



**U.S. Department of Labor (DOL)
Employment and Training Administration (ETA)**

**Green Jobs and Career Pathways:
An Arranged Marriage in Service
to a 21st-Century Workforce Development System**

Prepared by:
Ellen Scully-Russ, Ed.D.
The Center for the Study of Learning
The George Washington University
Washington, DC

This paper was funded, either wholly or in part, with Federal funds from the U.S. Department of Labor, Employment and Training Administration (ETA) under Contract Number DOLB101A21547. The contents of this publication do not necessarily reflect the views or policies of the Department, nor does mention of trade names, commercial products, or organizations imply endorsement of same by the U.S. Government. This paper was one of three prepared under the 2010 ETA Research Papers Program, which competitively awarded funding to conduct original research and prepare scholarly papers on topics relating to the workforce investment system.

Acknowledgments

I am grateful for the support of a professional team of researchers at the GWU Center for the Study of Learning. This study would not have been possible without the valuable contributions of Dr. Lesley-Anne Pittard, Post-Doctoral Research Fellow; Vinod Narayan, Research Fellow; Christiane Connors, Research Assistant; Maura Frederick, Research Assistant; and Ethel Williams, Research Assistant.

I would also like to thank the directors, staff, and partners of Vermont Growing Renewable Energy Efficiency Network (Vermont GREEN) and the Renewable Northwest (ReNW), the two energy training partnerships examined in this study. I am honored by their support and willingness to share their early start-up experiences with the research team.

Finally, I'd like to thank Heinrich Hock of Mathematica Policy Research and Michelle Ennis of the U.S. Department of Labor's Employment and Training Administration for helpful comments and feedback on the research design and the analysis. Their insights and suggestions have greatly enhanced this study; however, any omissions or weaknesses are the result of my analysis.

Table of Contents

	<u>Page</u>
List of Tables	iv
List of Figures.....	vi
Executive Summary	1
Context.....	1
Green Jobs.....	2
Career Pathways.....	3
Green Jobs Career Pathways: An Arranged Marriage	4
Research Design and Methods.....	5
Findings.....	7
Implications for Policy and Practice.....	11
Chapter 1: Introduction	14
An Arranged Marriage? Career Pathways and Green Jobs	15
Definition of Key Terms	21
Green Jobs.....	21
Career Pathways.....	21
Sector Partnership	22
Overview of the Report.....	22
Chapter 2: Literature Review: Green Jobs	23
Green Jobs: Convergence of Multifaceted Movements and Causes.....	26
Defining Green Jobs	29
The Nature of Work and the Dynamics of the Green Labor Market	37
Implications for Government Policy and Intervention	42
Implications for Workforce Development	49
Chapter 3: Literature Review: Career Pathways	52
The Trajectory of a 21st-Century Workforce Development System	52
The 1980s: The Emerging Agenda	52
The 1990s: Building the Policy Framework	54
The 2000s: Scaling Up.....	55
2011 and Beyond	57
Career Pathways Frameworks and Planning Processes	60
Education Career Pathways Model	63
Adult Career Pathways Model	69
Workforce Development Career Pathways Model	72
Empirical Studies of Career Pathways.....	76
Summary of Career Pathways.....	80
Chapter 4: Research Design.....	82
Purpose and Research Questions	82

Data Collection	83
Data Analysis	88
Limitations of the Study.....	89
Chapter 5: Vermont Growing Renewable Energy/Efficiency Network (Vermont GREEN)	92
The Case Context.....	94
The Green Industry Sector in Vermont.....	96
The Vermont Education and Workforce Development System.....	98
Vermont GREEN Strategy and Programs.....	100
Partnership Outreach and Networking Activities	100
Three-Pronged Program Development and Delivery Strategy	101
Vermont GREEN Training and Certification Programs	103
Vermont GREEN Early Start-up Experiences.....	106
Stakeholder Green Experiences	106
Stakeholder Interaction and Relationships Within Vermont GREEN	111
Start-up Challenges and Strategies.....	115
Stakeholder Perceptions of the Vermont GREEN Career Pathways Model.....	124
Stakeholder Perceptions of Vermont GREEN Trainees	127
Findings: Vermont GREEN.....	127
Finding 1: Quality of Partnership—Solid and Evolving Position of Vermont GREEN.....	128
Finding 2: Synchronization—Training Out Ahead of Job Creation	129
Finding 3: Emergence of a Workforce Development Career Pathways Model.....	130
Finding 4: Nature of Jobs—Green Jobs as Good Jobs.....	131
Chapter 6: Renewable Northwest (ReNW)	133
Case Context.....	134
The Green Industry Sector in the Northwest Region.....	134
The Workforce Development and Education System.....	137
ReNW Partnership Strategy and Programs.....	140
Four-Pronged Development and Delivery Strategy	140
ReNW Partner Coordination Strategy.....	144
ReNW Training and Certification Programs.....	145
ReNW Early Start-up Experiences	146
Stakeholder Green Experiences	147
Interaction and Relationships Within ReNW.....	156
Start-up Challenges and Strategies.....	160
Stakeholder Perceptions of the ReNW Career Pathways Model	169
Stakeholder Perceptions of ReNW Trainees.....	171
Findings: ReNW	174
Finding 1: Decentralized Nature of the ReNW Sector Partnership	174
Finding 2: Synchronizing the Labor Market.....	175
Finding 3: Multiple Career Pathways Models	176
Finding 4: Evolving Nature of Green Jobs	178

Chapter 7: Discussion and Cross-Case Analysis of Green Job Career Pathways	179
Stakeholder Experiences and Needs	180
Employers	180
Educators.....	187
Workforce Development Representatives.....	191
Cross-Case Comparisons	194
The Quality and Nature of the Sector Partnership	195
The Challenges and Strategies for Synchronizing the Green Jobs Labor Market	198
The Career Pathways Models in Use	200
The Nature of Green Jobs	203
An Arranged Marriage: Implications for Literature on Career Pathways and Green Jobs.....	206
Literature on Career Pathways	207
Literature on Green Jobs	211
An Arranged Marriage: Green Jobs Career Pathways	214
Implications for Workforce Development Policy and Practice	218
Policy	219
Practice.....	222
Conclusion	225
References.....	227
Appendix A: Converging Paths on the Road to a 21st-Century Workforce	
Development System.....	241
The 1980s: The Emerging Agenda	241
The 1990s: Building the Policy Framework	249
The 2000s: Scaling Up.....	264
Appendix B: Advisory Board Members	277
Appendix C: Energy Training Partnerships Meeting Study Criteria	278
Appendix D: Research Protocol	282
Appendix E: Green Jobs Grantees.....	288

List of Tables

		<u>Page</u>
E-1.	Green Jobs Definitions.....	3
E-2.	Types of Career Pathways	4
E-3.	Synthesis of Findings.....	7
2-1.	Perspectives and Conceptual Frameworks on Green Jobs.....	30
2-2.	BLS Green Jobs Framework.....	35
2-3.	Examples of Jobs in the O*NET Green Jobs Framework	36
2-4.	Examples of U.S. Federal Green Economic Development Programs and Resources	47
2-5.	Green Jobs Education and Workforce Development Challenges	50
3-1.	Features of the Emerging Workforce System.....	58
3-2.	Current Education and Workforce Development Challenges.....	59
3-3.	Career Clusters Recognized by the Office of Vocational and Adult Education and the National Association for State Directors of Career Technical Education Consortium.....	61
3-4.	General Characteristics of Three Career Pathways Models	62
3-5.	Summary of League’s Education Career Pathways Features	66
3-6.	High-Leveraged Strategies to Help Low-Waged Workers Achieve Credentials	70
3-7.	Hinckley and Hull’s Sequenced Career Pathways Framework	70
3-8.	Process and Features of Workforce Development Career Pathways.....	74
3-9.	Comparison of DOL 2011 Career Pathways SGA Required Elements and Features of Career Pathways Models in Literature Review	78
4-1.	Interview Sample by Industry Sector per Site	86
4-2.	Interview Themes for Each Group.....	87
5-1.	Vermont GREEN Training and Certification by Training Provider.....	104
5-2.	Vermont GREEN Infrastructure Challenges and Strategies.....	115
5-3.	Vermont GREEN Synchronization Challenges and Strategies	118
5-4.	Vermont GREEN Workforce Challenges and Strategies	120
5-5.	Vermont GREEN Resource Administration Challenges and Strategies.....	122
5-6.	Features of Vermont GREEN Career Pathways Model.....	125
5-7.	Vermont GREEN Case Findings	128
6-1.	ReNW Training and Certification by Training Provider	145
6-2.	ReNW Infrastructure Challenges and Strategies	160
6-3.	ReNW Synchronization Challenges and Strategies.....	163
6-4.	ReNW Workforce Challenges	165
6-5.	ReNW Resource Management and Administrative Challenges and Strategies.....	168
6-6.	ReNW Case Findings.....	174
7-1.	Summary of Employers’ Experiences and Needs in Green Industry	181
7-2.	Employers’ Jobs Impacted by Greening of Work, Required Training and Certification, Providers.....	186
7-3.	Summary of Educators’ Experiences and Needs in Green Industry.....	188
7-4.	Workforce Development Green Jobs Agenda and Supports	192

7-5.	Case Findings.....	195
7.6.	Comparison of ETP Training Programs with Career Pathways Features Found in the Literature.....	207
7-7.	Propositions about Green Jobs Career Pathways Presented to the Nine Interviewees.....	210
7-8.	Features of Green Jobs in the Literature as Affirmed or Disconfirmed by Each Case.....	213
7-9.	Structural Change in Firms and Education Programs in This Study.....	215
7-10.	Lessons Learned.....	219
A-1.	National Education Goals for the Year 2000.....	249
A-2.	Eleven Energy Training Partnerships Meeting Study Criteria.....	278

List of Figures

	<u>Page</u>
3-1. Timeline of Major Education and Workforce Development Reforms, 1980-1990	53
3-2. Timeline of Major Education and Workforce Development Reforms, 1990-2000	55
3-3. Timeline of Major Education and Workforce Development Reforms, 2000-2011	56
3-4. Career Pathways Template	67
3-5. Career Pathways System.....	68
5-1. Career Pathway for Renewable Energy Technology in Oregon.....	170

g

Executive Summary

This qualitative case study explored the early start-up experiences of two recipients of the Employment and Training Administration's (ETA) Energy Training Partnerships (ETP) in states applying the career pathways model to reform career and technical education.

Context

In response to mounting pressures to mitigate the carbon footprint of nations and to stimulate economic growth and recovery, recent worldwide government investment in the development and dissemination of clean, carbon-neutral technologies has been unprecedented. Indeed, when the 2007 recession hit, the U.S. government looked to the green economy as a source of innovation, economic growth, and skilled job creation. New government investments in green markets and green workforce development were in part justified by the promise that the outlay would result in green jobs that provide a livable wage and advancement opportunities for working people.

At the same time, the career pathway model emerged as a workforce development innovation that draws upon the last 30 years of experience to leverage large-scale statewide reform of education and workforce development systems. Each specific pathway develops as diverse and often disconnected institutional actors come together with industry stakeholders to contribute their existing resources to create a new education, training, and certification framework that reflects the hierarchical nature of work within an industry. Industries, particularly emerging industries like those that make up the new green economy, can use the process to develop a new labor market with built-in structural opportunities that help individuals advance as they engage in higher levels of education.

This report presents the findings of a comprehensive review of the literature on green jobs and career pathways which identified the propositions about the promise of green jobs and career pathways to reform both work and education in ways that provide low-wage workers with new career opportunities. It also reports on the results of a qualitative study of the early start-up experiences of two of the Department of Labor ETPs, Vermont Growing Renewable Energy/Efficiency Network (Vermont GREEN) and Renewable Northwest (ReNW), which examined whether and how green jobs and career pathways were resulting in new career opportunities for workers. This executive summary includes an overview of the propositions about green jobs and career pathways, the findings of the study, and the implications for workforce development policy makers and practitioners.

Green Jobs

The nature of green jobs and their labor market trajectory remain highly contested topics in the labor market literature. Though it is commonly understood that green jobs are in some way related to improving, protecting, and maintaining the environment, there is still no agreed-upon framework that can delineate the basic characteristics of green jobs, determine the nature of the work, and establish methods for capturing this information and for counting green jobs.

Despite the conceptual and practical challenges in defining and counting green jobs, green jobs do exist and they can serve as a model to explore the impact of evolving green technologies and practices on the nature of work and the dynamics of the green labor market. Indeed, the literature presents three definitions of green jobs, each in some way helping to promote a particular framework for what counts as a green job. These definitions, which include the industrial, the occupational, and the normative definitions, are found in Table E-1.

*Table E-1
Green Jobs Definitions*

Type	Definition
Industrial	The work is essential to the products and services that improve the environment and/or the job involves work in green economic activity
Occupational	The extent to which green economic activity and technology shape occupational demand and work requirements
Normative	Jobs that improve the environment and provide good wages, equal opportunity, and pathways out of poverty

Career Pathways

The career pathways models emerged in part as a strategy and framework to address many of the challenges facing education today. The framework represents a serious test to the conventional way education and workforce development are currently organized. Calling for an open system of education based on the principle of lifelong learning that provides continuous access to relevant education and training, it moves people from where they are developmentally and in their skill sets to the next step on their career or education pathway. Education is no longer curriculum driven; rather, it is driven by the needs of learners and real-life demands of the society, community, occupation, and/or industry.

According to the literature on career pathways, the model developed as a range of public systems came together with industry stakeholders and pooled resources to create a new education, training, and certification framework to reflect the hierarchical nature of work within an industry. Educators can use the process to improve education by integrating rigorous academic standards with relevant technical training. Industries, particularly emerging industries like those that make up the new green economy, may use the process to develop a new labor market that provides low-skilled workers with entry-level jobs linked to advanced education and career opportunities.

Three types of career pathways models or frameworks are found in the literature: the education career pathway, the adult career pathway, and the workforce development career pathway (see Table E-2). These models share a common vision for a sequenced, articulated series of education and work experience that provides a coherent pathway from education to a rewarding career (Lewis, 2008), each however emphasizes different interests.

*Table E-2
Types of Career Pathways*

Model type	Definition
Education	Aims to reform education by connecting all institutions and programs to a continuum of lifelong learning to prepare students and workers for the next level of education and/or career.
Adult/Bridge	Extends the education model to provide for the needs of adults who face significant barriers to postsecondary education and employment. A wide range of agencies pool resources to coordinate and integrate developmental and technical education and reduce the time it takes to earn a valuable credential.
Workforce Development	Stresses the alignment of all workforce development systems and integration with economic development activities to build new training infrastructure to support targeted industries and provide workers with access to good jobs with career opportunities.

Green Jobs Career Pathways: An Arranged Marriage

Advocates for the green career pathways model put forward the idea that the need for new training and certification programs in emerging green jobs requires employers, educators, and workforce development practitioners to reform career and technical education and align it with the needs of a 21st-century workforce. Equally, employers in the emerging green market must also reconsider their workforce strategy, upgrade technology and work organization, and improve the conditions and the long-term career opportunities for low-waged workers. An underlying assumption in this argument is that as education aligns more closely with the needs of industry, the organization and use of skills within the firms that make up the industry will also

become more aligned with each other. This new job structure will result in new career ladders that link advanced education and credentials to real opportunities for mobility and advancement within and between firms.

The argument made by these advocates is that there is a tremendous opportunity for government intervention to negotiate an arranged marriage between career and technical education and the emerging green jobs labor market to foster job growth and to better align the needs of industry and workers in a complex and continuously changing economy. As employers engage across an industry and interact with educators and workforce development programs, each stakeholder will face the need to make structural change that will result in demand-driven education, as well as new career structures in the workplace. Together these structural changes will build new opportunity and educational structures that are more aligned with the way people work and learn in the 21st-century economy.

Research Design and Methods

This qualitative study examined the arranged marriage proposition that green jobs career pathways will modernize the education system and build new opportunity structures into the labor market by examining the early start-up experiences of two U.S. Department of Labor ETP grant recipients applying different career pathways models. It explored the proposition of each partnership, whether and how stakeholders experienced a need to make systemic changes, and the numerous challenges each faced.

The selected ETPs were located in states that were using a career pathways model to reform career and technical education and made reference to the use of career pathways and/or career competency models. Two grant recipients were selected to participate in this study, and together they represented significant differences in the mix of stakeholders, the targeted

industries, the programs offered, and the delivery strategy. This variation was sought to explore two very different sets of early start-up experiences. Data were primarily collected through document review, contextual analysis, and interviews. Data from each interview were compared with data from other interviews in each peer group, in each site, and then across the two sites. Although there were several limitations to this study related to the small sample size in each case, the study drew thick descriptions of the two ETPs and detailed the challenges, concerns, needs, and hopes of the selected grant recipients relative to their early start-up experiences.

The two sites studied were as follows:

- **Vermont Growing Renewable Energy/Efficiency Employment Network (Vermont GREEN)**, which was formed in January 2010 based on a \$4.8 million ETP grant to Central Vermont Community Action Council. Vermont GREEN is a diverse public-private venture organized to prepare workers for careers in the energy efficiency and renewable energy industries and offers counseling and case management, training that leads to industry certification, and placement in green jobs for Vermont residents.
- **Renewable Northwest (ReNW)**, which was formed in early 2010 based on a \$5 million ETP grant to Oregon Manufacturing Extension Partnership. ReNW is a public and private partnership in the renewable energy industry that involves six counties in Oregon (Clackamas, Multnomah, Marion, Polk, Washington, and Yamhill) and three contiguous counties in Washington (Clark, Cowlitz, and Wahkiakum). Its mission is to grow the region's renewable energy industry, infuse sustainable manufacturing practices into its supply chain, and develop workers with the skills required to work in the green energy industry.

Findings

The case material was much too limited to affirm or disconfirm the proposition that green jobs and career pathways foster developmental change to education and work. However, there is evidence to suggest that educator and employer interaction has benefits to both, which were widely recognized by the participants in this study. The main findings from the two cases fell into four categories, related to the quality and nature of the emerging sector partnership, the labor market, the emerging career pathways model, and the quality and nature of jobs (see Table E-3).

Table E-3
Synthesis of Findings

Variable	Vermont GREEN	ReNW
The quality and nature of the sector partnership	Emerging network aiming to build a centralized institution to engage private-public partners in creating a new green economic and workforce development infrastructure in the state; the central organization brokers resources to deliver services to workers and employers with little program-level interaction among the stakeholders	Decentralized network of stakeholders who directly engage each other in a preexisting and evolving green economic and workforce development infrastructure to develop multiple programs and initiatives
Challenges and strategies for synchronizing the green jobs labor market	Training is out ahead of job creation	Short-term concern that training is out ahead of job creation, coupled with long-term optimism that ReNW's economic development strategy will deliver new green jobs
Career pathways model in use	Workforce development career pathways model disconnected from credit-granting education	Multiple models: education and workforce development career pathways models
The nature of green jobs	Some green jobs are good jobs, with the potential to increase skill and wages and provide training and advancement opportunities	Green jobs have some good qualities, but the seasonal nature of the jobs leads to unstable employment with few external mechanisms to facilitate job transitions

The Quality and Nature of the Sector Partnership. The major difference in the nature of the two partnerships was that Vermont GREEN appeared as a new institutional entity, whereas ReNW was more of a region-wide planning process among preexisting institutions in the region. These differences seemed to matter for how the stakeholders interacted with each other in the process of developing the strategies, programs, and services funded by the ETP grant. In both cases, structural change was observed in the workplace and the education system as a result of green jobs and career pathways development. This change seemed to be related to contextual factors, including but not limited to those factors created by the structure and nature of the ETP.

The Vermont GREEN ETP emerged as a centralized institution with a mission to connect and engage public and private partners to advocate for new policies and build a new strategy to support the green sector in the state. Stakeholders interacted at the strategic level, and the ETP brokered and coordinated the delivery of programs. The structural change that was observed in the workplace and the education institution was related to the new regulatory and customer demands placed on the employers as they entered into new green markets, and not to their interaction in the ETP.

On the other hand, in ReNW the formal institution of the ETP was background to the activities of a decentralized network of workforce and economic development institutions already engaged in a variety of green and other economic and workforce development projects, which the grant was focusing on the renewable industry. ReNW appeared as a funding mechanism to build and enhance the capacity of other institutions in the region to collaborate to meet the needs of the renewable sector. In this context, change in the workplace and in the

education program was occurring to accommodate the demands of the new green training and certification that was under development through the ETP.

These differences in the nature and quality of the partnership may have been related to the different contexts. ReNW is located in a region that has benefited from long-term investment to align workforce development, education, and economic development. For example, the region was a recipient of a Department of Labor WIRED grant that aligned resources and created a spirit of collaboration among agencies and programs. In addition, the Oregon community college system had aligned all green programs and certificates, and the state was working on a new green career pathways. This infrastructure created a context which provided both resources and relationships that eased the program development process and created openness to change.

Vermont, on the other hand, lacked a systematic infrastructure, and it may be argued that the purpose of the grant was to bring together the stakeholders to create a support infrastructure for the green industry sector in the state. Though there was some evidence that structural change was resulting from stakeholder interaction in the ETP programs, there were multiple external restrictions and requirements related to the stakeholders' move into the green sector that appeared to be very significant to the internal changes that were improving the quality of green jobs and green jobs training programs. For example, state and federal grants came with imposed wage standards, and new markets and customers demanded that workers' skills be upgraded.

These findings seem to indicate that the productivity of the marriage of green jobs and career pathways will depend upon many more contextual factors than just the interaction among educators and employers.

Challenges and Strategies for Synchronizing the Green Jobs Labor Market. It appeared that the workforce development strategy in ReNW allowed for closer coordination

between the green jobs and the green training programs than the Vermont GREEN strategy allowed, again due to the differences in the developmental state among the two partnerships. Vermont GREEN was training workers and building new training programs for anticipated jobs, whereas ReNW was working with employers to train workers for jobs that already existed. It remains to be seen whether there will be need for this new training once the current demand for skilled workers is met with the first few rounds of training.

Career Pathway Model in Use. The study also found evidence of the education and workforce development career pathways model in use across the two samples. As the available support services and developmental programs were not integrated into the career and technical training offered by the two ETPs, there was no evidence of the adult career pathways model in either case. This finding disconfirms the proposition that green jobs career pathways result in pathways out of poverty for low-skilled workers because the bar was set very high for entry into the green education and training programs offered by these two partnerships.

The Nature of Green Jobs. The three definitions of green jobs, including the industrial, the occupational/process, and the normative, were operating in both cases. The green jobs offered by the employers in these two cases were different. The Vermont GREEN employers were both manufacturers, and the ReNW employers were both in the renewable installation and repair industry. Though these different industries resulted in different working conditions that affected the nature of green jobs, this study also found similarities across the two sites in the participants' perceptions of some of the essential qualities shared by all green jobs. For example: (1) green jobs are intrinsically rewarding because they provide an opportunity to contribute to an improved environment and quality of life in a community, (2) green jobs provide workers with opportunities to develop valuable skills and to enter and advance in a stable and rewarding career

because they require broad occupational knowledge and technical skills; (3) green industries and green jobs in non-green industries are poised for long-term growth and are predicted to become a source of meaningful and secure employment in the future.

Implications for Policy and Practice

Therefore, the study puts forth three implications for policy and three implications for practice.

Policy 1: A Formative Role of External Regulation in Improving Job Quality. The influence of the multiple external factors on green job quality affirms the proposition in the literature that new government investments in the green industry may also enhance social benefits, to include increased wages and opportunities for advanced training. In Vermont GREEN, where the two employers interviewed for this study did not directly interact with the educators and others in the partnership, the external requirements imposed by customers for increased quality and by the government economic development funds for a minimum wage helped to change the jobs for the better. In this study, the workforce development policies that provide resources to employers to hire and train workers were also accompanied by minimum standards for pay and the quality of training, and these requirements seemed to have an impact on the quality of the new jobs inside the two firms.

Policy 2: A Formative Role of Investments in an Integrated Workforce and Economic Development Strategy in Creating a Demand-Driven System. The investment of public job training funds would be greatly enhanced if recipients were required to target industries and then synchronize workforce development with economic development activities and services to employers. It appeared that the ReNW partnership had more capacity to synchronize the supply and demand side of the labor market. This capacity resided in the

preexisting WIRED infrastructure, which connected education and workforce and economic development in the region, which allowed the ETP to leverage more resources and gave it more flexibility to respond to the fluctuations in the labor market.

Policy 3: A Formative Role of State and Local Education and Workforce

Development Agencies in Creating Partnerships and Responsive Programs. Long-term development of green career pathways in the Oregon community college system, coupled with the WIRED investments in the region's workforce development system, created the context and provided the framework for collaboration and innovation in ReNW. In addition, the workforce development system in Vermont played a formative role in creating the conditions and in forming the relationships required to bring about a successful ETP grant. This institutional actor is focused on the long-term sustainability of the ETP by working to provide valid data, expanding the partners involved in the initiative, seeking additional funding, and linking the partnership to broader workforce and economic development activities in the state. These cases suggest the need for an active role of the state education agency, as well as local education and workforce development agencies and programs. These roles should be encouraged in national policies and programs.

Practice 1: Build a Responsive System Through the Flexible Application of Best-Practice Models. The large differences between these two successful ETP grantees suggest the need for flexibility in the local application of best-practice models such as sector partnerships and career pathways. Indeed, these models may only be effective if they are allowed to emerge from within local conditions and circumstances.

Practice 2: Use the Tension Between the Need for Short- and Long-Term Training to Build New Pathways. Tension existed in both cases between the need to deliver short-term,

effective training for employers and the need to deliver the longer-term training required to prepare workers with the occupational skills required for the new green specialty jobs emerging in their regions. Workforce development practice can be enhanced by a more nuanced understanding of the value of short-term training for individuals as well as the broader workforce development system. Although broad general education is more important in the 21st century, effective short-term training, strategically linked to formative efforts in an area industry, can have a powerful effect if properly positioned and managed.

Practice 3: Build New Capacity to Respond to the Needs of Green Jobs/Industries by Connecting Existing Resources. Though there have been many calls for a national framework to organize and validate good green jobs training and certification, this study found that there is great potential in working locally to build a new green jobs workforce development infrastructure, which later may be connected with other efforts to create a broader organizing framework. A new national framework for green training and certification will only be effective once there is sufficient local understanding and valuing of green credentials. Until a critical mass of educators and green employers use green training and credentials, there is little practical experience upon which to judge the value of the credentials that currently exist. Workforce development practitioners can play an important role in educating employers and educators about the current local resources they tap, adapt, and expand to meet local needs.

Chapter 1:

Introduction

This paper reports on a qualitative study of the early start-up experiences of two U.S. Department of Labor (DOL) Employment and Training Administration (ETA) energy training partnership (ETP)¹ grant recipients in states applying a career pathways model to reform the educational system. This study explored the interaction of employers and educators in the start-up phase of a green jobs career pathways framework. A strong proposition in the literature on the green jobs career pathways is that the career pathways model will not only modernize the education system, but will also build new opportunity structures into the emerging green jobs labor market. It is assumed that a new integrated system that links the emerging job structures to a systematic series of education and credentialing will emerge to fortify green-collar workers against the structural inequities and insecurities that have come to characterize lower- and middle-skilled work in the global economy. It is also assumed that the new integrated work and learning system will provide low- and middle-skilled workers with access to continuous education that will ensure them more job security, and that new career ladders will emerge in the workplace to provide them with access to higher-skilled and better-paying jobs.

The purpose of this study was to examine how the model was being applied in the two ETPs and its perceived early impacts for key stakeholder groups, including employers and the broader education and workforce development system. The study explored the propositions in the literature on green jobs career pathways by examining the employer-education interaction in

¹ Please see the following on the grant competition and awards: <http://www.doleta.gov/grants/pdf/SGA-DFA-PY-08-18.pdf>; http://www.doleta.gov/pdf/ETP_SGA_Award_Summaries_120409.pdf; <http://www.doleta.gov/grants/awards/SGA-DFA-PY-08-18-Awardees.cfm>. Accessed 12/10/10.

the development of a workforce development system to promote green job skills. Particular attention was paid to whether and how these two key stakeholders experienced a need to make systemic changes to work structures and to educational programs as a result of their involvement in a green jobs career pathways workforce model. The study also examined how these stakeholders were navigating the challenges and opportunities the career pathways model presented to the internal, firm-based labor markets and the educational system.

The findings showed how the early start-up experiences of each partnership differed across the context of each case, including whether an infrastructure (such as a Workforce Innovation in Regional Economic Development (WIRED) grant) was in place and the status of the career pathways model with the state community college system. The Vermont GREEN ETP was an emerging network aiming to build a centralized institution, whereas Renewable Northwest (ReNW) was a decentralized network of stakeholders who directly engaged each other. They faced numerous challenges, one being concern about training being out ahead of job creation. In addition, the ETPs used different career pathways models. Findings from the interviews also challenged some of the propositions about the potential for green jobs to provide pathways out of poverty for low-skilled, low-waged workers. Further, they described a process of retrofitting existing jobs with new specialty skills to take on new green-related work rather than creating “new” jobs. Nevertheless, the study showed that green jobs were skilled jobs that offered meaningful work with advancement opportunities to workers.

An Arranged Marriage? Career Pathways and Green Jobs

For the past three decades, the relationship between education and the American workforce has demanded higher expectations for learning among non-college-bound youth and incumbent workers. Indeed, it was nearly 30 years ago when, in his book *The Neglected*

Majority, Dale Parnell (1985) examined the experience of the majority of U.S. youth whom he called “ordinary students.” He argued that these students were being shortchanged by a focus within the system on the needs of high- and low-performing students. Parnell envisioned a system of education that would establish new pathways to success for the middle 80 percent of students who did not aspire to a bachelor’s degree. Though the 4-year degree had become a new gold standard in society, there was little proof that a bachelor’s degree was required for labor market success. In fact, 80 percent of people with an associate’s degree or some college earned as much as those with a bachelor’s degree (Beebe & Walleri, 2005, <http://www.cccrp.org/images/CCJBeebeWalleriArticleFinal.pdf>). While *A Nation at Risk* (National Commission on Excellence in Education, 1983, <http://www2.ed.gov/pubs/NatAtRisk/index.html>), *The Forgotten Majority* (Parnell, 1985), and *The Forgotten Half* (Halperin, 1988a, 1988b) set forth an agenda for education reform, officials at the Labor Department began to examine the relevancy of the nation’s labor market policies and programs.

The policy debates of the early 1990s turned to what was needed to help employers, workers, and communities shift to this new model called high-performance work systems. Though the model demanded fewer workers, it required a new kind of worker, one who was more skilled and who was willing and able to continuously learn. By the year 2000 and according to *Workforce 2000* (Johnston & Packer, 1987), the U.S. economy would be more reliant on the service sector than manufacturing for new jobs and for economic growth. Success in this transition would require at least two things: increased productivity in this service sector and a workforce with medium to high levels of education and skills to fill the growing number of technical and professional jobs in these industries (Benner, 2002; Osterman, 2001).

By the mid to late 1990s, the U.S. economy was growing and creating new jobs. Research showed that the labor market had become increasingly bifurcated, so some of these new jobs resembled the skilled and continuously learning jobs described above, whereas others were low-skilled, contingent work that offered little opportunity for learning and advancement (Appelbaum & Batt, 1994; Houseman, 1995). At the same time, new ‘work-first’ welfare reforms were being put into place that limited access of the poor to the postsecondary education that had become increasingly important to accessing the higher-paying, more secure jobs in the emerging labor market (Jacobs & Winslow, 2003; Mazzeo, Rab, & Eachus, 2003, http://www.workforcestrategy.org/images/pdfs/publications/WSC_workingtogether_12.1.06_3.pdf). The workforce development system was challenged to develop new strategies to help the poor secure good jobs in the changing political-economic environment.

Dresser and Rogers (1999) observed deep structural flaws in the U.S. labor market and public workforce development system that made it incapable of bridging this gap. On the supply side, the public workforce development system consisted of a byzantine maze of decentralized training programs that had “grown into being over more than a century of political conflict over the appropriate role of government in human capital formation” (p. 276).

The demand side was equally disorganized because employers did not engage across a sector to establish common skill standards and invest in workforce development (Dresser & Rogers, 1999). In addition, many argued that there was no real need for the public education and workforce systems to organize around employer skill requirements. Despite the rhetoric of the skills gap and the increased demand for knowledge workers, the empirical evidence did not support the claim that U.S. employers were moving to broader engagement of highly skilled workers (Appelbaum, Bernhardt, & Murnane, 2003; Bernhardt, 1999; Cappelli, 1997). A new

sector-based model for workforce development emerged to address these gaps. This model represented an innovation to the workforce development system because it provided a new structure that brought together a wide range of regional stakeholders to ‘fashion’ a regional workforce and economic development infrastructure that crossed and connected the demand and supply sides of the labor market (Giloith, 2004).

Today, sector partnerships serve as a platform for the career pathways model and address the need to reform the U.S. education and workforce development systems. One might argue that the career pathways model is an innovation that draws upon the 15 years of sector partnership experience to leverage large-scale statewide reform of education and workforce development systems. The career pathways model is a rationalized sequencing framework that links education and training with work experience and credentialing to provide work-based stepping stones that allow individuals to move in and out of education and work to build higher-level skills and expertise. Each specific model develops as diverse and often disconnected institutional actors come together with industry stakeholders to contribute their existing resources to create a new education, training, and certification framework that reflects the hierarchical nature of work within an industry. Industries, particularly emerging industries like those that make up the new green economy, can use the process to develop a new labor market with built-in structural opportunities that help individuals advance as they engage in higher levels of education. In some cases (Stephens, 2009, http://www.workingpoorfamilies.org/pdfs/Career_Pathways_Report.pdf), and according to many policy advocates (Jenkins, 2006, http://www.workforcestrategy.org/images/pdfs/publications/WSC_pathways8.17.06.pdf; White, Dresser, & Roger, 2010, <http://www.cows.org/pdf/rp-greenerkills.pdf>), the model results in a new demand-driven education and workforce development system that is more responsive to the

needs of employers and more accommodating of the wide variation in the ways individuals sequence their education and work experience.

Around the same time the sector model emerged, climate change and other ecological threats created new economic pressures and opportunities to minimize the environmental impacts of economic activity (Stead & Stead, 2009). New technologies and new markets focused on greening the economy could change the requirements and conditions for some jobs. For example, many skilled trades are requiring new specialty skills in use of new equipment, tools, and materials associated with green construction (U.S. Department of Labor, 2009, http://www.doleta.gov/oa/pdf/Greening_Apprenticeship.pdf). Some have argued that these new green jobs could provide a source of good jobs for many low- to mid-skilled workers because they have low barriers to entry yet are linked to a career ladder that provides low-skilled workers with opportunities to learn and advance in careers (Anderberg, 2008; van Lier, Woodrum, & Gordon, 2010; Pinderhughes, 2007).

When the 2007 recession hit, the U.S. government looked to the green economy as a source of innovation, economic growth, and skilled job creation, which fostered new government investments in green markets and green workforce development.

Yet the labor market trajectory of the so-called ‘green jobs’ and the nature of these jobs remain highly contested topics in the labor market literature. An Occupational Information Network (O*NET)² report on the greening of work (Dierdoff et al., 2009, p. 112, <http://www.onetcenter.org/reports/Green.html>) provided a context for the green jobs debate: (1) green jobs are in some way related to improving, protecting, and maintaining the environment,

² While discussed again later in this paper, the O*NET system is the nation’s primary source of occupational information and contains a database of over 900 occupations, including green occupations (<http://www.onetonline.org/>).

and (2) the rush to invest in green jobs has outpaced attempts to develop a concept of what it means to be green. This conceptual challenge frustrates attempts to delineate the basic characteristics of green jobs, determine the nature of the work, and establish new methods for capturing this information and for counting green jobs. The new calls for lifelong learning, structural change in industry and the labor market, concerns for the environment, and attempts to stimulate new green markets and jobs are all trends and dynamics that must be grappled with to develop an effective green jobs career pathways model (Goerner, Dyck, & Langerroos, 2008; White et al., 2010). Advocates for the green career pathways model put forward the idea that the need for new training and certification programs in emerging green jobs requires employers, educators, and workforce development practitioners to reform career and technical education and align it with the needs of a 21st-century workforce. Equally, employers in the emerging green market must also reconsider their workforce strategy, upgrade technology and work organization, and improve the conditions and the long-term career opportunities for low-waged workers. An underlying assumption in this argument is that as education aligns more closely with the needs of industry, the organization and use of skills within the firms that make up the industry will also become more aligned with each other. This new job structure will result in new career ladders that link advanced education and credentials to real opportunities for advancement and mobility within and between firms.

The argument made by these advocates is that there is a tremendous opportunity for government intervention to negotiate an arranged marriage between career and technical education and the emerging green jobs labor market to foster job growth and give rise to a 21st-century workforce development system that is more aligned with the needs of industry and workers in a complex and continuously changing economy. The next two chapters, green jobs

and career pathways, explore these arguments as well as the government policies and programs that are providing new incentives and new resources to link the emerging green economic sector to efforts to reform and improve the U.S. education and workforce development systems. In turn, this study focuses on this complex set of relationships between education reform, workforce development, and other implications associated with the greening of America.

Definition of Key Terms

Although career pathways and green jobs are the focus of this report, it is important to clarify how these terms and concepts are utilized and explored throughout this study. Further, there remains a high level of debate and discussion around defining green jobs and career pathways, as they are a reflection of the economy of our modern social and economic contexts.

Green Jobs

It is commonly understood that a green job is in some way related to improving, protecting, or maintaining the environment. However, there are also differences in how the basic characteristics and the nature of green jobs are described and categorized. Three categories of green jobs are articulated in the labor market literature: the normative, the industry, and the occupational or process definition (see Table 2-1).

Career Pathways

The career pathways model is a rationalized sequencing framework that links education and training with work experience and credentialing to provide work-based stepping stones that allow individuals to move in and out of education and work to build higher-level skills and expertise. Each specific model develops as diverse and often disconnected institutional actors

come together with industry stakeholders to contribute their existing resources to create a new education, training, and certification framework that reflects the hierarchical nature of work within an industry. Three types of career pathways models or frameworks are found in the literature: the education career pathway, the adult career pathway, and the workforce development career pathway (see Table 3-3).

Sector Partnership

A sector partnership is a workforce and economic development model that provides a flexible and open structure to gather a wide range of stakeholders, including industry, employers, unions, educators, workforce development and economic development agencies, community organizations, and others to pool resources and ‘fashion’ a demand-driven workforce development system that supports economic growth, lifelong learning, and social mobility.

Overview of the Report

In the forthcoming chapters, there are reviews of the relevant literature on green jobs (chapter 2) and the career pathways model (chapter 3). The research design and qualitative data collection and analysis strategies are addressed in chapter 4, and chapters 5 and 6 present the experiences of two recipients of ETP grants, Vermont GREEN and Renew Northwest. The final chapter discusses the findings and their implications.

Chapter 2:

Literature Review: Green Jobs

In response to mounting pressures to mitigate the carbon footprint of nations and to stimulate economic growth and recovery, recent worldwide government investment in the development and dissemination of clean, carbon-neutral technologies has been unprecedented. In 2009, the G20 governments invested a total of \$2.6 trillion to stimulate economic growth; roughly \$400 billion was invested in new clean technologies (Cleantech, 2009, <http://cleantech.com/about/pressreleases/040109.cfm>). The American Recovery and Reinvestment Act (ARRA) of 2009 invested upwards of \$110 billion in the emerging green economy. A partial list of the ARRA investment in the clean sector included \$25 billion in research and development in greenhouse gas mitigation options (U.S. Department of Energy, n.d., <http://www.energy.gov/environment/climatechange.htm>); \$400 million to overcome barriers to the development of new clean energy technologies (U.S. Department of Energy, n.d.); \$5 billion to retrofit low-income family homes, \$1 billion of which may be spent on education and training; and \$500 million to fund energy training partnerships (ETPs) to train workers for new and emerging green jobs (Bozell & Liston, 2010, <http://www.cccco.edu/Portals/4/EWD/BuildingEffectiveGreenEnergyProgramsinCCs.pdf>). This stimulus funding does not include the billions in new revenues that are likely to result from federal, state, and local consumer tax credits and regulations designed to build a new consumer market for green products and services.

After a decline in private investment in the clean economy in 2008 and 2009, venture capital investment in the industry rose in the first three quarters of 2010. Though the third quarter of 2010 saw new investments in transportation (\$208 million), biofuels (\$186 million),

and smart grid technology (\$163 million), the investments of American companies in the clean sector were down by 15 percent from the same quarter in 2009 (Cleantech, 2010, <http://cleantech.com/about/pressreleases/3Q10-investments.cfm>).

Government and community leaders hope that these public and private investments will help to revitalize the U.S. economy and put Americans back to work. Yet the public investment far exceeds the private investment in the clean energy sector, which has led some to question whether the shift to a clean energy economy will result in social as well as ecological benefits (Jones, 2008; Pinderhughes, 2007; Speth, 2010, <http://www.thesolutionsjournal.com/node/619>). Optimists project that a growing green sector will spark domestic job growth because it will create new market opportunities for producers who will hire new workers to meet the increased demand (Renner, Sweeney, & Kubit, 2008, http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf). At the same time, new clean equipment, products, and services will save money for the firms and industries that purchase and install them, freeing up new capital to invest in market innovations and improved performance that will lead to new jobs (Anderberg, 2008; van Lier et al., 2010). Pinderhughes (2007) raised questions about the nature of the benefit as well as which communities and individuals would benefit from these jobs:

Who will benefit from current and future investments . . . ? Will investments in green economic development reinforce existing patterns of social and racial inequity by primarily creating new green business opportunities for the wealthy, new consumer choices for the affluent and new workforce opportunities for adults with relatively high levels of education and skill? Is it possible to structure investments in green economic development so that they bring new opportunities and benefits to low-income people and communities? (p. 13)

The unparalleled public investment in the development of a new industry to feed new economic markets has given rise to calls for a broader policy and ethical framework within

which leaders and communities can plan, manage, and evaluate these investments. Indeed, Pinderhughes (2007) and others (Bozell & Liston, 2010; Jones, 2008; Renner et al., 2008; Speth, 2010) suggest that the emerging green economy offers a historic opportunity to rethink the basic purposes, relationships, ethics, structures, policies, and practices that constitute the U.S. political economy. Jones (2008) called for a New Green Deal in which government partners with eco-entrepreneurs, community advocates, and civic leaders to protect the environment while providing all workers with access to decent work and economic justice. Many argue that the greening of the economy offers a dual promise to protect the environment and provide decent work for all (Renner et al., 2008).

The social opportunity of a green economy lies in the emergent character of green jobs because the structure, nature, and scope of this new labor market are malleable and open to influence from a variety of interests and stakeholders. Consequently, green jobs offer workforce development policy makers and practitioners a rare opportunity to examine not only how workforce development programs can be used to prepare workers for jobs in emerging industries, but also whether and how workforce development resources, programs, and strategies can affect the nature of emerging work as well as the structure of individual opportunity. The literature review that follows shows that this developmental relationship between workforce programs and the emerging labor market is reciprocal. This review found that the new resources and interest in workforce development to support the new green economy is providing incentive for the multiple stakeholders and actors in the U.S. workforce development system to rethink and restructure their programs and modernize their strategies and delivery systems to better align with the needs of the 21st-century workforce and economy.

This section examines the environmental, social, and political-economic context that is giving rise to the new green economy and green jobs. Literature on the challenges of defining green work and green jobs as well as the dynamics of the green labor market is also reviewed. In addition, policy recommendations for the role of government in ensuring the social and economic promise of green jobs are discussed. Finally, the implications of the new green economy for workforce development and for the education and training of the workforce are identified.

Green Jobs: Convergence of Multifaceted Movements and Causes

The political-economic debate about climate change has focused on an inherent conflict between the environment and the carbon-based economy (Renner et al., 2008). Recently, however, this debate has shifted to include attention to the social dimensions of sustainable development and its implications for a variety of issues and concerns, to include economic development and job creation, national security, social and environmental stewardship, and morality (Anderberg, 2008; Speth, 2010; Goerner et al., 2008).

The political-economic debate is in part played out in the research and policy reports on the green industry and green jobs. A key proposition underlying this literature is that many of the world's complex problems share a common cause: social inequity. Today, the concentration of wealth in the U.S. equals that of the period leading up to the Great Depression (Kumhof & Ranciere, 2010, <http://www.imf.org/external/pubs/ft/wp/2010/wp10268.pdf>). The total share of the income of the top 5 percent of the income distribution increased from 22 percent in 1983 to 34 percent in 2007. This pattern is the same as the one leading up to the Great Depression, when the share of the income concentrated in the top 5 percent rose from 24 percent in 1920 to 34 percent in 1928 (Kumhof & Ranciere, 2010). Some argue that the rise in social inequity

compromises the environment, the economy, and the democratic processes of nations because it undermines the social cohesion required for people to rise to a common cause (Jones, 2008; Speth, 2010).

Jones (2008) explored the link between social inequity and concerns for environmental quality. He noted that while there is an increasing concentration of wealth in America, 22 percent, or one in five Americans, hold poverty-wage jobs (Jones, 2008). The social-economic impacts are pervasive. Nearly 15 million, or 29 percent of American families, are living 200 percent below the federal poverty line, and 42 percent of minority families are low income (White & Walsh, 2008). Jones argued that environmental trends and their negative impacts are related to society equity. Our overreliance on fossil fuels puts seven tons of carbon into the environment every year, and Jones believes that some communities experience more consequences than others. Jones (2008) discussed the ecological haves and have-nots, where only a small segment of society can afford to lead eco-friendly lifestyles. Jones (2008) argued that a greener society will emerge only after all communities are granted full economic participation.

The theme of the dual crisis also underlies the philosophy of the United Nation's Environmental Programme (UNEP), which provides worldwide leadership to enable nations and peoples to improve the environment. Climate change and national efforts to adapt to and mitigate it will have far-reaching implications for people's consumption and production patterns. As nearly 1.3 billion people, or 40 percent of the world's workforce, live in poverty, this change implies both risk and opportunity to alter the conditions of the world's working poor (Renner et al., 2008). UNEP noted that green jobs must be decent jobs so that our efforts to improve the environment will also help to reduce poverty.

Speth, a co-founder of the National Resources Defense Council and environmental advisor to Presidents Carter and Clinton, called for a new environmentalism that locates a variety of environmental and social problems in rampant consumerism and the “society-wide commitment to growth at all costs” (Speth, 2010, p. 34). He argued that a movement that will drive people to form a “post-growth society” is required to give rise to an economy that moves beyond consumerism. Speth (2010) predicted that the recession will teach people to live more simply and will lead society to question its values and reexamine its priorities. This reflection may cause us to reexamine the purpose of a modern economy. Opportunity exists to build a more inclusive policy framework that would shift from a market-driven to a people-centered developmental model in which jobs would be created based on the social priorities of improving the environment and social well-being of nations (Speth, 2010).

Speth (2010), Jones (2008), and the authors of the UNEP report (Renner et al., 2008) are hopeful that the dual crises of the environmental degradation and worldwide economic recession will bring together a multifaceted coalition of governments, environmentalists, eco-entrepreneurs, community advocates, civic leaders, and others to build a new sustainable economy. A key tenet in their shared agenda is to ensure that green jobs are good jobs that will improve the environment while they also help to reduce poverty by providing gainful and decent work for the world’s poor (Renner et al., 2008).

These reports and other literature on green jobs are based on an optimistic premise that the promise of a new green economy lies not in its environmental and social impacts, but in the multifaceted coalition that has emerged to resolve the interrelated crises facing modern, global society (Anderberg, 2008; Renner et al., 2008; Speth, 2010). “Only a society that is cohesive and fair is likely to rise to share the challenge of the environment” (Speth, 2010) and a

worldwide economic recession. Thus, the hope is that what emerges from these efforts is a more democratic society.

The stakes in this broad social endeavor are high. Efforts to mitigate climate change will affect different communities in different ways. Some may have to adopt new carbon-neutral lifestyles, while others may need to learn to adjust to changing weather patterns (Renner et al., 2008). In addition, significant money is being invested in uncertain markets and in the design and delivery of workforce development and job training programs to prepare workers for jobs that do not yet exist. Consequently, multiple interest groups are pushing for a definition or a perspective on green jobs that favors their position or cause (Anderberg, 2008). Sorting through the often ideological debates complicates the task of building a high-wage, high-performance labor market that can support the industry while also providing quality jobs that provide access and advancement opportunities to workers from across the skills spectrum. The influx of federal education and training resources into communities to help create a new green workforce has intensified these debates (Bozell & Liston, 2010). The analytical task of establishing a common framework to define green jobs is an imperative (Anderberg, 2008; Dierdoff et al., 2009).

Defining Green Jobs

The massive public investment in green technologies and industries is motivated in part by the political aim to jumpstart the economy and create jobs. The politicians and government officials who are responsible for the policy decision to invest in the green economy and jobs are feeling pressure to show a return on the public investment. They are accountable to deliver a significant number of green jobs. Thus, a central political question at the moment is defining how many new green jobs have been created as a result of the ARRA investments in the green economy. This question begs a more fundamental question: *What is a green job?*

Table 2-1 summarizes the three different definitions of green jobs that are found in the labor market literature: the normative, the industry, and the occupational or process definition. Though there is some overlap between these definitions, each has different implications for whether and how specific jobs should be counted as green jobs.

Table 2-1
Perspectives and Conceptual Frameworks on Green Jobs

Normative	Industrial	Process/Occupational
<p>“Well paying, career track jobs that contribute directly to improving or enhancing environmental quality. . . . Range from low skilled, entry level to high skilled, high paid jobs, and include opportunities for advancement in both skill and wages. . . . Tend to be local work transforming and upgrading the immediate built environment and natural environment. . . . Simply put, if a job improves the environment but doesn’t provide a family-supporting wage or a career ladder, . . . it is not a green job” (Gordon, Hays, Walsh, Hendricks, & White, 2008, p. 3).</p> <p>“Green jobs should also aim to fight poverty as well as pollution, provide good wages, equal opportunity, and pathways to success and job creation” (Gregson, 2010, p. 7).</p>	<p>“A green job is one in which the work is essential to products or services that improve energy efficiency, expand the use of renewable energy, or support environmental sustainability. The job involves work in any of these green economic activity categories:</p> <ul style="list-style-type: none"> • Renewable Energy and Alternative Fuels • Energy Efficiency and Conservation • Pollution, Waste, and Greenhouse Gas (GHG) Management, Prevention, and Reduction • Environmental Cleanup and Remediation and Waste Cleanup and Mitigation • Sustainable Agriculture and Natural Resource Conservation • Education, Regulation, Compliance, Public Awareness, and Training and Energy Trading” (Workforce Information Council Green Jobs Study Group, 2010, pp. 4-5) 	<p>“Green activities have different effects on different technologies. A more prudent approach is to focus on the ‘greening’ of occupations, which is defined as the extent to which green economic activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work or worker requirements” (Dierdoff et al., 2009, p. 4).</p> <p>. . . The problem is that green economic activities are not dichotomous, either or, rather they are continuous, occurring in degrees that vary across industries, firms, establishments, and projects. Only measurable outcomes of discrete work activities can serve as criteria for evaluating green” (Anderberg, 2008, p. 27).</p>

Indeed, it appears that there is only one area of general agreement related to the definition of a green job, which is that green jobs are in some way related to improving, protecting, and

maintaining the environment (Dierdoff et al., 2009). The basic characteristics of green jobs, the nature of the work, and the methods for capturing this information and for counting green jobs are conceptual challenges that remain the subject of debate in the economic and labor market literature.

There are several conceptual and practical challenges to defining a green job (Dierdoff et al., 2009), including a lack of common nomenclature (Anderberg, 2008), difficulty in separating green from non-green jobs in green industries (Anderberg, 2008; Workforce Information Council Green Jobs Study Group, 2010, <http://www.workforceinfocouncil.org/Documents/WICGreenJobsStudyGroupReport-2009-10-01t.pdf>; White & Walsh, 2008), the nascent and emerging nature of green technologies and practices (Dierdoff et al., 2009), and the lack of a conceptual framework to organize various green concepts and activities (Workforce Information Council Green Jobs Study Group, 2010).

There is no understanding of green that is shared by the variety of industries and professional fields that are involved in the emerging industry. Experts from across the economy talk about green differently, and they do not share a common vocabulary for discussing the implications for new green technologies and practices on the work people do within their industry. A common nomenclature about green jobs is required before labor market experts can develop an accurate count of green jobs and the demand for green workers (Anderberg, 2008; Dierdoff et al., 2009).

At the same time, there are also many challenges in differentiating green from non-green jobs within an individual sector or professional or occupational area. Green activities and technologies have different effects on the various occupations that are involved in the work of an industry (Dierdoff et al., 2009). Just because a job is within a green industry or a green

workplace does not necessarily mean that it can be counted as a green job. In addition, the greenness of a specific job may vary widely across different workplaces. Thus, just because a job is within an occupation or an occupational cluster with high potential to be green does not mean that all jobs in the occupation can be counted as green jobs. Green, some argue, is closely tied to specific tasks that individuals perform in their daily routines, and work routines can vary widely across firms and occupations, even in the same industries (Anderberg, 2008; White & Walsh, 2008).

Dierdoff et al. (2009) argued that one challenge in defining green jobs lies in the way labor market experts traditionally go about defining and then counting all jobs, including green jobs. Traditional labor market information systems are organized around industries and their outputs. Jobs are linked to the products that are produced by the firms within which they reside. Auto manufacturing is a case in point. All jobs in auto manufacturing, including engineering, production, management, and administrative, are counted as auto jobs. This approach will not work in accounting for green jobs for two reasons. First, many production firms are adding new green products to a broader product line, so not all jobs in their firms can be linked to the new green product or service, but then again, it is very difficult to account for those specific jobs that are linked to the new product or service. Second, many new green jobs are embedded in broader industries whose output cannot be designated as green. Firms are adopting new green practices to become more internally efficient and to improve their own work processes. Since their product or service is not designated as green, the jobs associated with these new processes and practices cannot be counted.

Another challenge to counting green jobs is that many green technologies and practices are too new, or they have not been broadly recognized in past labor market studies, so little is

known about their occupational impacts. More knowledge is needed about how green technologies and practices affect the nature of work and worker requirements within all industries before nomenclatures and methods can be devised for counting the number of green jobs in the U.S. economy (Anderberg, 2008; Dierdoff et al., 2009). In other words, a conceptual framework is required to capture the various ways to conceptualize a green job and to explain the impact of the greening of work on worker requirements and employment demands across all industries (Dierdoff et al., 2009; Workforce Information Council Green Jobs Study Group, 2010). First, the features of the emerging green context must be established (Dierdoff et al., 2009). Afterwards, labor market analysts can begin to lay out and evaluate the efficacy of the competing definitions and the variety of methods for counting green jobs (Anderberg, 2008).

To this end, two DOL agencies, the Bureau of Labor Statistics (BLS) and the ETA, have undertaken significant research to support the development of a broad conceptual framework for defining, analyzing, and counting green jobs in the United States. The former framework is based on an industrial perspective and thus is closely linked to the industrial definition of a green job, whereas the latter approach, which is being undertaken through the O*NET system, is premised on the occupational or process definition of a green job. The normative definition, which espouses that green jobs should have a social value, can apply to either an industrial or process definition or perspective.

The BLS framework is directed at gathering information on the number and distribution of green jobs, as well as the labor market conditions for this sector. The information will support policy development and evaluation as well as provide ongoing information to support research on the impact of green economic activities on the labor market. The framework uses two approaches to collecting and organizing data on green jobs. The BLS defines green jobs as jobs

that either produce goods or provide services that benefit the environment or conserve resources or jobs that help to make industries and establishments more environmentally friendly. As it is not assumed that all jobs in industries that are producing green goods and services and/or using new green technologies and processes are green jobs, a framework was devised to identify which jobs within each establishment in the industry were indeed green jobs. The BLS framework, which is based on the North American Industry Classification System and the Standard Occupational Classification, will identify those jobs that directly contribute to the production of green goods and services and jobs associated with making the establishment's processes more environmentally friendly. Thus, the green jobs in the BLS framework will be jobs related to either green outputs or green processes across all sectors (see Table 2-2) (Workforce Information Council Green Jobs Study Group, 2010).

Rather than focusing on counting the number of green jobs, O*NET is focused on determining the effects of new green outputs and processes on the nature of work and worker requirements. Literature and surveys on the number of green jobs, such as the BLS project, cannot describe the workforce development implications of the emerging green labor market. O*NET is filling this gap with research on how the greening of work is affecting existing as well as giving rise to new and emerging occupations across all industries.

Table 2-2
BLS Green Jobs Framework

Category	Output jobs Jobs in industries that provide goods and services that benefit the environment or conserve natural resources	Process jobs Jobs in which workers' duties involve making production processes more environmental friendly or conserve natural resources
Renewal energy: electricity, heat, fuel generated from renewable sources	Jobs related to output in the areas of wind, biomasses, geothermal, solar, ocean, hydropower, landfill gas, municipal solid waste	Jobs related to processes in the areas of wind, biomasses, geothermal, solar, ocean, hydropower, landfill gas, municipal solid waste
Energy efficiency	Jobs related to products and services that <ul style="list-style-type: none"> • Improve energy efficiency, e.g., energy-efficient equipment and appliances, buildings, and vehicles • Improve the efficiency of buildings and the efficiency of storage and distribution of energy (smart grid technology) 	Jobs that <ul style="list-style-type: none"> • Use technologies and practices that improve energy efficiency • Relate to cogeneration (combined heat and power)
Pollution reduction and removal, green house gas reduction, and recycling/reuse	Jobs that offer products or services that <ul style="list-style-type: none"> • Reduce, eliminate the creation of, or release pollutants or toxic compounds • Remove pollutants or hazardous waste • Reduce greenhouse gas emissions through methods other than renewable energy generation and energy efficiency (nuclear) • Reduce or eliminate the creation of waste materials • Collect, reuse, remanufacture, recycle, or compost waste or wastewater 	Jobs that use technology and practices to <ul style="list-style-type: none"> • Reduce, eliminate the creation of, or release pollutants or toxic compounds • Remove pollutants or hazardous waste • Reduce greenhouse gas emissions through methods other than renewable energy generation and energy efficiency (nuclear) • Reduce or eliminate the creation of waste materials • Collect, reuse, remanufacture, recycle, or compost waste or wastewater
Natural resource conservation	Jobs that offer products or services that conserve natural resources: i.e., related to organic agriculture and sustainable forestry, land management, soil, water, wildlife conservation, storm water management	Jobs that use technology and practices related to organic agriculture and sustainable forestry; land management; soil, water, or wildlife conservation; and storm water management
Environmental compliance, education, training, and public awareness	Jobs that focus on <ul style="list-style-type: none"> • Enforcing environmental regulation • Providing education and training • Increasing public awareness of environmental issues 	

O*NET identified 12 main categories of green jobs, which are found in Table 2-3. This framework is used to capture green jobs and place them in three categories according to impact of green product lines, technologies, or processes: (1) increased demand: green activities increase the demand for a job which remains relatively unchanged; (2) enhanced skills: green activities

alter or enhance the tasks, skills, knowledge, and credentials for an existing occupation, but the basic nature of the occupation remains the same; (3) new and emerging: green activities create

Table 2-3
*Examples of Jobs in the O*NET Green Jobs Framework*

Category	Increased-demand occupations	Enhanced-skills occupations	New and emerging occupations
Renewable energy generation	Power distributors and dispatchers, power systems operators	Power plant operators, electrical engineers, continuous mining machine operators, geological sample test techs, mechanical engineers	Designers, technicians, operators, installers, and sales personnel
Transportation	Fuel-related jobs, engineers, lawyers, researchers	Railroad conductors, locomotive engineers, auto specialty techs, transportation managers, electrical engineers	Fuel cell engineers and techs, auto engineers and techs
Energy efficiency	Electric power line installers and repairers, engineers, boiler operators, boilermakers	HVAC mechanics and installers, mechanical engineers	Technicians to weatherize or seal buildings
Green construction	Carpenters, electricians, cement masons, concrete finishers, welders, cutters, solders, blazers	Construction managers, civil engineers, construction building inspectors (involved in installing and inspecting greener building materials)	Perhaps energy engineers, who develop ways to reduce energy costs
Energy trading	Financial analysts, financial services sales agents		Specialists in trading or analyzing carbon credits and analyzing and purchasing energy
Energy carbon capture and storage	Geologists, pipeline designers, pipeline maintenance staff		Specialists in carbon capture and sequestration systems
Research, design, and consulting services	Engineers, business consultants, sales personnel, marketing professionals, financial analysts, geoscientists	Financial analysts, sales representatives, geoscientists	Marketers for green products or services, researchers and engineers for green technologies
Environmental production	Environmental scientists, natural sciences managers	Environmental engineers, hazardous materials removal workers, environmental engineering techs, atmospheric and space scientists, soil and water conservationists	Specialists in water resources, redevelopment of brownfields, analysis of climate change, certification of environmental quality, and industrial ecology
Agriculture and forestry	Agriculture workers and inspectors	Farmers and ranchers, landscape architects, agriculture techs	Specialists in precision agriculture and biomass farming
Manufacturing	Drilling and boring machine tool setters, operators, tenders	Industrial engineering techs, electrical engineering techs, machinists, occupational health and safety techs	Biochemical manufacturers, microsystems engineers, and photonics specialists
Recycling and waste reduction	Recyclers, waste management professionals	Plant and systems operators, refuse and recyclable materials collectors	Specialists in sustainable design, recycling, and reclamation, recycling coordinators

Category	Increased-demand occupations	Enhanced-skills occupations	New and emerging occupations
Governmental and regulatory administration	Agriculture inspectors	Soil and water conservationists, environmental engineers	Consultants in sustainability, air quality control, gas emissions

the need for unique work and worker requirements that result in a new occupation relative to the O*NET taxonomy. O*NET is conducting research to future populate its database, which provides workforce and labor market information on all occupations contained within the Standard Occupational Classifications as well as new and emerging occupations (see the O*NET green jobs Web site at <http://www.onetonline.org/find/quick?s=green+jobs>). The 12 categories of green jobs, according to O*NET, relate to 64 increased-demand occupations, 60 enhanced-demand occupations, and 45 new and emerging occupations.

Together the two systems from the U.S. Department of Labor will provide a robust picture of the emerging green economy and labor market. BLS will provide data to determine the impact of the green economy on the number of jobs as well as basic labor market information such as wages and benefits. O*NET will complement this quantitative data with more detailed information about the current and future nature of green work.

The Nature of Work and the Dynamics of the Green Labor Market

Despite the conceptual and practical challenges in defining and counting green jobs, green jobs do exist and they can serve as models of the impact of evolving green technologies and practices on the nature of work and the dynamics of the green labor market. According to many analysts, these existing jobs help to validate the normative definition of green jobs (Gordon et al., 2008; U.S. Department of Labor, 2009; Jones, 2008; Pinderhughes, 2007; Renner et al., 2008) because they pay more than other jobs in the same skill range and they provide opportunities for meaningful work (Pinderhughes, 2007) that is difficult to outsource (Jones,

2008). Pinderhughes (2007) found that these trends held true for jobs at the lower end of the skill distribution. Though some studies disagree regarding the level of existing skills required to obtain an existing green job; however, by many accounts, green jobs are fairly accessible to people with less than a bachelor's degree (U.S. Department of Labor, 2009; Pinderhughes, 2007).

In a survey of employers in green industries and firms in the San Francisco Bay Area, Pinderhughes (2007) found that green jobs are relatively high-quality jobs with low barriers to entry. For example, these jobs provided an average wage of \$15.80 per hour—\$4.00 more than the living wage standard set by the City of Berkeley, CA, which is the highest in the country. In addition, many employers surveyed reported that they provided health insurance for workers and their dependents and offered job training and advancement opportunities for workers.

Pinderhughes (2007) also found, and others have confirmed (U.S. Department of Labor, 2009; Jones, 2008; Renner et al., 2008), that green jobs provide meaningful work because green jobs are associated with cleaning the environment and improving the quality of life so individuals believe that a green job provides them with an opportunity to make a positive contribution to society. This feature of green jobs is also cited as the reason why the greening of work is helping to attract youth and minorities to occupations in the skilled trades and advanced manufacturing, which have had difficulty recruiting them in the recent past (Gordon et al., 2008; U.S. Department of Labor, 2009).

Another purported positive characteristic of green jobs is that they are local jobs that are less likely to be outsourced to other countries. As Jones (2008) stated:

To green ourselves as a nation, much of the transformation will occur in our everyday lives from where we live, work, and how we get around. For this to occur, work in our communities and cities cannot be outsourced. Solar panels and wind turbines need to be

manufactured as close to the intended sites to fit a particular need and they need on the ground expertise to service. (pp. 10-11)

Though Pinderhughes (2007) found that employers hired individuals without degrees or postsecondary credentials and trained them for green jobs, other analysts and reports do not concur with this finding (Dierdoff et al., 2009; U.S. Department of Labor, 2009; Stone, 2010). For example, the U.S. Department of Labor's Office of Apprenticeship conducted a focus group of directors of apprenticeship training programs to discuss the greening of the skilled trade occupations. The consensus of the directors was that green jobs required education and experience in a trade and not just short-term training in a particular green technology or procedure. Job quality, workplace safety, and long-term career stability could only be assured if workers were prepared with the basic skills and knowledge of the occupation.

Stone (2010) shed light on the discrepancy in the literature regarding the minimal level of skill and education required by existing green jobs by noting that job requirements are linked to the particular labor market under investigation. Stone observed that although a variety of green jobs exist across the skills and educational spectrum, the jobs in great demand that are also expected to grow in the future are indeed middle-skilled jobs that require postsecondary education and, in many cases, a credential. Stone's (2010) research shows that "The largest number of green jobs is projected to be in occupations requiring professional certifications, apprenticeship training, or one or two years of post-secondary education" (p. 44).

Indeed, the normative argument for green jobs rests on whether green jobs actually will provide access to career-related training and well-paying career-track jobs to low-waged and low-skilled individuals. If the minimum entry requirement for a large portion of green jobs is set at the postsecondary level, then green jobs will not be well suited for low-skilled individuals who do not hold diplomas, certifications, or degrees. This is why advocates for the normative view of

green jobs also argue that government investment in green industries must be accompanied by job quality standards and training programs that provide low-wage workers with access to good entry-level jobs linked to ongoing job experiences, education, and training that will enable them to advance in a career. White and Walsh (2008) made the point that if green jobs are to result in both a stronger economy and a stronger middle class, then there must be a focus on job quality; “otherwise, day laborers will be installing solar panels without job security or proper training or health care” (p. 6). It remains to be seen whether green jobs will move low-skilled workers into the middle class and middle-skilled labor markets.

In addition to the outstanding questions related to the nature of work in green jobs, the impact of the scaling up of existing green jobs and the implications of emerging green technologies and practices in the labor market are still largely unknown (Renner et al., 2008). It is unclear whether and how green jobs will result in a gain in future net job growth. Indeed, examining the trends in green jobs without also accounting for the effects of green technologies and practices on the entire economy will provide misleading information about the potential implications of green jobs for the labor market. Gains in green jobs may be offset by job loss in other areas of the economy. For example, green energy may result in a drop in employment in the fossil fuel industries. Also, a decline in consumer demand for non-ecological-friendly products may lead to significant job losses in some sectors of the consumer products industry. The recession has slowed industry growth, and though some green-job growth has occurred, it is too slow and insignificant to contribute to an overall reduction in the number of people who are unemployed or underemployed in other industries today (Renner et al., 2008). Therefore, a broad analysis of the transformation to a green economy is required in order to determine the significance to the labor market (Renner et al., 2008).

Though it is unclear whether green jobs will emerge as a significant source of employment growth in the long term, some of the literature described a virtuous cycle of secondary job growth in the long term (Anderberg, 2008; Renner et al., 2008; Stone, 2010). As green technologies and practices become more distributed, the effect of the greening of work will “radiate out” beyond green sectors and begin to impact other industries (Renner et al., 2008). As other industries adopt or integrate green technologies and practices, they may also experience long-term energy cost savings and market advantages that can be reinvested in innovations and efficiencies that may lead to economic expansion and job growth in those sectors (Anderberg, 2008; Renner et al., 2008). Thus, growth in the green sector may stimulate growth across the entire economy because it helps to make all industries more sustainable (Renner et al., 2008).

However, several industries have indicated that they are being held back or they anticipate being held back in efforts to expand into the green sector by a labor shortage in their core jobs and functions. For example, the National Association of Manufacturers found in a survey that its members face moderate to severe skill shortages (Gordon et al., 2008). These are the same employers who must be relied upon to produce the green technologies and products that are required to green other sectors and occupations. Slow growth in manufacturing will mean slow growth in other green sectors of the economy. In addition, the utility industry, which must be relied upon to take renewable energy to scale, faces a significant shortage of technical workers, as nearly one-quarter of its workforce is eligible to retire in the next 5 to 7 years (Gordon et al., 2008; White & Walsh, 2008). Though the new workers that are required to meet these shortages will need certain green-related skills and knowledge, they must first possess the core expertise required to perform the basic jobs within these industries (Renner et al., 2008).

Green training programs will not result in the creation of new jobs. Training is important to ensure that workers have the skill sets to help companies move into the green economy or to adopt new green technologies and practices, but the availability of new skills will not in and of itself provide incentives to employers to create new green jobs (Anderberg, 2008; Gordon et al., 2008). New jobs or employment demand will only follow new market demand for green products and services.

The next section examines the current and potential role of government in stimulating the demand of new green markets and the development of new green industries that can respond to the demand and create new jobs.

Implications for Government Policy and Intervention

Government intervention into the marketplace is a controversial topic. However, one point that runs through the literature on green economic development is that the pressure to adopt new green technologies and practices is located in both environmental and a social concerns. The United Nations Intergovernmental Panel on Climate Change found that greenhouse emissions must be reduced by 50 percent to 85 percent by 2050 in order to limit the increase in the average world temperature (Governing Council of the United Nations Environment Programme, 2010, http://www.rona.unep.org/documents/partnerships/GreenEconomy/UNEP-GCSS-XI-10-add1-background_paper_on_GE.pdf). Achieving this target will take enormous worldwide cooperation and investment. The UNEP estimates that this effort could cost as much as \$45 trillion to replace the fossil-based technologies and infrastructure with low-carbon, renewable alternatives. This figure does not account for the economic and social cost of modifying consumption and production patterns around the world, nor does it consider the cost

of mitigating the disparate impacts that climate change and the transition to carbon-neutral technologies will have on industries and communities.

Together, the magnitude of the financial investment and the social impacts of both climate change and the transition to a new green economy portend a large, activist role for government. Indeed, market-based solutions alone will not deliver the new green economic infrastructure to the scale and at the speed required to change worldwide production and consumption patterns and deter environmental destruction (Renner et al., 2008). That said, however, government policies and investments cannot in and of themselves create new markets and build a new economy. Greening of the economy will take a balance of market-driven and public policy initiatives to bring green industries and workplaces to scale at the speed required to meet the carbon reduction goals set by the United Nations (Renner et al., 2008).

The green marketplace is relatively new in the United States. With no clarity about which of the many alternative technologies will emerge as the standard, venture capital investment is slow to invest in the research and development and infrastructure required to bring the industry to scale. Several competing alternative energy sources include, for example, wind vs. solar vs. biofuels or hybrid vs. electric automobiles (Anderberg, 2008; van Lier et al., 2010). The uncertainty over which of these technologies will emerge as leaders in the alternative energy marketplace makes investing in any one area risky for venture capital. In addition, the current recession has limited the amount of private capital available to launch these relatively new industries. Because green jobs are relatively new, it requires years of evaluation, development, and investment to better understand both the system and process of “greening” the economy. Government investment is viewed as warranted to stimulate the market and to continue its future development during this recessionary period. In other words, government

investment is seen as needed to keep momentum that is so important to launching an emerging industry, especially one that is viewed as having great potential as a future source of productivity and jobs.

Several argue that there is a role for government in socializing some of the risk associated with commercializing and bringing these new technologies to the market (Anderberg, 2008; van Lier et al., 2010). Suggested government intervention into stimulating the rapid development of large-scale production and consumption of alternative energy includes favorable and guaranteed tax policies aimed at stabilizing the market for alternative products and systems (Agrawal et al., 2007, http://www.league.org/league/projects/ccti/files/Systemic_Framework.pdf; Anderberg, 2008; van Lier et al., 2010); investment in upstream research and development in the knowledge and infrastructure capacity required to design, produce, and deliver green products at scale (Anderberg, 2008); and market-based incentives such as financial incentives from government and utilities for consumers to adopt new green products and install new systems to generate a large-scale market for green products.

The U.S. federal action to stimulate the development of the green marketplace has been wide and varied. ARRA and other federal programs have involved a total investment of \$240 billion in new green technologies and economic development (Anderberg, 2008; van Lier et al., 2010). This investment has added to the complex series of federal economic development initiatives, which include over 180 federal programs scattered across nine federal departments and four agencies as diverse as the Departments of Defense and Labor and the Small Business Administration, for example (Drabenstott, 2005, <http://ideas.repec.org/b/fip/fedkmo/2005arotfrire.html>; White & Walsh, 2008). No single department or agency is responsible for coordinating the economic development efforts of the federal government; in

addition, most programs are guided by the legislation that created them. The result is a highly fragmented system that is difficult to navigate (Drabenstott, 2005).

One federal initiative relevant to this study is the Green Jobs Act of 2007 and the ETA's ETP Solicitation for Grant Application which it generated. In 2007, Hilda Solis (D-CA), who currently serves as the U.S. Secretary of Labor, and John Tierney (D-MA) introduced to the 110th Congress H.R. 2847, The Green Jobs Act (GJA). GJA, Title X of the Energy Independence and Security Act, would utilize \$125 million a year to implement the Energy Efficiency and Renewable Energy Worker Training Program. This pilot program would amend the Workforce Investment Act of 1998. GJA is significant in that it cultivates a holistic and blended approach to addressing ecological climate issues. Further, it focuses on workforce development by way of "green pathways out of poverty" (van Lier et al., 2010). GJA aims to achieve the dual goal of an improved environment and social justice by building a skills pipeline into the green economy that will attract and train individuals who are underskilled, underserved, and underrepresented for good green jobs.

GJA was authorized to support five specific programs to "establish energy efficient and renewable energy worker training programs" (H.R. 2847, 2007, <http://www.govtrack.us/congress/bill.xpd?bill=h110-2847>). More specifically, it was authorized to cornerstone the National Research Program (10 percent); National Energy Training Partnership Grants (30 percent); State Labor Market Research, Information, and Labor Exchange Research Program (10 percent); State Energy Training Partnership Program (30 percent); and Pathways out of Poverty Demonstration Program (20 percent). These energy efficiency and renewable energy worker-training programs especially targeted persons "in need of updated training" in the energy efficiency and renewable energy industries, identified as veterans, unemployed workers, and at-

risk youth. The GJA directed the Labor Secretary to award ETPs on a competitive basis to nonprofit partnerships. The grantees would carry out training programs that lead to economic self-sufficiency and develop the energy efficiency and renewable energy workforce.

The national ETP funds, which are the subject of this study, are intended to provide training that prepares workers to enter the energy efficiency and renewable energy industries. The U.S. Department of Labor's ETA solicited grant applications for its ETP for fiscal year 2008-2018 in the total amount of \$500 million. The selection criteria included proposals for projects that were to be developed and implemented through strategic partnerships, affiliated with green occupations, within various industries. Appendix E displays a summary of SGA recipients, representing various partnerships, industries, and employers. Parties and programs eligible for training were aligned with private, not-for-profit organizations. The training was targeted toward those impacted by national energy and environmental policy, individuals in need of updated training related to the energy efficiency and renewable energy industries, and unemployed workers.

Table 2-4 lists examples of other federal programs supporting the green industry and the creation of green jobs.

Many of the federal green economic development policies and resources position state and local governments at the center of government efforts to stimulate a green economy. Thus, state and local leaders are pivotal to ensuring that the public investment in the new green industries will result in social as well as environmental and economic gains. Key to accomplishing these multiple ends is a coordinated approach to link economic and workforce development in ways that provide emerging industries with pipelines to skilled workers and provide community members access to good jobs and ongoing training in a sustainable career

(Anderberg, 2008; van Lier et al., 2010; Gordon et al., 2008; Pinderhughes, 2007; Renner et al., 2008).

Table 2-4

Examples of U.S. Federal Green Economic Development Programs and Resources

Program	Description
Energy Independence and Security Act of 2007	Broad legislation with many implications for green industries and employment. Increased fuel standards for automobiles and trucks; provided incentives for the development of advanced vehicle technologies, such as batteries and hybrids; provided \$10 million per year in competitive grants to improve the solar industry; provided funds for the development of new skill standards and certifications for workers in solar technology; provided \$2 billion per year to state and local governments to reduce fossil fuel use in the building, transportation, and other sectors, which could be used for home energy conservation programs (i.e., weatherization), the development of new building codes and efficiency standards, and retrofitting public buildings to make them more energy efficient (White & Walsh, 2008).
American Recovery and Reinvestment Act	Included \$110 billion in the development of energy efficiency, renewable energy, smart grid technology, advanced batteries, and high-speed rail to support new capacity building for product development and manufacturing and to foster new markets for green technologies and products (Anderberg, 2008; van Lier et al., 2010).
Grants from the Department of Energy	Grants provided home weatherization retrofitting to low-income homeowners; funded national accreditation and certification programs for the installation of solar systems (Anderberg, 2008; van Lier et al., 2010); invested ARRA funds into research and development in a broad range of technologies aimed at greenhouse gas mitigation, including high performance buildings, efficient manufacturing, advanced vehicles, clean biofuels, wind/solar/geothermal/nuclear power, carbon capture, advanced energy storage, and smart grid technology (U.S. Department of Energy, n.d.).
President's High Growth Initiative from the U.S. Department of Labor, Employment and Training Administration	Funded 11 projects in the energy industry, eight of the 11 WIRED regions targeting the energy sector, and the recent ETP grant for 25 sector partnerships to provide training and workforce development programs to prepare incumbent workers and others in new skills for green jobs (White & Walsh, 2008).

The green economic development literature suggests steps that states can take to achieve these aims. For example, analysts suggest that states support sector-based economic development strategies that promote local industries and support the development of skilled and good-paying jobs for local citizens (Dresser & Rogers, 1999; Renner et al., 2008; White & Walsh, 2008). States can use these partnerships to identify local priorities, set overarching economic and environmental goals (Renner et al., 2008), and define and target specific industries and green jobs that support these goals (White & Walsh, 2008). The use of data to drive this

analysis is highly recommended. Information on existing businesses, occupations, wages and working conditions of the jobs in the sector, the skill sets that are available in the region, and the education and training resources in the area can support the development of a comprehensive economic and workforce development initiative for economic and job growth in the region (Renner et al., 2008; White & Walsh, 2008). In addition, states can adopt policies and programs to stimulate the market demand for the targeted industry (Pinderhughes, 2007; Renner et al., 2008). Once specific industries have been identified and the economic development cycle has been initiated, states can collect information on the impact on of the economic development activities on employment and develop training programs to qualify residents for jobs. This final and important step will help to ensure an integrated economic development and workforce development framework to grow the green economy and ensure local residents have access to training and good jobs in an emerging industry (Renner et al., 2008).

Implications for Workforce Development

There is great hope that the green sector will be a source of significant job creation to help pull the nation out of the economic recession. The ARRA invested hundreds of millions of dollars in green job training programs as part of its support for economic development in the emerging green economy. Table 2-5 summarizes the significant challenges facing workforce development programs and practitioners in responding to the opportunity of the new federal investment in green worker education and training programs.

Table 2-5
Green Jobs Education and Workforce Development Challenges

Category	Challenges
Structure of green industry and jobs	The industry comprises small to mid-sized firms that are geographically dispersed and not well organized, and it is difficult to engage them in workforce development forums and programs (Bozell & Liston, 2010).
	Many green tasks are new specialty tasks to existing occupations, which are difficult to identify and codify for training purposes (U.S. Department of Labor, 2009).
	The emerging green jobs require broad education training in core occupational knowledge and skill, whereas federal job training dollars are earmarked for short-term training and job placement (Bozell & Liston, 2010).
Synchronization of industry with the labor market	The unsettled nature of the industry makes it difficult to identify which green sector will grow to be a significant source of jobs to drive public training programs (White et al., 2010).
	The availability of federal green job training funds potentially results in training programs that are out ahead of demand (White et al., 2010).
	There is a lack of common skill standards and consensus on meaningful credentials to drive employment decisions and the development of training (White et al., 2010).
Workforce development policies and strategies	Workforce development strategies respond to a labor market demand and to needs of jobs that already exist, whereas green jobs are evolving and it is difficult to predict the impact on job growth and worker skill requirements (Anderberg, 2008; U.S. Department of Labor, 2009).
	Federal job training is earmarked for the training and placement of low-skilled individuals and populations with barriers to employment, whereas over half of the green jobs require some postsecondary degree or credential (Bozell & Liston, 2010).
	Many federal job training participants do not have the basic skills required to succeed in green jobs training programs (Bozell & Liston, 2010).
	Though some green jobs do exist, there is no comprehensive career or certificate framework to guide the planning and/or integration of existing programs, curriculum, materials, and other training resources and to target gaps for future program development (Bozell & Liston, 2010; White et al., 2010).

It has been suggested that the enthusiasm and the investment in green economy provides real opportunity for the U.S. education and workforce development system to develop a comprehensive framework to upgrade the skills of the working poor while also creating a new

postsecondary education system to meet the needs of the vast majority of jobs and workers (White et al., 2010).

The next section turns to a discussion of career pathways, a workforce development framework that has emerged to link economic development, workforce development, and postsecondary education to better integrate and align work, learning, and credentialing in the emerging 21st-century labor market. This next discussion may bring new insight to help workforce development practitioners address these challenges to responding to the needs of the emerging green jobs sector.

Chapter 3:

Literature Review: Career Pathways

The career pathways model is an education and workforce planning framework that has gained prominence in federal and state workforce and educational policies and programs. This review begins by tracing the trajectory of the national debate and policy over the past 30 years that have helped shape the current-day education and workforce development system, with a summary of features and challenges of both systems. Each decade is visualized by a timeline, which highlights major education and workforce development reforms. The timelines also display major areas of focus for each system, generating a robust reform agenda totaling 30 years across five presidential administrations. A more thorough discussion of this history, including legislation and major initiatives by decades, is included in Appendix A. The second part of this review reports on the career pathways model developed by research and policy institutions with recognized expertise in career and technical education and workforce development.

The Trajectory of a 21st-Century Workforce Development System

The 1980s: The Emerging Agenda

The 1970s was a time of great social unrest in the United States, which brought to light systematic poverty and disparate educational outcomes for students, particularly for poor students of color (Vinovskis, 1999). At the same time, American communities were struggling to respond to the dramatic shifts in the American economy, which had resulted in the large-scale loss of middle-class manufacturing jobs (AFL-CIO Working for America Institute, 1998; <http://www.workingforamerica.org/actionbriefs/basics-01.htm>). A prevailing consensus had also

emerged in policy circles about the failing condition of American schools. A growing public concern for the quality of education and the growing recognition of the importance of education to individual and economic prosperity drove new educational reforms (see Figure 3-1) to focus on achievement and the introduction of Carl D. Perkins Vocational and Technical Education Act, which marked the new economy of vocational training.

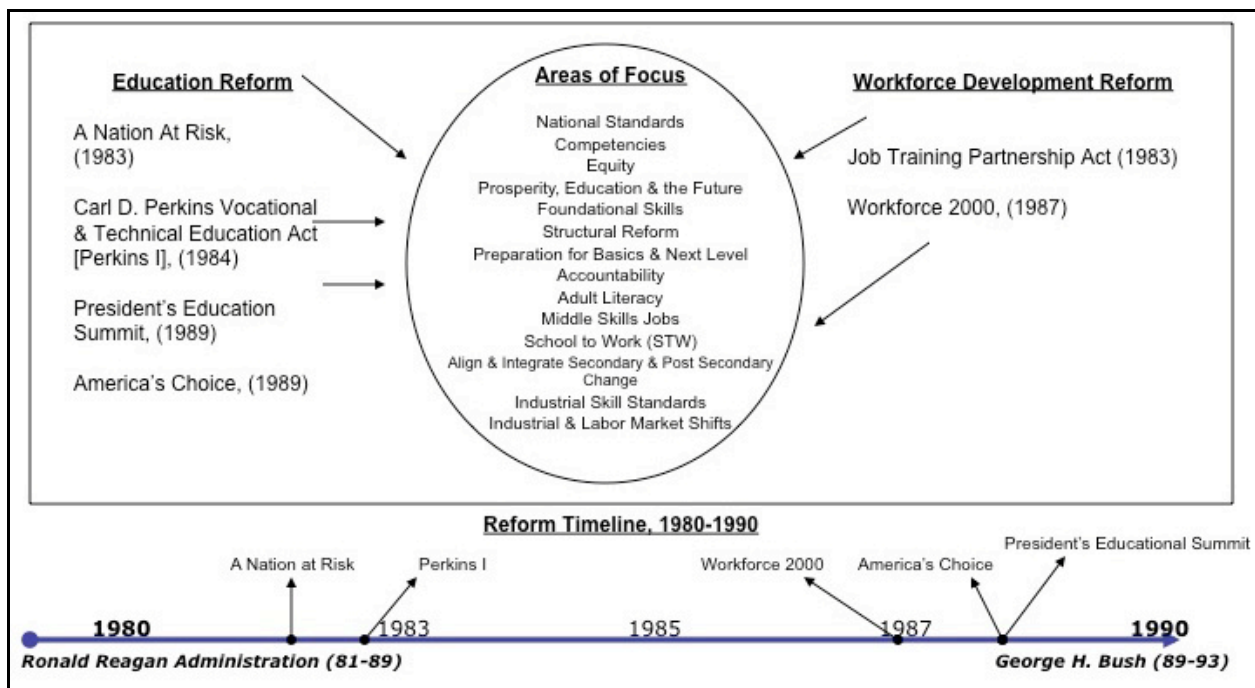


Figure 3-1. Timeline of major education and workforce development reforms, 1980-1990.

The public discourse shifted from the flaws in the education system to debates over how to improve it. Wonacott (2003) observed that a “new vocationalism” (Grubb, 1995) emerged which moved the vocational model away from training for a specific occupation to a broader education that prepared students for both work and further education in a society that had become more technically advanced.

This shift was bolstered by enhanced understandings about the changing nature of work articulated in Workforce 2000 (Johnston & Packer, 1987). The new economy would rely heavily

on a new class of worker with strong technical skills and the ability to continuously learn, and the skills and competencies needed for these jobs could largely be achieved through the attainment of a postsecondary credential. By the end of the 1980s, a context for reform that linked improvements in education to the future of democracy and economic prosperity was clearly established.

The 1990s: Building the Policy Framework

In the early 1990s, the public policy debate over a 21st-century system of education and workforce preparation shifted from a focus on the supply side of the labor market to issues related to the demand side. Many had begun to conclude that the traditional “mass production” work system prevalent throughout the U.S. industrial economy had become a significant barrier to competitiveness and employment security for workers (Appelbaum & Batt, 1994; Bluestone & Bluestone, 1992; Carnevale, 1991; Marshall & Tucker, 1992). Labor market analysts and workforce advocates called for new supports and incentives to help American employers to adopt new high-performance work systems that utilized advanced technology and worker skill to compete on quality.

This decade of educational and workforce development reform was focused on increasing educational achievement and enhanced vocational training, workforce opportunity, and technical skills required to move employers to a reliance on a skilled workforce (see Figure 3-2). Perkins II charted the agenda for the new vocationalism. Federal funds were concentrated on strategies and programs that integrated vocational and occupational education in order to improve educational outcomes for all students.

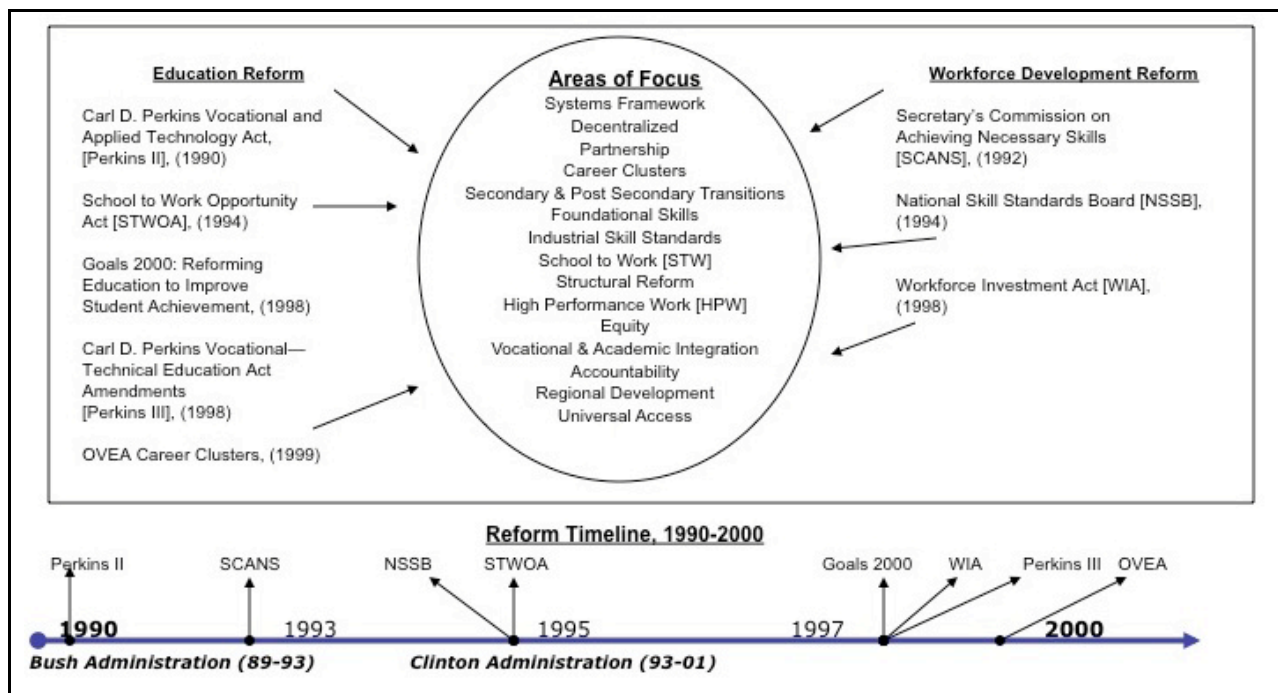


Figure 3-2. Timeline of major education and workforce development reforms, 1990–2000.

New initiatives, such as the National Skills Standards Board, and organizing frameworks, including the Office of Vocation and Adult Education’s (OVEA) career clusters, emerged to codify the skills requirements of industries and occupations and to ensure the setting of rigorous academic standards to drive the development of a more relevant education system. It was at this point that career pathways emerged as a new mechanism to bring occupational standards and proficiency levels into the academic curriculum and assessments in schools.

The 2000s: Scaling Up

The early 2000s brought new attention to local models aimed at improving career and technical education in the U.S. (see Figure 3-3). Communities and industries began to experiment with the creation of multiemployer labor market institutions to improve alignment and coordination between firms sharing similar skill sets and drawing from the same labor

market (Bernhardt & Bailey, 1997; International Labour Organization, 2002; Plastrik, Seltezer, & Taylor, 2003, <http://www.aecf.org/upload/publicationfiles/changinglabormarkets.pdf>).

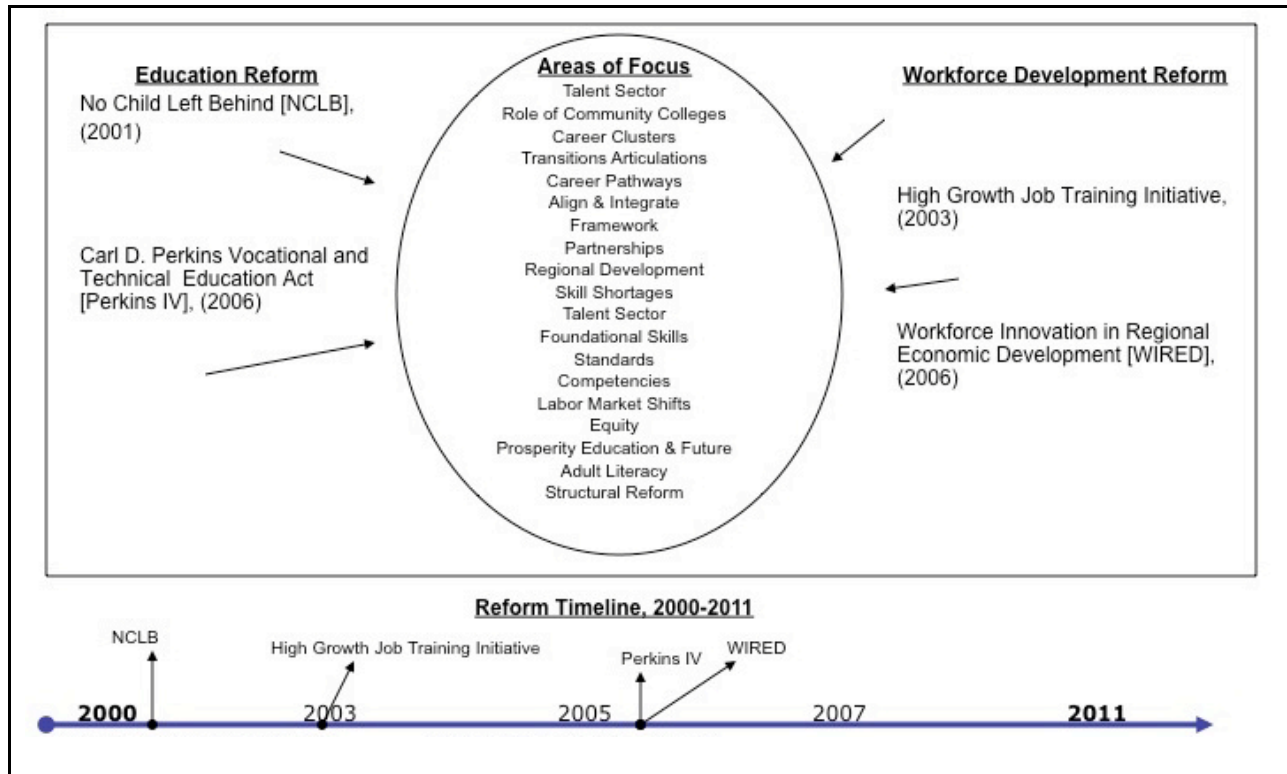


Figure 3-3. Timeline of major education and workforce development reforms, 2000–2011.

These new sector-based and regional labor market partnerships emerged to tackle a number of workforce and high-performance work system transition issues: training, setting skill standards, forming hiring halls, joint benchmarking, disseminating best practices, and other activities that firms were unwilling or unable to engage in on their own. The partnerships helped companies pool their resources with government agencies and private funders to address gaps in the labor market, improve the internal performance of individual firms, and offer new employment and advancement opportunities to workers.

By 2010 the regional and sector partnerships emerged as a prime vehicle for engaging employers and delivering workforce programs in local communities. Many of these initiatives

incorporated the 30-year experience and the growing understanding of what works to meet the skill demands of employers and prepare and support the ongoing learning of individuals who work in the 21st-century knowledge occupations (Baran, Michon, Teegarden, Giordond, & Lodewick, 2010, <http://nfwsolutions.org/sites/default/files/2009-10%20National%20Evaluation%20Report-FINAL.pdf>). The community college has emerged as a pivotal actor in the new system, as it lies at the nexus of secondary and postsecondary education, academic and technical education, postsecondary and higher education, and school and work. Employers and industries in some communities are more organized and more knowledgeable about their workforce needs, and thus they are strong advocates of education and workforce development. The workforce development system has become more integrated into the political economy of regions. Characteristics of the emerging workforce and education systems are summarized in Table 3-1.

2011 and Beyond

Early in the development of the 21st-century workforce development system, it was widely recognized that public schools and the workforce development system needed to do a better job at preparing youth for work and supporting lifelong learning among the adult population. Though progress has been made, the educational outcomes in many communities and for many students throughout the U.S. are still mediocre. And yet the crisis has been made more severe because the bar for the skills and knowledge required for a family-supporting job has risen considerably in the last 30 years. In 1980 a good high school education was sufficient to obtain a secure, middle-class job. Today, 80 percent of the fastest-growing jobs require some postsecondary education (Warford, 2006), and employers say that 85 percent of all jobs require education beyond high school (Hull, 2005).

Table 3-1
Features of the Emerging Workforce System

Feature	Description
Networked partnership	The basic structure of the emerging system is a networked partnership. Diverse institutions with varied interests in education, the workforce, and economic development come together with industry stakeholders to identify dual customer needs. Resources are pooled to develop innovative responses. As Jenkins (2006) described, a development cycle may emerge within the partnership in which success for the partnership breeds success for the individual contributors, and this fosters further commitment and engagement in partnership activities.
Reform of the reform process	In the emerging model, the parties do not set out to <i>reform</i> education or the public workforce development system; rather, they set out to achieve common goals. Their new connections and interactions require each party to examine its structures and standard operating procedures and to make adjustments. This process may occur on both the supply and demand side of the labor market. For example, schools may change curriculum or degree frameworks so students can gain marketable credentials and earn them more quickly. Employers may change human resources policies, invest in worker training, or restructure the work organization to improve performance and provide new advancement opportunities that attract skilled workers.
Data, accountability, and transparency	In the traditional model, partners operated in isolation. Partnerships introduce new accountability measures, which foster new priorities and new ways of thinking and organizing within and across the partner organizations. Data, such as community audits, client outcomes, and program evaluations, have become more important. Such practices establish a new level of transparency within each organization that fosters new sources of accountability and supports continuous improvement across the system.
New planning frameworks and templates	To meet the dual goals of employers and individuals, a first step is to align the available education programs with the nature and demands of work within specific industries or across the region. Partnerships often develop or adopt new industrial-based standards. In many cases, career clusters and pathways provide a grounding model. Most partnerships engage in mapping jobs according to their skill requirements and relationships, and this process fosters communication and helps to develop deeper understanding of employer needs and worker interests.

At the same time, the nation is faced with a deep economic crisis which has moved the attention from long-term efforts to reform education and workforce development to the short-term need to get the economy back up and running (Baran et al., 2010). In addition, the recession greatly impacted individual retirement accounts, forcing many older skilled workers to

remain in the labor market, taking pressure off of the public systems to deliver on employers' skill needs. Attention in the public system has moved from investing in skills upgrades to helping unemployed and underemployed workers find jobs. Table 3-2 summarizes the main challenges that continue to face the education and workforce development systems today.

Table 3-2
Current Education and Workforce Development Challenges

Challenge	Description
Education divide	The gap in the percentage of college entry between high- and low-income students has not changed since 1980 (Warford, 2006). In addition, only 47 percent of African American and 53 percent of Latino high school graduates are academically prepared for college, whereas 68 percent of white students are prepared (Warford, 2006).
Low completion rates	Thirty percent of students do not complete high school, and in some communities as many as 60 percent of high school students drop out (Warford, 2006). Close to half of the students who entered a 2-year and a quarter of those who entered a 4-year education institution do not return for their second year (Warford, 2006), and a total of 44 percent of students entering community college in 1994 dropped out before completing a degree (Hughes & Karp, 2006). Many adults do not achieve 1 year of college or a certificate within 5 years of enrolling in a community college (Prince & Jenkins, 2005).
Lack of academic preparation/ remediation needs	Investments in remedial education for postsecondary students range from \$260 million to as much as \$1 billion each year (Hull, 2005). Among all students who enroll in community college, 5 out of 6 public university students and 6 out of 10 private university students require remedial services (Hull, 2005). An estimated 36 percent of all new college students enroll in remedial courses (Alssid et al., 2002). Nearly 4 out of 10 working adults who enter postsecondary programs are referred first to developmental programs (Alssid et al., 2005).
Demographics	Immigrants will make up most of the growth of the working population in the coming decades, and many will come from non-English-speaking countries with low levels of education (Hull, 2005; Theis, 2009).
Debates	<ul style="list-style-type: none"> • The features and content of a “good education” • The best ways to organize students’ educational experience • The most effective methods to assess and document student learning and competencies • Higher education’s inability to respond to rapid changes in the workplace with degree programs that take many years • Pros and cons of having one extended linear educational program versus having students alternate between periods of work and learning • The capacity and flexibility in higher education to accommodate millions of more working learners

The career pathways model is discussed in the next section. The discussion emphasizes how the model embodies many of the basic features of the emerging career education and workforce development and responds to the structural problems that prevent so many youth and adult learners from completing their education and achieving a valuable postsecondary credential.

Career Pathways Frameworks and Planning Processes

The career pathways models emerged in part as a strategy and framework to address many of the challenges facing education today. The framework represents a serious challenge to the conventional way education and workforce development are currently organized, for it calls for an open system of education based on the principle of lifelong learning that provides continuous access to relevant education and training that moves people from where they are at developmentally and in their skill sets, to the next step on their career or education pathway. Education is no longer curriculum driven; rather, it is driven by the needs of learners and real-life demands of the society, community, occupation, and/or industry within which they live their daily lives.

According to the literature on career pathways, the model developed as public systems came together with industry stakeholders and pooled resources to create a new education, training, and certification framework that reflected the hierarchical nature of work within an industry. Educators use the process to improve education by integrating rigorous academic standards with relevant technical training. Industries, particularly emerging industries like those that make up the new green economy, may use the process to develop a new labor market that provides low-skilled workers with entry-level jobs linked to advanced education and career opportunities.

Career clusters organize related occupations by the type of products and services they provide (see Table 3-3), and career pathways chart the education and work-related hierarchies of the specific careers available in the cluster. A 2007 survey of members of the National Association of Career and Technical Education Consortium found that of the 47 states and territories that responded, 26 or more provided programs within 15 of the 16 career clusters adopted by the U.S. Department of Education (Lewis, 2008).

Table 3-3
Career Clusters Recognized by the Office of Vocational and Adult Education and the National Association for State Directors of Career Technical Education Consortium

Agriculture, food, and natural resources	Hospitality and tourism
Architecture and construction	Human services
Arts, A/V and communications	Information technology
Business, management, and administration	Law, public safety, corrections, and security
Education and training	Manufacturing
Finance	Marketing, sales, and service
Government and public administration	Science, technology, engineering, and mathematics
Health science	Transportation, distribution and logistics

Three types of career pathways models or frameworks are found in the literature. Each is discussed here: the education career pathway, the adult career pathway, and the workforce development career pathway (see Table 3-4). These models share a common vision for a sequenced, articulated series of education and work experience that provides a coherent pathway from education to a rewarding career (Lewis, 2008), but reflecting different issues and interests. The education career and adult career pathways emphasize the supply side of the labor market, whereas the workforce and economic development career pathway emphasizes the demand side of the labor market. A close examination of these frameworks and processes shows how the career pathways model has been influenced by the past 30 years of debate and experimentation in education and workforce development reform.

Table 3-4
General Characteristics of Three Career Pathways Models

Variable	Education career pathways	Adult career pathways or bridge programs	Workforce development career pathways
Source	League for Innovation in the Community College (Lewis, 2008, p. 170)	Adult Career Pathways (Hinckley & Hull, 2007)	Workforce Strategy Center (Jenkins, 2006, p. 6)
General description	“A coherent, articulated sequence of rigorous academic and career courses, commencing in the ninth grade and leading to an associate’s degree, an industry recognized certificate or licensure, and/or baccalaureate degree, and beyond.”	“Offers a strategy for overcoming workforce barriers by bringing together selected industries, community services, government agencies, and community colleges to identify, enroll, educate, and prepare these adults for high-demand career opportunities.”	“A series of connected education and training programs and support services that enable individuals to secure employment within a specific industry or occupational sector, and to advance over time to successively higher levels of education and employment in that sector.”
Target population	“Available to all students, including adult learners, and designed to lead to rewarding careers.”	“Adult learners whose education backgrounds are varied, whose needs for support services are considerable, and whose lack of academic preparation for college-level work is often extensive . . . ; specifically targets unemployed, underemployed, and dislocated workers.”	Not addressed
Other key features	Partnerships: “Developed, implemented, and maintained in partnership among secondary and postsecondary education, business, and employers.”	Special populations: “Is ideal for serving individuals with little or no college, returning veterans, foreign-born U.S. residents, and ex-offenders.”	Alignment: “A particular framework . . . by which regions can better align publicly supported systems and programs to build a knowledge-economy workforce customized to the needs of local labor markets.”

Education Career Pathways Model

The education career pathways model is designed to strengthen partnerships between high schools, postsecondary education, and actors in a local labor market (Hughes & Karp, 2006, <http://ccrc.tc.columbia.edu/Collection.asp?cid=35>). The aim is to reform the labor market by connecting all educational institutions and programs into a continuum of lifelong learning to improve how students and learners are prepared for work and how they transition from one level of education to the next (Agrawal et al., 2007).

Improvements and Coordination in the Community College Approach. The community college is at the nexus of the education career pathways model (Agrawal et al., 2007; Alssid et al., 2002, <http://net.educause.edu/ir/library/pdf/eqm03111.pdf>; Hughes & Karp, 2006). With over 1200 community colleges in local communities nationwide, the community college is a uniquely local institution. These colleges are the main recipient of the federal Career and Technical Education funding, which positions them as a critical link in the education continuum from secondary and remedial education to postsecondary education and training (Agrawal et al., 2007).

The education career pathways model is based on an integration of the multiple missions of the community college, including remedial or developmental education, career and technical education, academic education, and customized or industry training services (Alssid et al., 2002). In a traditional community college, each of these missions is supported by a stand-alone organization, which independently provides a variety of educational programs and services. Rather than having strong internal ties, the stand-alone organizations have a network of strategic partnerships with external stakeholders (Alssid et al., 2002). For example, tech-prep programs are delivered through formal relationships with area high schools; industry or customized

training programs are delivered through relationships with regional industry bodies and employers; developmental or remedial programs are delivered through relationships with the workforce development system and adult basic education programs; and academic programs are aligned with the university system.

Though this traditional model has its benefits, it often fails students, especially those who seek to transition from one area of the college to another to advance in their education (Agrawal et al., 2007; Alssid et al., 2002). The isolated missions are not aligned with each other. For example, remedial or developmental education may not prepare students with the skills required to enter academic programs, and technical training certificates may not provide academic credit. Thus, students may need to start from the beginning to advance in their education. Many become frustrated by the time required to navigate this system and drop out before completing a course of study (Agrawal et al., 2007).

The new career pathways model brings the siloed programs and services together with their external partners to build a new education and credentialing system that prepares students for stable employment and advanced careers in key industries. The staff of the community college work together to develop an integrated and coordinated series of education programs that shortens the amount of time required for students to learn new skills and earn a credential or degree. Eventually, a new aligned mission and structure emerge that serve as the mechanism to connect and engage the full range of partners required to build a demand-driven education and training system (Jenkins, 2008, http://www.fordfoundation.org/pdfs/library/Bridges_to_Opportunity_for_Underprepared_Adults.pdf). This new framework also provides workforce development and social service agencies a structure within which to integrate their programs and resources (Agrawal et al., 2007).

In this light, the education career pathways model is not a program, but “a systematic framework for a new way of doing business in our high schools, colleges, and communities” (Agrawal et al., 2007, p. 3). The goal is to provide a “seamless system of career exploration, preparation, and skills upgrades linked to academic credits and credentials, available with multiple entry and exit points spanning middle school, secondary school, postsecondary institutions, adult education and the workplace” (Agrawal et al., 2007, p. 3).

Students benefit because the new career pathways provide them with a map they can use to navigate what might otherwise be a confusing educational system. They can more readily target the courses and programs of study that match their career goals. Employers benefit because they are assured that students are trained in the skills they require for jobs. Thus, career pathways enable community colleges to serve a number of customer needs.

Six Features of the Education Career Pathway. The League for Innovation in the Community College highlighted six basic features of this approach: institutional and instructional transformation; tools to support student success; partnerships; employer involvement; commitment to continuous improvement; and commitment to sustainability (Agrawal et al., 2007). Table 3-5 summarizes these six features (Agrawal et al., 2007).


Table 3-5
Summary of League’s Education Career Pathways Features

Feature	Summary of Feature
Institutional and instructional reform	Institutional reforms align all community college missions to ensure coordination and create flexible curriculum roadmaps for students to move through a rigorous course of study leading to a valuable degree or credential. Articulation agreements developed among institutions from the continuum of lifelong learning, including secondary, remedial, and postsecondary education, serve to link courses, credentials, certificates, and degrees together so that students can move quickly through the educational system. Instructional reform comprises new delivery formats and methods to make education more accessible to working learners. Academic and industry skill standards can be used to ensure that the course of study will result in the basic competencies required for graduation and for jobs. The curriculum is then modularized or packaged to match the requirements for specific jobs along a career pathway, so that working learners can flexibly enter and exit the program. New templates are developed to guide curriculum and advise students of education needs and options.
Student supports and tools	A variety of support is offered to help students understand the demands of their chosen occupation, manage a successful job search, develop employability skills, obtain credit for prior experience, gain real work experience, and obtain referrals to needed social services.
Partnerships	A culture of trust and shared leadership is cultivated among a wide range of partners across the pathway, including employers, industry associations, unions, apprenticeships, educational institutions, and workforce and economic development agencies.
Employer involvement	Employers play a hands-on role in determining skills and competencies at every level of the educational pathway. This effort ensures the integration of industrial standards into the curriculum, which is key to ensuring advanced training of incumbent workers.
Continuous improvement	Partners use data to identify and target high-growth industries and occupations, identify training and education gaps, design new pathway programs, and track outcomes for students and employers.
Commitment to sustainability	New funding mechanisms are created to support the ongoing development of the system, and new state and federal policies are developed to allow for the reallocation and blending of existing funds and to support experimentation.

COLLEGE: _____
HIGH SCHOOL(S): _____
CLUSTER: _____
PATHWAY: _____
PROGRAM: _____

	GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES		
						RECOMMENDED ELECTIVE COURSES	OTHER ELECTIVE COURSES	CAREER AND TECHNICAL EDUCATION COURSES
SECONDRARY	9							
	10							
	11							
	12							
POSTSECONDARY	Year 1 1st Quarter							
	Year 1 2nd Quarter							
	Year 1 3rd Quarter							
	Year 2 1st Quarter							
	Year 2 2nd Quarter							
	Year 2 3rd Quarter							

ADULT LEARNER ENTRY POINTS



CCTI
College and Career Transitions Initiative
Funded by the U. S. Department of Education
(V051B020001)
Updated: xx/xx/xx

Required Courses

Recommended Elective Courses

Career and Technical Education Courses

Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)

(◆=High School to Com. College) (●=Com. College to 4-Yr Institution) (■=Opportunity to test out)

Mandatory Assessments, Advising, and Additional Preparation

Figure 3-4. Career pathways template.

Figure 3-4 shows a career pathways template, and Figure 3-5 shows the fundamental features of an ideal career pathways model; the secondary, postsecondary, and systems levels each have a different yet complementary role in educating students and preparing them for workforce success.

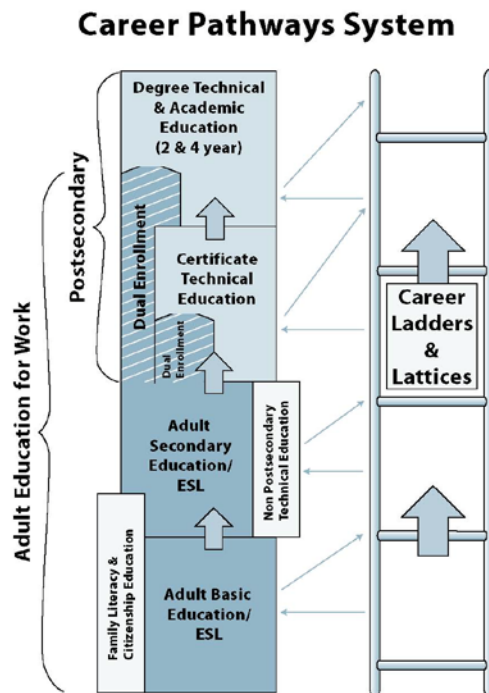


Figure 3-5. Career pathways system. Source: Theis, 2009, p. 9.

Barnett (2008, <http://www.league.org/league/projects/ccti/files/changing.pdf>), in an evaluation of 15 career pathway pilots affiliated with the College and Career Transitions Initiative, noted that several of these features—improvements to academic instruction, new data-driven decision-making processes, new partnerships with industry and employers, and new articulation agreements among schools—led to positive results in student outcomes.

Warford (2006) studied states' roles in the support of career pathways and found that though many states were undertaking pieces of the reform agenda, no state had implemented policies that encouraged the implementation of all the components. Many states had continued the traditional division between academic, career, and technical education, so many students still lacked the flexibility to transfer technical coursework to an academic program. Career awareness and preparation was either absent or vague in state plans. Finally, many state policies failed to build a meaningful role for employers in the model.

Adult Career Pathways Model

The adult career pathways model extends the educational model to provide for the needs of adults who face significant barriers to postsecondary education and employment (Hinckley & Hull, 2007). Though this model specifically targets the unemployed, underemployed, and displaced workers, it also includes a focus on the continuous education and training of all working adults. Specific adult career pathways emerge as a wide range of agencies and programs pool their resources to better coordinate the provision of developmental services to adults. In this model, practitioners are provided more flexibility to customize an education and employment plan to match individual needs and goals. The amount of time it takes for an individual to pass from remediation to credential or degree is shortened, and this helps to improve program completion rates and improve the return on investment of public education and training funds (Jenkins, 2006; Theis, 2009, http://www.ncee.org/wp-content/uploads/2010/09/adult_ed_work_guide.pdf).

As with the education career pathways model, the community college sits at the center of a more coordinated, demand-driven delivery system. Programs are crafted as community college faculty and staff work with employers to identify skill needs and valuable credentials and use this information to develop a competency-based curriculum that integrates basic and technical education. New partnerships are also formed with social service providers, which offer students a range of support to help them successfully complete a course of study.

Strategies Incorporated into the Model. In their review of innovative adult career pathways, Liebowitz and Taylor (2004) identified four high-leveraged strategies that helped low-wage workers achieve valuable postsecondary credentials, which are summarized in Table 3-6. Though all four strategies were not implemented consistently in each case study, the research

showed that the impact was enhanced when the four strategies were integrated “to create multiple paths that adults can navigate toward occupational or technical degrees” (p. 1).

Table 3-6
High-Leveraged Strategies to Help Low-Waged Workers Achieve Credentials

Strategy	How strategy helps low-waged workers achieve credentials
Integrate adult developmental services and resources from across institutional structures	Creates multiple pathways for students to prepare and enter into occupational training and degree programs
Individualize and contextualize short-term, intensive learning programs	Accelerates learning and decreases time required to complete a program, which may result in more adult students advancing to the next level of education
Offer employer-driven programs focused on high-demand occupations	Connects education to meaningful work and economic payoffs and enables the contextualization of training in foundational skills
Provide comprehensive financial and academic support services	Help adults meet family responsibilities while succeeding in education

A Sequenced Approach. Hinckley and Hull’s (2007) adult career pathways framework contains many of the strategic levers found by Liebowitz and Taylor (2004) but in a sequenced model with seven components, which are summarized in Table 3-7.

Table 3-7
Hinckley and Hull’s Sequenced Career Pathways Framework

Step	Framework
1	Focus on personal needs and determine the support the individual needs to stay in school.
2	Provide remedial education that is contextualized to ensure that the individual has the academic skills needed to succeed in postsecondary training.
3	Offer career-focused assessments and activities to help the learner identify a career track and develop an educational plan.
4	Offer employability skills training that reviews the general skills and competencies employers seek, such as those delineated by the Secretary’s Commission on Achieving Necessary Skills (SCANS)
5	Provide career and technical skills training, at which point the student becomes employed and continues to study part-time in a curriculum that prepares him or her for a long-term career. Initial training is broad, pertaining to a wide range of jobs in a career cluster, and later training is more tailored to specific jobs, with the possible addition of academic education in mathematics, reading, and science.
6	Train in job entry skills (such as computers and possibly employer-specific skills) at the completion of the career-technical stage of the program.
7	Offer advanced skills training at a later stage, depending on program goals (e.g., training to acquire certification or to be prepared for a promotion). Courses are transferable to students’ higher education goals

Theis (2009) offered an adult career pathways framework with many of these same components, except that learners did not engage the pathway through a linear process. Individuals combined adult basic education with technical training and training in postsecondary credentials that counted toward college credit. The goal was to help individuals progress as quickly as possible, regardless of which educational path they chose.

Requirements and Challenges. Building adult career pathways takes time, cooperation, and leadership. It also requires each partner to significantly change the structure of their organization and programs (Hinckley & Hull, 2007; Stephens, 2009; Theis, 2009). Processes must be coordinated on all levels, including at the level of the service deliverer, such as the school, in the region, and in state policies (Jenkins, 2008) (see Figure 3-5).

In theory, the adult career pathway is a demand-driven process that also coordinates services across public and nonprofit systems to provide out-of-work and/or low-wage adults with the basic skills and remedial education they need to secure a job and advance in their education. Stephens (2009), in a review of statewide adult career pathways in five states, described the process of career pathway development this way:

Statewide implementation of the career pathways framework can be challenging and requires a great deal of work on multiple fronts: demonstrating value of career pathways to achieve a shared vision; motivating colleges to participate; developing partnerships and obtaining support from political leaders, employers, community colleges, state agencies, and community-based organizations; securing investments from the state to financially support the endeavor; and building the capacity of community colleges to shift the way of doing business. (p. 31)

Fitzgerald (2000) suggested that one limitation is that the main actor in the model, the community college, has little influence over how low-wage employers structure work. For adult career pathways to meet their full promise, employers must restructure jobs into career ladders

that provide learners with opportunities to continuously learn and advance in their education and career after completing their basic training.

Fitzgerald (2000) advocated for progressive intermediaries that reside between education and the labor market and work across both to improve and align education and jobs. These intermediaries are a cross between an educator and organizational consultant, providing technical assistance to modernize the work process and providing customized training. In the study of career pathway programs for low-skilled workers, Fitzgerald (2000) found that community colleges had little influence as intermediaries and were not very successful at helping employers create better jobs.

Though community colleges are being responsive to business needs, they have limited capacity to affect skill demand. This is not a critique, but a reality. When it happens it is a bonus; when it does not, the community college can help students find ways to accumulate skills and move to other types of employment. (p. 38)

This research indicates that demand-side interventions are also needed to ensure that new education and adult career pathway initiatives result in meaningful employment for individuals and bring the benefit of an educated and skilled workforce to employers.

Workforce Development Career Pathways Model

The third career pathways model is the workforce development model promoted by the Workforce Strategy Center. This model stresses the alignment of all the systems and programs involved in workforce development and their integration with economic development activities and strategies in a regional economy. Though community colleges are key partners in this framework, the nexus of the system is a multi-stakeholder partnership built to support the economic and workforce development needs of a particular industry or occupation that is central to the regional economy. The emphasis in this model is on economic growth and improving the

performance of the local firms (Lewis, 2008). Through the broader partnership, high-skilled, high-growth industries that are vital to a regional economy are identified, and an infrastructure is built to provide for the ongoing needs of employers for educated and skilled workers (Alssid et al., 2002), thus responding to the needs of both employers and workers (Jenkins, 2006).

Employers play an active role in the partnership, which results in strong relationships and deep knowledge of employers' interests and needs. Partners work closely with individual employers to help them modernize their work processes and improve their performance. Through these interventions, new work structures and human resource development policies can be developed that improve the conditions of entry-level jobs and connect them through advanced education to higher-level jobs along a career ladder (Alssid et al., 2002).

Jenkins (2006) described the process by which workforce development pathways are developed, and in so doing, he identified the developmental activities and articulated many of the salient features of the model. This process and the accompanying features are described in Table 3-8.

In a case study of the career pathways partnerships, Bozell and Liston (2010) identified five types of workforce development career pathways programs, each based on a different sponsoring agency: community-based organization, career and technical education, employer, industry, and social enterprise organization. Several common features were found across all the program types, including a concern for dual customers (employers and learners), focus on regional labor market needs, direct connections between education programs and the jobs in the labor market, a hands-on curriculum leading to industry-recognized credentials, wrap-around support services, the use of data to plan programs and establish accountability measures, and the use of multiple funding streams. All partnerships offered employers a menu of engagement

Table 3-8

Process and Features of Workforce Development Career Pathways (Jenkins, 2006)

Steps	Developmental Activities	Features
Form public-private partnership among stakeholders in a targeted industry	<ul style="list-style-type: none"> • Target industry sector • Analyze industry and occupational data • Identify and evaluate related education, training, and workforce services in region • Identify gaps in education programs and workforce services 	Partnership Data-driven
Develop maps for a career pathway	<ul style="list-style-type: none"> • Identify connections between education and jobs at all levels in industry and occupations • Use maps to identify training gaps and to articulate programs across the educational system • Use maps to identify gaps in the career ladder and restructure work organization to structure advancement opportunities based on increased education and skill • Use maps to align education and credentials with emerging career ladder inside firms 	Visual templates Education reform Workplace reform
Make structural change to educational programs and schools to accommodate the needs of all learners	<ul style="list-style-type: none"> • Adjust class schedules to accommodate working learners • Modularize the curriculum into small chunks, each leading to a credential that can be used to qualify for a more advanced job and that can also be credited towards a degree • Connect programs across the educational system to ensure students at every level are being prepared to succeed at the next level of education • Create bridge programs to help disadvantaged youth and adults learn basic skills and prepare for jobs and postsecondary education 	Articulated education
Integrate support services	<ul style="list-style-type: none"> • Conduct case management based on career and educational assessments • Offer a full range of assistance, including financial, child care, and job placement, to all participants • Partner with community service agencies to recruit marginalized individuals and provide social services 	Support services
Advocate for public policies that ensure sustainability	<ul style="list-style-type: none"> • Commit new resources to make and support systemic change and encourage employer involvement • Promote policies that improve access to college education for disadvantaged groups, integrate support services into the education system, and align and coordinate levels of education to improve student transitions • Allocate resources and mandate the use of data to measure results and improve the return on investment and accountability 	Policy reform

options, which met employers at the point of their need. This enabled the development of strong and trusting relationships with employers and helped the partnerships to become very knowledgeable about the workforce and economic development needs in the industry (Bozell & Liston, 2010).

However, only two of the five program types, the industry and the career and technical education, had potential to result in system change described by Jenkins (2006). Industry-led efforts encourage standardization of curriculum and credentials and develop a critical mass of employers across the industry that agrees to adopt the standards. These partnerships will often work with local educators to map a variety of instructional programs, certificates, and degrees and link them to the jobs and career ladders across firms within the industry. In some circumstances, employers may realign internal job structures to align them with the emerging education, training, and credentialing system (Bozell & Liston, 2010). This large-scale adoption of standards ensures that training results in portable credentials that individuals can use to access jobs and career advancement opportunities across the region.

In contrast, career and technical education partnerships often draw upon national industrial skill standards and combine them with local employer input to develop a broad curriculum that leads to career track employment for learners. What emerges is a new curriculum that provides flexible entry and exit points so learners can move in and out of education and work to advance their education and career (Bozell & Liston, 2010).

The distinguishing feature of the workforce development career pathway is its focus on employment outcomes, and this focus on outcomes reveals a basic paradox underlining the model. Though most of the literature focuses on recommendations for and examples of improving the education system, it is widely acknowledged that the primary measure of success

is the employment outcome (Bozell & Liston, 2010). Indeed, Bozell and Liston (2010) found that the programs that focus mainly on the credential rather than the job were unable to build the partnership required to sustain the model and bring it to scale.

The workforce development career pathways model involves fundamental reforms to the organizations involved in education, workforce development, and social service delivery, requiring all stakeholders to rethink how they do business in fundamental ways (Mazzeo, Roberts, Spence, & Strawn, 2006).

Empirical Studies of Career Pathways

The empirical data, though limited, indicates that the career pathways model holds promise. In 2008, Lewis conducted an ERIC search on the performance of career pathway programs between 1990 and 2008 and found six studies. A 2010 update of Lewis' ERIC search conducted for this review identified an additional seven studies on the effects of the career pathways model. Overall results point to one overarching theme: more statistical and analytical data, including labor market data, are needed to understand how well pathway programs are serving the needs of participants and local employers. Three conclusions can be drawn from available studies:

1. Career pathways have been associated with higher grade-point averages and less need for remediation at the postsecondary level. Results for postsecondary education have been mixed, with some studies noting higher college entrance rates for program participants and increased certificate completion or postsecondary degree attainment and others showing no significant increase in the number of participants who continue or complete their education.

2. Alignment and articulation of courses (secondary and postsecondary, credit and noncredit, and academic and technical content) represent major challenges for these programs. Integration presents barriers such as the difficulty in scheduling common planning time for teachers to work together to coordinate instruction, conflicting goals among various constituencies, and the challenge of ensuring that credits are accepted at multiple postsecondary institutions.

3. Many pathway programs have reported barriers to collecting and reporting data (e.g., poor or inefficient data systems and student reluctance to provide information). Pathway programs in states with established reporting requirements have developed successful ways to collect and report student data (e.g., a state-mandated program review process).

Future research should focus on determining whether participation in career pathway programs improves outcomes for students in terms of increased postsecondary graduation rates or certificate completion and successful career placement after graduation.

Perhaps in growing recognition of the effectiveness of the career pathways model, the Department of Labor's Employment and Training Administration issued an SGA for the Career Pathways Innovation Fund Grants Program (SGA/DFA-PY 10-06) in February 2011 (<http://www.doleta.gov/grants/pdf/SGA-DFA-PY-10-06.pdf>). The SGA makes \$122 million available to community college partnerships for the development and implementation of new career pathways programs with employers and other stakeholders.

Two features of this SGA are relevant to this discussion. One is that the SGA delineates four program types that must guide the development of the models funded. These program types roughly align with two of the career pathways models discussed in this review: the education career pathway (which combines the secondary education, postsecondary education, and

community college education program types in the SGA) and the adult career pathway model (precollege ‘bridge’ program type in the SGA).

Secondly, the SGA identified a set of “required critical elements” that must be incorporated into the proposed career pathways, which align nicely with many of the features of the three career pathways models in this review. Table 3-9 arrays the features of each of the three career pathways models in this literature review by the critical elements of the SGA. This helps to illustrate that the career pathways model, as described in and advocated for in the literature review, has gained prominence in national workforce development policy and programs. This SGA helps to illustrate that the career pathways model, as described in and advocated for in this literature review, has gained prominence in national workforce development policy and programs. Also observed is that the SGA includes many of the model’s features highlighted in this review.

Table 3-9
Comparison of DOL 2011 Career Pathways SGA Required Elements and Features of Career Pathways Models in Literature Review

Required elements in DOL career pathways SGA	Education career pathways (combines SGA secondary, postsecondary, and community college programs)	Adult career pathways (same as SGA bridge program type)	Workforce development career pathway
Include evidence-based best practices/strategies	<ul style="list-style-type: none"> • Align and integrate missions across the community college missions • Develop articulation agreements • Offer dual enrollment • Use new delivery formats and methods to make education more accessible • Contextualize education (career clusters) • Integrate academic and career education • Shorten time to credential (modularize curriculum) • Provide credential map for students to navigate 	<ul style="list-style-type: none"> • Shorten time to credential • Offer competency-based training in employers’ expressed needs • Integrate basic and technical education • Integrate missions across the community college • Accelerate learning to speed instruction • Contextualize learning • Train in foundational skills and knowledge 	<ul style="list-style-type: none"> • Offer basic/developmental education combined with career orientation • Connect basic education to postsecondary credentials • Integrate on-the-job training with education • Open access to allow movement in and out of work and learning • Map education and jobs used to design education programs and curriculum • Modularize curriculum leading to marketable credentials that can be stacked towards degree

Required elements in DOL career pathways SGA	Education career pathways (combines SGA secondary, postsecondary, and community college programs)	Adult career pathways (same as SGA bridge program type)	Workforce development career pathway
	education	<ul style="list-style-type: none"> • Open access to allow movement in and out of work and learning 	<ul style="list-style-type: none"> • Offer hands-on, contextualized instruction • Adjust schedule to accommodate adults
Offer assessment and services to support training completion and transition to next step on career pathway	<ul style="list-style-type: none"> • Provide counseling to increase understanding of careers • Teach skills to manage job search • Assess and credential prior learning • Provide work readiness support • Offer internships • Offer case management • Make referrals to social support 	<ul style="list-style-type: none"> • Pool resources to meet needs of adults with barriers to employment • Offer case management to customize program for individuals' developmental needs • Offer a range of social supports 	<ul style="list-style-type: none"> • Recruit by social and community service agencies • Have workforce development agencies certify individuals for services and provide financial support to the community college for education and support
Ensure the substantive involvement of employers in the development and implementation of the career pathway model and programs	<p><i>For employers:</i></p> <ul style="list-style-type: none"> • Identify skills and competencies • Ensure national standards suit local needs • Support incumbent worker training • Hire pathway graduates 	<ul style="list-style-type: none"> • Have community college staff work with employers to identify skill needs and valuable credentials • Encourage employers to hire trainees; training is connected to a real job (i.e., job placement and/or experience) 	<ul style="list-style-type: none"> • Focus on high-growth employers • Encourage employers to play an active role, especially in the beginning, to select industry and occupations and map connections between education and jobs • Have partners work inside firms to customize solutions to performance problems and improve or upgrade entry-level/low-skilled jobs
Ensure strong partnerships and coordination between educational institutions, employers, industry groups, and relevant stakeholders in the community	<ul style="list-style-type: none"> • View the community college as a critical link • Emphasize improvement of student learning, competition, and transition • Bring together programs from across community college missions • Include a wide range of partners • Develop a culture of trust • Have shared leadership 	<ul style="list-style-type: none"> • Community college is critical link • Emphasize employment outcome • Integrate services from other institutions: adult basic education, workforce development, developmental education, noncredit programs • Require structural change in partner organizations to pool/coordinate resources 	<ul style="list-style-type: none"> • View sector partnership as critical link • Emphasize economic growth and employment outcomes • Streamline and connect processes of all partners to allow for more coordination and integration of services

Required elements in DOL career pathways SGA	Education career pathways (combines SGA secondary, postsecondary, and community college programs)	Adult career pathways (same as SGA bridge program type)	Workforce development career pathway
Have built-in mechanisms for sustainability beyond the grant period	<ul style="list-style-type: none"> • View it as a new way to do business across education levels and providers • Focus on continuous improvement • Use data-driven processes to identify targets and gaps and design pathways • Use MIS to track outcomes, remain accountable, and support DM • Find new funding sources • Develop new policies to allow blending of resources 		<ul style="list-style-type: none"> • Develop new policies that allow public systems to share and commit funds and make systemic change required to adopt model

Summary of Career Pathways

This literature review on career pathways has brought to light how three decades of experimentation in the U.S. public workforce education and development systems has contributed to the current-day understanding of what it takes to support employers and workers as they compete in a continuously changing, 21st-century knowledge economy (Baran et al., 2010). Many individuals and groups continue to face significant challenges in moving through the educational pipeline to earn credentials and secure stable employment. Additionally, agents and stakeholders in the education and workforce development systems continue to face significant challenges in helping youth and adults complete a course of study and successfully transition to the next level of education and/or a career path—especially as more jobs require postsecondary credentials and degrees.

The career pathways model has emerged as an organizing mechanism to bring together and engage all stakeholders in an ongoing process of responding to needs of real workers and

real employers in local communities. Three important lessons can be delineated related to the development and implementation of the pathways model and the system reform it fosters.

1. The career pathways model is a mindset or a new way of thinking about education and workforce development that is more holistic and integrated than the traditional educational mindset. The model encourages educators and practitioners, as well as their partners and dual customers, to think in terms of career levels and tiers rather than in terms of de-contextualized degrees, certifications, or training programs. The new mindset also fosters a new way of doing business within and across the various systems of education and workforce development. More flexibility may result as stakeholders collaborate and each comes to define its role in the system based on what it does best.
2. Second, the model highlights the importance of a regional approach to workforce and economic development and educational reform.
3. Finally, the career pathways model provides an alternative to the work-first policies that move individuals into the labor market without the education and training needed to succeed in a long-term career.

The literature provides a comprehensive understanding of career pathways models and their utilization. The opportunity to examine whether and how these theories are utilized in practices presented itself with the U.S. Energy Training Partnership grants. Specifically, a qualitative study of two grant recipients using a career pathways model was initiated in 2010. This report now turns to a brief discussion of the study's methodology.

Chapter 4:

Research Design

This qualitative study examined the early start-up experiences of recipients of ETA's ETP grants in states applying a career pathways model to reform the educational system. This chapter describes the design and summarizes the methods employed in this study.

Purpose and Research Questions

This study explored these and other propositions by examining the employer-education interaction in the development of a workforce development system to promote green jobs and skills. Particular attention was paid to whether and how these two key stakeholders experienced a need to make systemic changes to work structures and to educational programs as a result of their involvement in a green jobs career pathways workforce model. The study also examined how these stakeholders navigated the challenges and opportunities the career pathways model presents to the internal, firm-based labor markets and the educational system. Four research questions guided the study:

- What are the early start-up experiences of key employer and education leaders in two energy training partnerships (ETPs)?
- How do employers and educators interact in the development of the ETP career pathway model?
- What are the challenges the employers and educators face in their early start-up experiences, and how are they responding to these challenges?

- What career pathways model is used in the ETPs, and how does it relate to the career pathways model in the state?

Data Collection

The researcher established an advisory committee consisting of four members from stakeholder groups with an interest in green jobs career pathways: (1) an industry green jobs advocate, (2) an educator, (3) a union representative, and (4) a workforce development practitioner (see Appendix B). Each advisory committee member was knowledgeable of trends and challenges of green jobs and green jobs training, and several also had expertise in U.S. workforce and economic development policies and practices. The role of the advisory committee was to review the research protocols and to provide a sounding board to the researcher in the conduct of the study and in the interpretation of the data.

The study began with a review of the literature on green jobs, career pathways, and green jobs pathways to identify the emerging features and challenges of the green jobs labor market and the features of the emerging career pathways model. While the literature review was under way, the researcher worked with officials from the ETA to develop the criteria for the selection of the two ETPs to include in this study (see Appendix C). Two threshold criteria were established: (1) the ETP was located in a state that was using a career pathways model to reform career and technical education and (2) the ETP proposal made reference to the use of career pathways and/or career competency models. After a review of the summary of 25 ETPs, 11 met the criteria (see Appendix C).

The researcher reviewed these 11 partnerships with ETA officials and the research advisory committee. ETA officials identified four sites that they thought were significantly developed to warrant a study of the partnerships' early start-up experiences and forwarded the

proposals for those four sites. The researcher next reviewed the proposals and shared a summary of the four sites with the advisory committee. The two sites that were chosen represented significant differences in the mix of stakeholders, the targeted industries, the programs offered, and the delivery strategy as to potentially allow for the exploration of two very different sets of early start-up experiences. This choice also contributed to the limitations of the study, which are discussed below.

ETA officials contacted the program operators of the two partnerships to invite them to participate. Both operators agreed to participate in the study. The selected partnerships for this study were the Vermont Growing Renewable Energy/Efficiency Network (Vermont GREEN) operated by the Central Vermont Community Action Council and the Renewable Northwest (ReNW) project operated by the Oregon Manufacturing Extension Partnership.

Once the sites were identified, the researcher contacted the program operator to conduct a contextual analysis and documentation review of the program. Program documents were reviewed such as the ETP grant proposal, partnership promotional materials and planning documents, partnership meeting agendas and minutes or summaries, partnership newsletter (in the case of Vermont GREEN), and the two quarterly ETA grant performance reports. These documents were collected from the program operator and/or the partnership staff.

Also included in the review was documentation and information on the training and support services available through the partnership, including educational program planning reports, curriculum and materials, and service agreements and letters of support.

Finally, documentation on the state's economy and specifically the status of the green sector, the state economic and workforce development initiatives and programs directed at the green sector, and the state career pathways activities was also examined. Included were state-

level research reports and summaries of policy initiatives, the governors' workforce development plans, and the Perkins Act summary of the state activities produced by the U.S. Department of Education and the state's Perkins status reports. This documentation was collected from the program operators, state officials, and a search of states' and community colleges' Web sites.

The analysis of these documents focused on the history of the partnership and its programs, administrative features of the partnership, the employer-education partnership, and the regional context, including the regional economy, the structure of the educational system, and the status of state educational reform efforts, and the features of the program delivery system, and the career pathways model adopted by the broader statewide education system and workforce development system. The results of the literature review and these other analyses were used to develop the research protocols (see Appendix D) and initial analysis codes for this study.

The program operators were asked to identify up to five individuals who were active participants in the partnership to participate in the study, including two employers, one or two educators (there was only one educator involved in one of the partnerships), and one representative of the regional workforce development system. The program operator contacted the selected individuals and invited them to participate in the study. The researcher followed-up with those who expressed an interest to explain the study and the interview; those who agreed to participate were asked to sign the informed consent form and were scheduled for a 60- to 90-minute interview. The study participants held roles as senior operations managers and education/workforce development program directors. In order to protect the identity of the participants, this report cannot provide any more detailed information on the specific roles of the participants included in this research.

Table 4-1 summarizes the industry sector included in the interviews in each site. The interview themes for each group are summarized in Table 4-2.

Table 4-1
Interview Sample by Industry Sector per Site

Industry	Vermont GREEN	ReNW
Renewable: installation and repair	Weatherization training and certification/job placement services in the building and construction industry for unemployed and contractors (Educator 1)	Wind blade repair company offering jobs with training/certification program (Employer 1) Wind blade repair technician training and certification for Employer 1 and for general student population (Educator 1) Solar installation company offering trade jobs and on-the-job training in solar specialty skills (Employer 2)
Renewable: Manufacturing	Manufacturer of new capacitor technology for auto and other industries offering assembling and engineer jobs with in-house training and certification in advanced manufacturing and on internal processes and equipment (Employer 1) Manufacturer of new do-it-yourself solar energy units offering assembling jobs with in-house training and certification on internal processes and equipment (Employer 2)	Green manufacturer specialist training and certification for incumbent workers through customized training and for unemployed through workforce development council (Educator 2)

Table 4-2
Interview Themes for Each Group

Interviewee group	Questions
Employers	<ul style="list-style-type: none"> • Experiences in the start-up phase of the partnership • Involvement in the design of the partnership’s program • Relationships with the education system • The structural demands the program placed on their internal operations • The work they were doing inside their firm to accommodate the structural demands • Relationships and interactions with the program participants • Views on the program participants’ experiences with the program • Challenges they faced in the effort • Hope or vision for the outcomes of the program for their firm, the region, and their industry • The extent to which the career pathways model’s features and benefits for employers and job structure as defined in the literature matched their experience
Educators	<ul style="list-style-type: none"> • Experiences in the start-up phase of the partnership • Involvement in the design of the partnership’s program • Relationships with employers • Work they were doing in their educational institution to accommodate the structural demands of the program • Relationships and interactions with the students and workers involved in the program • Views on the program participants’ experience with the program • Challenges faced in the effort • Hope or vision for the outcomes of the program for their educational institution and the region • The extent to which the career pathways model’s features and benefits for educators and education as defined in the literature matched their experience • Knowledge of the career pathways model in the state and in their educational institution and whether and how it related to the work with the partnership
Workforce development system representatives	<ul style="list-style-type: none"> • Involvement in the partnership • Views on the roles and relationships of employers and educators in the region • Capacity of the parties to work together to forge the structural linkages necessary for a successful career pathways program in the region • Relationship with the program participants • Views on program participants’ experiences with the program • Views on the career pathways model under development in the region and its implications for workforce development

Each interview was recorded using a digital recording device. The digital recordings were transcribed by a professional transcription service. A copy of the interview transcript was submitted to each interviewee for review and clarification (member checks). Data were stored in ATLAS.ti, a qualitative research program. The researcher used the software to analyze the data.

Data Analysis

The data were analyzed utilizing the constant comparative method, in which data from each interview were systematically compared with data from other interviews in each peer group (i.e., employers, educators, and workforce development system representative) in each site and then across the two sites.

In the first phase of the analysis, an in-case review was conducted of the early start-up experiences shared by each participant. The focus of this analysis was how each participant and then each peer group responded to the research questions. These analyses were used to produce the summary of each case found in chapters 5 and 6 of this report.

Subsequent to in-case analysis of the participant's and peer group experiences, the researcher finalized the coding scheme established by the literature and documentation review. A peer examiner assisted with the categorization of the codes, including suggestions for how they could be split and merged. The researcher used the codes to conduct a comparative analysis of the transcripts per case. Central to this in-case analysis was a search for material upon which to describe the green jobs career pathways model emerging in each partnership and to identify the themes used to summarize each case. Four themes emerged in this analysis: (1) the quality and nature of the emerging sector partnership; (2) challenges and strategies in synchronizing the labor market; (3) the career pathways model in use; and (4) the nature of the green jobs. A summary of these themes for each case is also included in chapters 5 and 6 of this report.

Next a cross-case analysis was conducted. First a cross-case analysis of each peer group was conducted to identify the salient features of the roles and expressed experiences that appeared across the study sample. A summary of this analysis is included in chapter 7 of this report. Next a cross-case analysis of the four themes was conducted to explore the early start-up experiences and relationships across the two cases. These two cross-analyses revealed little commonality in the early start-up experiences and in how each of the four themes appeared across the two sites. Consequently, this study concluded that early start-up experiences as well as the developmental themes underlying each case were related to or could be explained by the specific context of the individual partnership. The cross-case and thematic analysis are discussed in chapter 7 of this document.

Finally, the emerging green jobs and career pathways models became apparent in each of the partnerships. These data were compared against the findings and models from the reviews of the literature that guided this study. This analysis is supported by a final interpretation and discussion of whether and how each of the emerging models in use matched the propositions about the models found in the literature. This information appears in chapter 7 of this report.

Limitations of the Study

There are several limitations to this study related to the small sample size in each case. Due to federal Paperwork Reduction Act regulations,³ this study was limited to nine participants across the two sites, since obtaining approval from OMB would likely exceed the expected timeframe of the grant. This limited participation resulted in a very limited perspective into the

³ The Office of Information and Regulatory Affairs (OIRA) is a federal office established by Congress in the 1980 Paperwork Reduction Act. It is part of the Office of Management and Budget, which is an agency within the Executive Office of the President. Under the Paperwork Reduction Act, OIRA reviews all collections of information by the federal government.

dynamics of the early start-up experiences of participants in the partnership. It also forced a choice in whether to explore a limited number of employer-educator program development partners and examine the relationship from two perspectives or to examine a variety of different training program types and probe the interaction from the perspective of either the educator or the employer. Given the exploratory nature of this study, the latter strategy was selected so that a variety of program types could be examined. Table 4-1 shows only one employer-educator pairing in this study. Thus, there are limitations to the findings about the employer-educator interactions because the relationship was explored largely from the perspective of one or the other on different programs and not from both perspectives in the same program.

Another limitation in this study is related to the difficulty in identifying two cases that met the criteria for being in states with career pathways with enough similarity to allow a cross-case comparison. The programs were funded by a U.S. Department of Labor grant competition, which sought variation among awardees. Indeed, finding similar sites that had also developed significantly similar enough programs as to warrant the investigation proved difficult. The result is that the two sites are not well matched for comparison. The significant difference appeared in the developmental state of relationships among the partners. One partnership, Vermont GREEN, consisted of many partners who had no formal working relationships prior to the grants. The other partnership, ReNW, involved many stakeholders who had worked closely together to deliver workforce and economic development services within the region under several other initiatives in the past. The study explored and observed two very different start-up experiences, which allows the results to reflect a wide range of stakeholder experience in the ETA's ETP grant projects.

This study drew upon thick description analytical methodology (Geertz, 1973) to overcome these two limitations. In thick description, the researcher presents both a rich description of participants' experiences as well as detailed contextual information to help the reader make meaning of the study's results. The thick description in this report is aimed at offering the reader a detailed perspective into the challenges, concerns, needs, and hopes of the participants for their work in the early start-up phase of the two ETPs in this study.

The next two chapters present the early start-up experiences of each case. Chapter 5 presents Vermont Growing Renewable Energy/Efficiency Network (Vermont GREEN), and chapter 6 presents Renewable Northwest (ReNW). Chapter 7 presents the cross-case analysis and findings of the study.

Chapter 5:

Vermont Growing Renewable Energy/Efficiency Network (Vermont GREEN)

In January 2010, Central Vermont Community Action Council (CVCAC) received a \$4.8 million grant from the U.S. Labor Department to create a statewide green energy training partnership (ETP). Named the Vermont Growing Renewable Energy/Efficiency Employment Network (Vermont GREEN), the partnership is a diverse public-private venture organized to prepare workers for careers in the energy efficiency and renewable energy industries. The partnership offers counseling and case management, training that leads to industry certification, and placement in green jobs for Vermont residents. The partners include more than 30 local organizations: nonprofits, training providers, higher education institutions, private industry, organized labor, state agencies, workforce boards, and industry associations. Partners attend a quarterly advisory board meeting to help coordinate statewide recruiting and placement efforts, assist with annual job summits, build new avenues for strategic partnering, and examine future funding opportunities.

The CVCAC was well positioned to organize Vermont GREEN. It maintains an extensive network within Vermont's workforce development system and energy efficiency industry. Prior to receiving the grant, CVCAC leaders and representatives served on the statewide workforce development council and on several regional workforce investment boards (WIBs). The CVCAC helped to establish the Vermont Coalition for Workforce Solutions, a network of workforce development leaders and advocates. Additionally, the CVCAC played a central role in the formation and operation of the Vermont Weatherization Program, which helps

low-income residents weatherize their homes and trains community members hired by the contractors who deliver this service to the community in weatherization skills. Through the CVCAC's work in these boards and initiatives, it has established close connections with many of the workforce, social service, education, and industry partners who signed on to the ETP grant and who are now active members of the growing green jobs partnership in Vermont. Profiles of the workforce development system, the educational institution, and the two employers who were interviewed appear in Boxes 1 to 4 in this chapter.

The following sections present the findings of the case study research on the early start-up experiences of the Vermont GREEN ETP. First, an overview of the case context is provided. Next, the discussion focuses on the features of the case that are most relevant to this study, including a review of the early start-up experiences of the partners interviewed for this study, a discussion of the interactions and relationships among the partners, a summary of the key

Box 1. Profile: Vermont Workforce Development System

The workforce council recently made a decision to adopt an approach to green jobs that mirrored the state's approach to the information technology labor market, in that green jobs were seen as cutting across all sectors and not just those within designated green industries. This view of 'greening' of the labor market allows the workforce development system flexibility in using its designated 'green' resources to support employers and workers who want assistance in adopting green technologies and practices.

In the meantime, the Vermont workforce development system continues to steer training resources towards green firms to help them grow the workforce. In fact, officials had strong ties with many of the Vermont GREEN training and employer partners prior to the award of the ETP grant. For example, the two employers interviewed for this study had preexisting relationships with the Vermont Department of Labor and were receiving assistance for on-the-job training and technical assistance related to their training needs.

One challenge faced by the Vermont green industry, as with other industries, is that it is made up of very small companies, many of which are isolated in small communities around the state, so it is difficult to establish a critical mass of jobs and workers with training needs. The workforce development system works to foster collaboration among employers in this sector around workforce training. One initiative currently under way in the energy-efficiency building sector is the development of a YouTube library of instructional videos that employees can access in real time when they need assistance or information on installing specific equipment or performing a new procedure. The workforce development system is trying to be creative in meeting the needs of the emerging green sector in Vermont.

Box 2. Profile: Vermont Education Institution

The education partner interviewed for this study is a career-focused college that offers 22 associate's degree programs, 11 baccalaureate degree programs, and one certificate that qualifies its students for careers in great demand in Vermont. In 2007, the college established the Center for Sustainability (pseudonym) to apply green technology and sustainable practices to the operations and the education provided at the school and to help increase the sustainability of the campus and its community. Key to the center's mission is an integration of a 'green' focus into the college curriculum and provision of certification training to students, Vermont workers, residents, and employers in skills for green jobs and practices.

The center staff also work on policy issues in the broader community to support economic development of green industries in Vermont. In an interview, the director explained the rationale for this policy effort. "It was sort of circular thinking that led us to say: If we were able to help them grow their business, our graduates would have more opportunities to remain in the state, which is desirable for Vermont." The center is a key training partner in Vermont GREEN. It provides weatherization training and has used grant funds to hire a job developer who works with the career counselors to find jobs for Vermont GREEN participants. The center director is also an active member of the Vermont GREEN leadership team and is an active participant and contributor to the partnership's policy development and communications efforts.

challenges and opportunities these partners face in their work with Vermont GREEN, and a discussion of the participants' perceptions of the green jobs career pathways model in development within the Vermont GREEN network, as well as their perceptions of the trainees' experiences. These sections are followed by a summary of the findings related to Vermont GREEN's green jobs career pathways model and the early start-up experiences of its partners.

The Case Context

This section describes the context within which the Vermont GREEN ETP has emerged. The discussion is focused on the broader context that the partnership is responding to, as well as the emerging features and developmental processes of a new infrastructure to support the growth of the green economy and prepare Vermont residents for green jobs. The discussion explores the green industry sector in Vermont, relevant developments in the Vermont education and workforce development system, and the Vermont GREEN strategy and programs.

Box 3. Profile: Vermont Employer 1

A local company with strong ties in Central Vermont, Employer 1 has been building capacitors for over 50 years. In 2004, the firm 'stumbled' onto a new technology, and since then it has been developing the technology and looking for new market applications for it. After two grants from the Department of Energy—\$9 million for research and development and \$9 million to modernize its production facility and processes to produce the product and bring it to market—the company is poised for major growth in revenue and jobs in the next 4 to 5 years. The transition into the new market has meant nothing short of a total transformation for this company. A new culture based on Lean manufacturing is being ushered in through the adoption of new manufacturing processes, a new enterprise resource planning system, and a new factory complete with custom-made, one-of-a-kind manufacturing equipment that costs millions of dollars in new investments.

Currently, the company employs about 70 employees, with about half in production-oriented positions. The company is projected to employ an additional 132 in the next 4 to 5 years. Such growth is unusual in Vermont, so there is much cooperation and interaction between the company and the state workforce and economic development systems, and they have been successful at leveraging between \$3 and \$6 million in additional state funds to support the job growth goals. The company received a Vermont Employment Growth Incentive grant, which provides annual reimbursement based on the number of new jobs created, provided that the wages are a minimum of \$12.90 per hour. If the company meets its job creation goals, it stands to receive a maximum of \$3 million over 9 years. The company is also working with the state Department of Labor to access incumbent worker training funds to train employees in new skills required by the new production system.

Vermont GREEN came into existence around the time the company received its first Department of Energy award. Vermont GREEN worked with the company to tailor its program to meet the company's needs for new workers and for training to upgrade its production workers' skills. Vermont GREEN training funds have been used to leverage training needed to fully implement the new system and to ensure that production quality meets the stringent standards of the customers in the new markets targeted by the company for its new green product line. Funds have been used to develop training in specific equipment and training in new manufacturing processes like Lean manufacturing, the enterprise resource planning system, and geometric dimensioning and tolerancing. Much of the training will be offered in house, so a big part of the Vermont GREEN investment is going into helping the company build a new training infrastructure with the capacity to train and certify existing and new employees. Envisioned is a new, multi-skilled process assembly technician who would be qualified to work in all processes and certified on all equipment in the plant. Individual employees would be cross-trained so they could perform any task required on the production floor. The company plans to develop a skills chart supported by ongoing in-house training. The more skills an employee acquires, the more pay he or she will receive. Current employees are being trained for leadership positions in the new system, and the company is working with Vermont GREEN to recruit and train new entry-level workers to fill the new positions coming on line in the next few years.

Box 4. Profile: Vermont Employer 2

Employer 2 was a leader in energy-efficient home products and tools when in 2009 it moved into a new product line to capture the growing green home market. After examining the new green market, it settled on a niche serving the needs of its current customer base, the 'do-it-yourself homeowner.' The first product brought to market was a home solar water heater that homeowners could install themselves or with a little support from the company. That became the guiding principle of the new product line: make products that average Joes can use to upgrade the efficiency of their own home in a weekend's time. Like Employer 1, Employer 2 works with the state and the federal government to garner grants to put the new product line together and bring it to market.

The company employs 200 permanent employees; this number swells to about 250 during the summer. After addressing the challenges of making the new product and sourcing its component parts, the company turned its attention to learning the dynamics of its new market. While it was sold directly to the customers, the new product line also had appeal to businesses and government building operators. Much of the initial job growth and skills needed were related to building a marketing workforce who could expand into these new sectors. Engineers were also needed to design the new products. The company also hired installers to either install the new systems or help homeowners plan and troubleshoot their own installation project. These jobs required basic construction trade skills and knowledge as well as good customer relation skills. Though the company did not increase its assembly workforce, these workers needed new skills and product knowledge to assemble the new product. The funds and technical assistance of Vermont GREEN have been instrumental in helping the company offer in-house training to meet the skill demands of its new market.

The Green Industry Sector in Vermont

According to the American Council for an Energy-Efficient Economy (Molina et al., 2010, <http://www.aceee.org/sites/default/files/publications/researchreports/e107.pdf>), Vermont ranks eighth in the nation for percentage of renewable energy produced (10.9 percent) from the total energy consumed and is a leader for energy efficiency policy and standards, energy production, and financial and information incentives. A supportive cultural and policy environment for green industry in Vermont has resulted in the development of new businesses as well as in the greening of existing industries and jobs.

A 2009 survey of the Vermont environmental business sector found that over half of the 250 respondents expected to grow their environmental business over the next 5 years (Vermont Consortium, 2009). The two Vermont employers interviewed for this study illustrate this point.

Both were launching new green products, and both anticipated the need to increase their workforce if their new products were successful. However, the question remains of whether they will find workers with the skills they need to move into these markets. One in five of the firms in the 2009 environmental business survey reported difficulty finding qualified project managers and technicians, and over one third reported that they had not been able to find training in Vermont that could help them fill these gaps.

Vermont GREEN Employer 1 saw long-term opportunities in Vermont for workers with green skills and credentials:

I would say that, yeah, if people go out and get some certification or if they're able to avail themselves to some of these programs that are out there, then we may not have a higher-level job for you today. If we do in the future, you're certainly going to be a candidate for that because you've gone through this type of training.

However, in the short to medium term, participants in the study were concerned with job quality and job creation in the green marketplace. On the surface, Vermont's job market looked good, especially when compared with other states. In September 2010, Vermont reported steady positive job growth for the first time in 2 years. In December 2010, the Bureau of Labor Statistics reported that Vermont's unemployment stood at 5.8 percent, the fifth-lowest unemployment rate in the nation. Still, problems related to the high cost of living, the continued recession, and the uncertain market cycles in the emerging green industry have led the employers in this study to believe that the job growth masks the difficulties facing businesses and workers in Vermont. For example, Employer 2 talked about how the overall economic climate offset the benefits of employment in green jobs or any jobs in Vermont.

In this particular part of the country in Central Vermont, the cost of living here is extremely high. So even at \$12.90 an hour [the starting wage with this employer] plus, at that level, it is extremely difficult for someone to have any kind of a great life. Taxes are very high, rental properties are very expensive, food is expensive, fuel for heating and

electricity are very expensive. In this particular environment, and in this economy, in this part of the world, things are difficult, even with green jobs.

This employer continued to talk about the challenges the firm faced in timing its entry into an emerging green market with its workforce recruitment and development efforts.

In these kind of businesses, you can expect 3, 4, or 5 years to go by before you can enter with your product. . . . Consequently, in this economy, things are slow right now. . . . When that starts to ramp, we expect that the volumes will ramp at a significantly accelerated pace, and we will be challenged at that point to find individuals qualified, and the numbers we need.

The Vermont Education and Workforce Development System

Education. The statistics on educational attainment in Vermont also may hide gaps and challenges in the state's education and workforce development system's ability to meet the needs of the emerging green economy. At 82.3 percent, Vermont's high school graduation rate exceeds the national average by nearly 10 points (Stillwell & Hoffman, 2008, <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008353rev>). However, one third of Vermont adult men and 31 percent of Vermont women do not attain advanced degrees beyond high school, which in turn significantly limits job prospects.

Under Perkins IV, the Vermont Department of Education has undertaken a redesign of the career and technical education system that is in part designed to fill this gap. The strategy is to move Vermont career and technical education away from its traditional focus on occupational skills training to the broader, higher-level knowledge and skills within a career field. The goal of the new system is to prepare high school students to enter college and/or a challenging career that offers opportunities for continuous learning (Fisher, 2006). This effort is based on the implementation of new programs of study based on industry-identified career pathways in high-skill, high-demand labor markets in the state.

This plan is recognized as a long-term effort. As Fisher (2006) explained,

Full implementation with all our . . . pathway programs will be a huge challenge. To bring this model to scale will require strategic efforts and aggressive professional development. . . . All components of CTE [career and technical education] will need to transform (p. 17).

Indeed, there was little evidence that the interviewees in this study and the projects sponsored by Vermont GREEN were connected to this broader state initiative. One reason for this may be that the pathways for the green sector are still under development. Another reason may lie in Vermont GREEN's strategy, which relies heavily on industry and proprietary training providers, rather than the state community college system.

Workforce Development. A representative of the Vermont workforce development system interviewed for this study explained the current gap in the Vermont education system and talked about how the Vermont Department of Labor and the state workforce development system are working to meet the needs of the non-college-bound population.

So it's kind of the black hole of the education and training system, where we try to patch things together through our adult ed systems through offering courses and getting employers to pick up half the cost through state grants. Basically where the bulk of the workers are in Vermont . . . is that mid level; . . . the opportunity is there for a lot of Vermonters just to move into that mid-level technical area—the non-college-credit 1-year training programs, those kind of things.

Resources are extremely limited to help those people. So when they get dislocated from a job which they may have held for 5, 10, 15 years, or maybe they've even had a spotty work history, and now the economy goes down and they need to shift gears into something else, training infrastructure for them is really limited. The opportunities are just too limited. And community colleges can be an important part of that and that's growing, but in Vermont, community college is an expensive option. It's like \$1200 for a three-credit class. And if you're not very careful about what you study, and make sure it's going to get you a job, if you walked out with maybe high skills that are not in demand and \$10,000 or \$20,000 in debt on top of it. So this kind of program the Department of Labor puts up is one of the things that plugs that gap. You don't have to be a high school graduate; you don't have to be ready for college.

Vermont GREEN aligned itself with this broader workforce development agenda by building a network of educators, training and service providers, employers, and unions in the energy efficiency and renewable energy industries in Vermont that will expand and improve the certification and training programs available to workers in green industry skills.

Vermont GREEN Strategy and Programs

The Vermont GREEN partnership is building an infrastructure to engage a wide variety of partners in the development and delivery of training and certification programs that will prepare and place workers in green jobs and strengthen the green economy in Vermont. This infrastructure includes partnership outreach and networking activities, a three-pronged program development and delivery strategy, and the provision of a variety of green-related training and certification programs. Each strategy is discussed in this section.

Partnership Outreach and Networking Activities

Through outreach, networking, and the pooling of a variety of federal, state, and private funds, Vermont GREEN and its network of partners are working towards the development of a new infrastructure to meet the commitments of the ETP grant and to sustain the ETP and its activities beyond the grant period. One outreach and networking activity that was mentioned by several interviewees as being particularly effective at meeting their needs and expanding their engagement in the network was Vermont GREEN's internet newsletter/Web site. The Web site connects the partners to a wide range of green training programs and activities, funded by a variety of means throughout the state. Indeed, one employer interviewed for this study was surprised by the value of this information.

They do a great newsletter. Newsletters tend to be ho-hum. Sometimes they're boring, but we get these e-mails that have great links. Have you looked at this? Have you

checked this out? Look what this company's doing. Check this profile out. Often, I spend my time looking at it going, "Hey, that's really cool. That's value added." Something I wasn't expecting that's really a neat sort of thing that they do. I just got one today; that's why I was thinking about it.

The sundry meetings Vermont GREEN sponsored were also mentioned as effective mechanisms for bringing together the partners, building community, and fostering learning in the network. The educator interviewed for this study talked about the value of these meetings to her work.

Typically, I might be developing training programs based on what I think industry needs or what one industry needs. And I don't—as a client developing that, I might succeed and I might not, but I don't have a working relationship with the customer to reflect on what could be changed and what could be improved. I just have an evaluation of what happened.

So for me, the coalition of partners that Vermont GREEN pulled together for this project gives me that feedback. It shows me the whole system. It shows me where my weaknesses are and gives me the opportunity to brainstorm solutions with folks who may not have exactly the same desire as I do, but we all share the same end-goal. That has been really helpful. I mean, we've been able to sort of course-correct and adjust pretty quickly to some feedback we've gotten. And otherwise, I think, it would've taken us a long time and there may have been some lack of satisfaction that we never understood.

Three-Pronged Program Development and Delivery Strategy

CVCAC, the convener of the Vermont GREEN partnership, relies on an extensive and growing network of social service and training providers to deliver programs based on a three-pronged strategy, which includes sponsorship of a statewide weatherization training and certification program, a counseling and referral network, and customized training programs and services for apprenticeship programs and individual employers. These strategies aim “to broaden the career pathways in green industries and to meet the emerging skill needs of green employers” (CVCAC, 2010, p. 1).

Prong 1: Weatherization. The first point in Vermont GREEN's three-pronged program

delivery strategy is to partner with the home energy efficiency/weatherization certificate program to provide training in a wide range of skills, including training that leads to a Building Performance Institute weatherization certificate. Prior to the ETP grant, the Vermont Office of Economic Opportunity (OEO) operated an extensive weatherization program to provide low-income homeowners with subsidies to weatherize their homes. OEO weatherization funds are administered by the state community action agencies, which broker jobs for local residents with the local contractors who are paid to deliver weatherization services. OEO pays the tuition costs to train the workers recruited by the community action agencies for weatherization certificates and jobs. This training and certification is provided by the partnership's education partner, who was interviewed for this study. The ETP grant also provides funds for new outreach and wrap-around services that have expanded and improved upon this preexisting program.

Prong 2: Counseling and Referral. The second line in Vermont GREEN's strategy is its network of career counselors—placed in five Vermont community action agencies as well as at the Vermont Technical College—who are responsible for identifying, placing, and retaining Vermont residents in green-related training programs and green jobs throughout the state. Counselors work with individuals to assess their needs and help them access relevant federal- and state-funded services that will enable them to enter into and successfully complete one of the green training programs available through the partnership. Counselors continue to work with participants until they have completed the training and secured a job. Counselors play an important role in matching trainees to available jobs and apprenticeship slots with the Vermont GREEN partner unions and employers.

Prong 3: Customized Training. The third prong of Vermont GREEN's strategy is to work with private industry to support the development and delivery of training targeted to the

specific needs of regional employers in the renewable energy and the electric and hybrid vehicle sectors. It also works with union apprenticeship programs to support upgrade training in green skills for union members. Though Vermont GREEN pays for some of the cost of this training, the partners augment the total cost by leveraging other public and private resources. Vermont GREEN will also pay the cost of training for individuals in need of training in green skills and certifications that are not available in the Vermont GREEN partner network. A primary element of the Vermont GREEN–sponsored training is that it results in an industry-recognized certificate or a skill that is valuable to the trainees’ current employer. This study included interviews with two of the three employers who signed onto the ETP grant for this service (see Box 3 and 4 earlier in the chapter).

Vermont GREEN Training and Certification Programs

It may be apparent from this overview that the training and certification model under development in Vermont GREEN is not closely linked to the broader career pathway reforms under way in the Vermont career and technical education system. Rather, Vermont GREEN’s career pathway model is being built as the partners connect the dots between available funding for economic development and job training, preexisting training and certification programs for occupations, and green tasks in housing, construction, and manufacturing and link them when possible to customized incumbent worker training for existing and projected jobs in businesses poised for growth in an emerging green market.

Table 5-1 summarizes the training and certification available through the Vermont GREEN network of training partnerships. According to the December quarterly report to the ETA, Vermont GREEN partners had enrolled 662 trainees, of whom 481 completed the training, 351 received a certification, and 348 were placed in a job.

Table 5-1

Vermont GREEN Training and Certification by Training Provider

Training partner	Training and certification	Certificate and qualification
Home Builders and Remodelers Association	Certified Green Professional	The Certified Green Professional™ designation recognizes builders, remodelers, and other industry professionals who incorporate green building principles into homes—without driving up the cost of construction. Classwork leading to the designation provides a solid background in green building methods, as well as the tools to reach consumers, from the organization leading the charge to provide market-driven green building solutions to the home-building industry.
International Brotherhood of Electrical Workers	Training in support of apprentice and license credits	
Vermont Technical College	Building Performance Institute certification Weatherization training	Provides certification for different types of workers: <i>Building analyst:</i> Perform comprehensive, whole-home assessments, identify problems at the root cause, and prescribe and prioritize solutions based on building science. <i>Envelope:</i> Quantify performance and prescribe improvements to help tighten the building envelope (shell), stop uncontrolled air leakage, and optimize the comfort and durability of heating, ventilating, and air conditioning performance. <i>Residential building envelope whole house air leakage control installer:</i> Implement measures to tighten the building envelope to reduce energy loss from air leakage and reduce pollutants and allergens through air migration. Improve thermal comfort and energy efficiency through the proper installation of dense-pack insulation materials. <i>Residential building envelope whole house air leakage control crew chief:</i> Provide supervision, guidance, and quality control of teams in the field working on controlling air migration through the building envelope and also on the proper installation of dense-pack insulation materials. <i>Manufactured housing:</i> Apply house-as-a-system fundamentals to the specific needs particular to the various types of housing technologies. <i>Heating:</i> Optimize the performance of heating equipment to help save energy and ensure occupant comfort, health, and safety.

Training partner	Training and certification	Certificate and qualification
		<p><i>Air conditioning and heat pump:</i> Understand the role of these systems within the whole home and how to diagnose and correct problems properly to achieve peak performance.</p> <p><i>Multifamily:</i> Apply building-as-a-system fundamentals to diagnose problems and improve the performance of larger, more complex residential structures.</p>
Vermont Department of Labor	Career Readiness Certificate Program	Up to 60 hours of training provided in partnership with Vermont Community College in fundamental work readiness skills. Students receive a nationally recognized National WorkKeys Certificate as well as a Career Readiness Certificate. Customized sections of the training and certificate are provided for specific employers, agencies, and/or populations.
Vermont Fuel Dealers Association	National Oilheat Research Alliance (NORA) Certification	<p><i>Bronze Certification</i> is designed for beginners to learn and execute fundamental skills. This certification is the first step toward a career as an oilheat service technician.</p> <p><i>Silver Certification</i> is technical competence established through training, a test, and field experience.</p> <p><i>Gold Certification</i> is established through previous participation in the silver certification program with additional competency in energy efficiency.</p> <p><i>Tank Certification</i> educates oilheat technicians to perform the proper tank maintenance and inspection.</p> <p><i>The Static Testing Program</i> teaches the proper procedure of testing an underground tank.</p> <p><i>Continuing education unit</i> courses sharpen skills of those not enrolled in a certification program.</p>
Vermont Housing and Conservation Board	EPA Lead and Renovation, Repair, and Painting Certificates	Certification in federal guidelines for lead paint abatement.
Vermont Works for Women	Pre-apprenticeship training	Entry into union apprenticeship programs
United Association of Plumbers and Pipefitters	Training for apprenticeship and license credits	
Employer partners	Customized training provided in-house to incumbents	Examples include Lean manufacturing processes, enterprise resource planning, implementation training, cross-training on manufacturing equipment

Vermont GREEN Early Start-up Experiences

This section reviews the early start-up experiences of the Vermont GREEN partners interviewed for this study. It begins with a discussion of experiences that brought the individual stakeholders to their involvement in and support of Vermont GREEN; it next focuses on the interactions and relationships among the stakeholders that contribute to building the partnership and delivery of programs. This section also includes a discussion of the challenges stakeholders face in the partnership and its programs and the strategies that they have employed to meet these challenges. Finally, this section explores the stakeholder perceptions of the career pathways model and of the trainees' needs and experiences in Vermont GREEN programs. This section is followed by a discussion of the findings of the Vermont GREEN case. Vignettes of the start-up experiences appear in Boxes 5 to 7 in this chapter.

Stakeholder Green Experiences

Though the genesis of Vermont GREEN was the U.S. Labor Department's ETP grant, many of the partners were involved in economic and workforce development initiatives under way within the state prior to the grant opportunity. A number of the Vermont GREEN participants interviewed for this study saw the ETP grant as an opportunity to connect their individual green workforce development efforts to broader economic and workforce development efforts in Vermont, which they believed would broaden their network and strengthen their programs.

Consequently, when the interviewees shared their early start-up experiences, it appeared difficult for them to delimit the boundaries between their activity in Vermont GREEN and preexisting initiatives in their firms and in the workforce development system around the state. Further, they saw the value of Vermont GREEN as its ability to connect the dots between these

Box 5. Start-Up Vignette: Employer 1

Employer 1 talked about its new training and workforce development strategy to support its entry into new green markets. “The training that is necessary to pull a project like this off is often overlooked, and it has been a key piece of the puzzle even though it’s not technically part of the deal [the Department of Energy grant].”

The move to Lean manufacturing and the new computer-based equipment that the company had purchased changed every job in the firm. Engineers needed to learn new processes and standards, and operators needed to be cross-trained. “Our intent is to maintain flexibility on the floor, which we need to be competitive. . . . We don’t have 40-hour-a week jobs per se, so we have jobs that may take a person 1 or 3 days, so these individuals have to be able to do a multitude of different things for us, so I am trying to cross-train as many individuals as I can.”

In the short term, the company leveraged a number of trainings for specific pieces of equipment and for general processes like Lean manufacturing and the enterprise resource planning system, which have helped to build introductory knowledge to begin to implement the new process. But more training is needed to bring the new system to the next level.

Vermont GREEN provided support for the development of a comprehensive entry training program, which consisted of 3 to 4 weeks of training to certify employees to work in the firm. “They will know the history of our company our philosophy and culture, our requirements regarding safety, etc., a good understanding of our product, what markets we are targeting, and all the various assembly jobs we have. . . . We want to make sure our employees are trained in the use of most of the equipment.” Training did not stop at the entry level. “I believe in training, cross-training, and cross-training until you run out of things to train in, and that is unlikely.” Advancement in the new system was tied to skills, and employees who availed themselves of the training would receive higher pay.

This entry program resulted in the company aligning itself more closely with Vermont GREEN. Vermont GREEN was now its sole source for training and for the candidates for the new positions it is opening up. This relationship was a great benefit to the company, especially in this time of its transition into a new green market. “The opportunity afforded us by this grant has been extremely beneficial. It allows us to bring people on and helps us carry the burden of additional staff—sometimes prior to what product sales would support—and allows us to position ourselves to be ready for those big orders, which we assume will be coming shortly.”

preexisting activities to help fill the gaps between supply and demand in the green labor market.

The workforce development representative described the start up of Vermont GREEN in this way:

This project was a shot in the arm to some training efforts that we had already been undertaking, like weatherization, solar panel installation, green construction. . . . But we’d been—the state had been making some much smaller grants to some of the same employers that were involved in this project. So this is kind of a logical follow-up because those are at the stage of beginning to wind down.

Some of these are pretty innovative companies. . . . We've seen some growth opportunities that this thing came along just at the right time. But we still had a good tie-in with those firms, pretty active tie-in, saying, hey, would you guys be interested in taking the next step?

The two manufacturing employers interviewed for this study discussed their preexisting relationships with the government agencies supporting their expansion in the green industry and shared their enthusiasm for integrating Vermont GREEN into a broader economic and workforce development initiative in the company. Employer 1 explained:

Box 6. Start-Up Vignette: Employer 2

Employer 2 had worked with Vermont GREEN to support the launch of its new, easy-to-install solar water heating system. "Just to be able to do this in an efficient way, in a lean way, and in a way that makes sure that the quality is still there, . . . there's a lot to learn, and training had to take place because we had never done anything like this before."

One of the challenges was to figure out how to assemble the new product and to prepare a workforce for this new work. The employer knew that it wanted a new internal training program that would certify employees in the new work, but first it had to figure out the assembly process. The new jobs would be very similar to traditional assembly jobs, but new quality standards and new technologies also required the company to build and recruit for new skill sets.

Another challenge was to figure out the demand versus the build cycle. Though it knew that the market would take off, the initial demand was not as high as expected. Consumers were interested in the product, but sales took time because a solar water heating system is not a spontaneous buy. The company brought in employees to help build the infrastructure for the launch of its green product line. It hired a director of merchandising to oversee the commercialization process, marketing staff to reach out to a new customer base, and installers to work with clients to install or to train them to install the product in their homes. A new engineer was also brought in to help in the product design and production process.

Given the slow buy cycle, the company struggled with how to balance the numbers and preparation of the manufacturing workforce. It had hired a few factory workers and cross-trained them to work across all product lines, which allowed some flexibility while it figured out the demand-buy cycle. In the meantime, it was working with Vermont GREEN to develop an internal training program to certify assembly workers in all product lines. Existing employees were trained first so they could train new employees who would be hired once the new product took off.

The company was pleased with the support from Vermont GREEN. "The thing that has been good is the money. All of a sudden we have this pool of money that we didn't have before, and we can do things that maybe we wouldn't have been able to do without it. That's been terrific. The second part is knowing that we have the support of a bigger organization that's able to help us do the training and help us navigate through the system so that we can get what we want to get out of it."

We learned of the Department of Energy grant roughly in the summer 2009, we were awarded in August, and then formally didn't begin the project until January 2010, which is roughly when the Vermont GREEN process started as well, so the timing there was great for us. But to consider the number of things that we've had to accomplish in a very short amount of time: we've constructed new manufacturing facility, built up a new complete manufacturing line. And, again, implementing the changes needed to accommodate all of those, bringing on a large number of new staff people, and incorporating them into the company culture, all happening at the same time, has been very difficult. Resources, both in terms of people, man-hours, as well as physical resources, materials, and always cash flow during a process like this, with some large investments are always very critical.

. . . It's great that this investment has been made, not only by the Department of Labor, by the Department of Energy, but we've seen a number of different projects here that we've been lucky enough to leverage to make this greater project happen, Vermont GREEN being one of them.

Employer 2 also saw a great fit between Vermont GREEN and the work under way in the firm to expand into a new green market.

Box 7. Start-Up Vignette: Educator

The Center for Sustainability provided the training for the OEO-funded weatherization program administered by the community action agencies throughout the state. Since the training was funded by state and American Recovery and Reinvestment Act funds, it naturally came with a job placement requirement. In the interview, the director of the center shared frustrations with the way in which the funding requirements drove the training and inhibited the school's ability to respond to the market. Managing and responding to this challenge was a big focus during the school's start-up experiences with Vermont GREEN.

The Vermont GREEN ETP grant provided the school with resources and a broader network to help manage this challenge. First, grant funds were used to hire a job placement counselor at the school to work within the community to identify weatherization as well as other green jobs to place program participants. This counselor also worked closely with the community action agencies' career counselors to locate clients from across the system to present as candidates for open jobs. Though frustrations regarding the definition of green jobs continue to persist, the placement rates within green as well as other jobs have risen since the job placement counselor was hired by the school.

As another benefit, Vermont GREEN provided the director with a broader view of the entire system of green jobs and workforce development in the state, which has helped to improve existing programs and insight into unmet training needs in the industry. In response to the feedback and in light of the challenges in placing trainees in green jobs, the director was considering offering other types of training to develop broader skill sets that would allow individuals more mobility across the green labor market—for example, training in environmental literacy, basic math, and English proficiency.

We knew that we would be able to look at that, the whole green segment of the economy, and be able to hopefully develop some products that would be in line with that. That's when we started to look at some things other than our traditional product line. We developed a new brand based on solar. That's really where we've been working with this grant to the state and the federal grant to do training around putting this thing together and bringing it to market. It's been a terrific product for us.

The community action agency, a central partner in the Vermont GREEN strategy, was also well connected with the green industry through its involvement in the OEO weatherization initiative mentioned earlier in this report. This initiative positioned the network as a key agent in the renewable sector in the region. The workforce development representative interviewed for this study explained the importance of the community action agency network in Vermont, which further clarified why CVCAC emerged as a natural leader for the ETP grant.

Well, the community action agencies are really important in Vermont, especially in a recessionary period, just for the basic services that they provide. They're networked with all the programs and financial counseling programs and small business start-up programs. They're a pretty big deal in Vermont. There's a network of these, and community action has kind of emerged as a leader in the state. And the director of Central Community Action is a member; he's one of my board members. . . .

So we have interaction. And generally in Vermont when we're going after a big grant, we don't have any advantage of a team of grant writers sitting around like a lot of big states do that systematically go after these things. But what we do have is advantage in—it's a small state, and a lot of us know each other and we're pretty well networked. We've been involved in other projects before, and you kind of know who to call and who might be likely partners.

Consequently, Vermont GREEN was born as the CVCAC and the workforce development system connected the dots among the various initiatives and relationships they had already established in the state and in the manufacturing and the energy efficiency sectors in Vermont. The workforce system brought several manufacturing firms they were supporting with small incumbent worker grants throughout the state, and the community action network brought

its relationships in the home construction and retrofitting sector to provide the basis for a more comprehensive approach to green workforce development.

Stakeholder Interaction and Relationships Within Vermont GREEN

Interaction among the stakeholders in Vermont GREEN occurred largely within the context of the three-pronged strategy, including the weatherization program, the counseling and referral network, and the customized industry training programs and services. However, Vermont GREEN was working to develop relationships and involvement within the context of the broader partnership, as well as between the partnership and the broader workforce and economic development system in Vermont.

Interaction Within the Three-Pronged Strategy. There was limited interaction across the stakeholders engaged in the three Vermont GREEN strategies. The career counselors (strategy 2) assessed and referred clients to green job training in the community. Some of the clients were referred to the Vermont GREEN weatherization program (strategy 1), so there was ongoing interaction among the counselors and Educator 1. However, there was limited interaction among the counselors and the operators and providers of the customized training (strategy 3) provided by the apprenticeships and employer partners. Counselors referred clients to a variety of formal education and certification programs throughout the state, whereas the apprenticeship and employer partners worked with either in-house resources or proprietary training providers to deliver green training to upgrade the skills of incumbent workers.

Indeed, both the educator and the workforce development representative interviews confirmed that direct interaction between educators and employers on program development was rare within the Vermont GREEN network. For instance, the educator acknowledged that she had

little interaction with employers; rather, she interacted mainly with trade associations and unions, and this interaction had led to new opportunities to collaborate.

We all have these mobile, renewable energy vehicles we take to trade shows to demonstrate what we do. And they're great teaching units, and we never share them with each other. We didn't even know they existed. We didn't know each other had—like solar hot water is owned by the plumbers union, and the electrical union has PV module, and we have a weatherization one. So, now we're talking about sharing that equipment, showing up at the same place, coordinating that.

The workforce development representative talked about the challenge in bringing employers and educators together to work directly with each other when he stated: “So unless you have relationships with all the parties to begin with, these two cultures are working on different frequencies most of the time.” Educators, he suggested, want to help people, and employers want to make their company successful and create social value for their employees and community; thus, what he tries to do is to “figure out, well, what are the things they can contribute that are most valuable? Coming to a meeting and sitting for 3 or 4 hours with an unfocused discussion is not something that they are going to consider a good use of their time.” So in part, the lack of direct interaction among employers and educators may be by design.

Relationship Building Within the Partnership. Even though the delivery of the three program strategies required little interaction among the partners, Vermont GREEN sponsored activities to foster engagement of the stakeholders in the broader partnership and system. Several of the participants talked about the activities that Vermont GREEN sponsored to generate more involvement in the partnership and industry. For example, the educator talked about her work inside the partnership to help connect the strategies and improve the outcomes of the grant.

So, they've created this amazing ladder, or skeleton, or something, some sort of chart, graphed out, that has different layers. So, there's a regular meeting of all the partners . . . that I attend and so do the other lead partners. Like the owner of some of the company partners might attend. So it is sort of policy-level, big-picture meeting. Then there's the meeting of the youth counselors that happens every month, and they come in and talk about their clients and what their struggles are. . . . Then there's the community action agency counselors meetings. . . . I spend a lot of time in meetings listening to all these people, who are—have some similar role in Vermont GREEN, and that's where I get the feedback. . . . So, I may hear from the counselors that they have no work for their weatherization crews that we've trained because the contractors they normally work with don't see the value. So then we all say: Well, how can we convince these folks?

Also, though direct interaction among employers and the educator was rare, the two employer partners did report that they were more engaged in the industry and in the community as a result of their relationship with Vermont GREEN. For example, Employer 1 reported that it attended a few partnership meetings to provide input into the overall project and Vermont GREEN's Web site. In addition, it also had Vermont GREEN counselors as well as local teachers tour its new facility so they could see firsthand the changes being made and the jobs being created and could share with students the opportunities available to them in the future. This employer also talked about the potential, once the new system was up and running, for it to partner directly with the area high schools and the technical college on different types of internships as well as on the development of technical degrees for manufacturing workers that included higher-level engineering skills which it anticipated needing in the future.

Employer 2 was involved in the Green Jobs Summit sponsored by Vermont GREEN. The summit brought together all partners to explore how to influence Vermont policy to support the development of the green sector in the state. He thought the community learned a lot by planning the event, and he expressed interest in working to improve the outcomes of next year's event.

Thus, both employers envisioned a long-term and continuing role for their companies in the partnership. As employer 1 put it: “We are hoping that there are a lot of other partnerships under way, and we are hoping that we can begin to participate at a different level.”

Relationship Building Between Vermont GREEN and Broader System. The workforce development representative also talked about the long-term objective of connecting Vermont GREEN to the broader workforce development system in Vermont. According to this interviewee, one of the things which he and other partners looked at in the start-up phase of the project was sustainability. From the beginning, they were concerned with how they would sustain the various strategies once the ETP grant was over and stated:

Those would have to be picked up, or integrated in some way into the work of a lot of the member organizations. So we see this as a project with soft edges to try to engage with the state college system, the regional tech centers, the union, the nonprofits, and try to build those working relationships right from the beginning.

Accordingly, Vermont GREEN was working with its partners to connect all the dots in the green sector in Vermont and to leverage and integrate a wide variety of resources to deliver workforce development programs. It was also working with the state WIB and others to engage employers in identifying the long-term workforce needs of the green industry sector in Vermont. For example, through another grant, the WIB and Vermont GREEN were conducting interviews with 100 employers in a variety of green industry sectors to identify needs and to guide the next phase of the training. The state WIB would continue to push resources to the industry to help leverage other private and public funding to engage employers in training and job creation. The intention was to work with Vermont GREEN and to use state funding to develop and pilot innovative approaches for the industry and then leverage other resources, federal and private funds, to bring them to scale.

Start-up Challenges and Strategies

Though the Vermont employers and the educator interviewed for this study had little direct interaction with each other, they shared similar challenges in the partnership. The shared challenges were related to the development of a supportive partnership infrastructure, synchronizing the supply and demand cycles, workforce challenges, and challenges related to the administration of partnership resources.

Infrastructure. Infrastructure challenges related to the miss-match between the internal structures and systems inside the stakeholder organizations and the demands of the emerging green economy. Table 5-2 summarizes the infrastructure challenges and the strategies adopted by the stakeholders to alleviate them.

Table 5-2
Vermont GREEN Infrastructure Challenges and Strategies

Stakeholder	Challenge	Response strategies
Employer 1	Lack of internal processes and systems to meet quality standards of new green customers/markets	<ul style="list-style-type: none"> • Hire new expertise • Implement new quality and cost control information systems • Implement culture change
Employer 1/2	Roles and personnel policies not aligned with requirements of Lean manufacturing	<ul style="list-style-type: none"> • Enlarge roles and increase engagement • Cross-train and certify all workers in Lean manufacturing and in all product lines and equipment • Train workers in customers/products • Provide continuous training • Increase compensation • Build new career ladders/opportunities
Educator	Lack of expertise to meet needs and develop/deliver training for green jobs	<ul style="list-style-type: none"> • Hire new expertise from within green industry
Educator	Lack of space and inappropriate physical layout of classroom for green training	<ul style="list-style-type: none"> • Build new training center
All	Sustainability of green programs	<ul style="list-style-type: none"> • Seek new funding sources • Advocate for more flexibility in use of existing public training funds

Employer 1 talked about challenges related to developing a number of processes and systems required to meet the quality standards required by the customer for their new green product.

In order to make a company grow, you first have to make sure you have the infrastructure that can support that growth, and that means bringing on staff that is qualified and knowledgeable in the field of sales, but also to make sure that you have the infrastructure internally. You have the systems to record costs, data, you have the systems that will make sure you use your labor and materials wisely, and that represents also a significant culture change.

Both employers spoke about the need to redesign internal job structures and the personnel systems to support Lean manufacturing. Workers needed to have the skills and knowledge required across the work system so that they could move from one product line to another to meet changing demands. In both cases, the employers talked about the need for employees to be more knowledgeable about the product as well as the customer, particularly in the green sector, so that they would be more engaged in the work processes. Both also recognized that they would need to support employees with continuous training and compensate employees for their enlarged role with more remuneration and with advancement opportunities. Both employers were using Vermont GREEN funds to develop internal training capacity, including training and certification programs, to ensure that employees had the specific knowledge and skills required by the new green jobs. Part of the certification included demonstrated knowledge of Lean manufacturing principles. Employer 1 was also developing training and certification in six sigma quality assurance and for each piece of the one-of-a-kind equipment it purchased to manufacture the new green product.

The educator also talked about challenges related to a mismatch between the school-based infrastructure and the needs of the students and employers in the green industry.

Recruiting and on-boarding new expertise was a challenge.

Finding the expertise to develop the curriculum meant the college had to become more nimble in terms of hiring. We did not have a roster of expertise on campus. So, we had to find people, and they consult in the business world. And so, things like procurement procedures and accounting and financial information and paying quickly and all that isn't often part of your day-to-day in a small college. Procedures had to be adapted.

Space was also an issue. A new training center was built to accommodate weatherization training because the institution needed space big enough to blow cellulose insulation without interfering with the other training and social activities that take place in common space.

But perhaps the biggest infrastructure challenge facing the educator related to establishing the structural flexibility needed to respond to evolving needs of an emerging industry. The program was sustained by public funds, so it was tied to the priorities of the funding, which currently was weatherization training. When it was first developed, the training was part of a broader economic development plan that provided funds to low-income residents to create a market demand for new weatherization services and skills. But this market was not big enough to sustain continued growth in the sector, and a broader market of middle-class homeowners seeking retrofitting for their homes had not yet materialized. The educator believed that new funding and/or more latitude in existing funding streams to train in broader green skills and specialty areas would help to make the school more responsive. For example, she thought that if they placed a trainee in an open receptionist job in a green firm or placed a homeless youth participant in a degree-granting program in the college, these placements should be recognized as successful outcomes by the funders because such outcomes have long-term benefits for the individual and the industry.

Synchronizing the Supply and Demand Cycles. These challenges related to the difficulties in ensuring that training was not out ahead of the job market, while at the same time preparing workers for anticipated jobs. Table 5-3 summarizes these timing challenges and the strategies adopted by the stakeholders to respond to them.

Table 5-3
Vermont GREEN Synchronization Challenges and Strategies

Stakeholder	Challenge	Response strategy
Employer 1	Despite knowledge of the impact of new green products and practices on jobs, a lack of knowledge about when the demand for the new product will increase and create a need for jobs	<ul style="list-style-type: none"> • Develop flexibility to respond to changing needs by training incumbent workers to take on new roles and tasks • Work with Vermont GREEN counselors to develop process to recruit and screen new workers and to develop new in-house training to quickly train new employees once needed
Employer 2	Uncertainty regarding the impact of new product on jobs	<ul style="list-style-type: none"> • Explore the development of specialty skill training to overlay existing jobs
Educator	The need to provide training to meet anticipated job growth while ensuring trainees placement in jobs related to skills	<ul style="list-style-type: none"> • Expand curriculum to include broad occupational skills that provide individuals flexibility in the labor market

The interviewees were all struggling to establish a cadence in the green jobs labor market. Most acknowledged that the sequencing between training and job growth was off. On the demand side of the labor market, the two employers in this study knew that once the demand for their new product increased, they would need new workers with enhanced or specialized skills. Employer 1 was also aware of the skills required and the number of workers it would eventually need. What it did not know was when exactly they would need to add trained workers to its workforce. Employer 1 was working with Vermont GREEN to develop in-house programs to train existing employees to take on new roles and tasks so that they could manage the new

work that existed in the firm. This training would also be used to train and certify new employees when needed. Employer 1 had also just begun discussions with Vermont GREEN about a process to involve the counselor network in the recruitment and screening of new employees once the product took off and created new jobs.

Employer 2, on the other hand, appeared to struggle with describing the effect that the new product would have on the skill requirements for the firm's production and installation workers. He knew that the core features of the job would remain the same—it would remain a basic assembling job or in the case of the installers, it would be related to the construction trades—but the new green product would require new specialty skills and perhaps evoke new passion among workers because their work was related to 'green.' The lack of clarity over how the new product would change the jobs and the workers in them was delaying the development of the in-house training and causing problems in how to describe the new jobs to potential recruits.

In the meantime, the educator was struggling to meet an anticipated need for new weatherization skills that did not yet exist. The risk, of course, is that the individual trainee who successfully completed a training program may not find an appropriate job. The educator talked about the effect of this mismatch between the supply and the demand side of the green labor market on individual learners.

The training not only develops skills but gives them a sense of accomplishment, and I think that the counselors who deal with the youth feel that's the case in our training as well as other training they've sent their youth constituents to—that it really begins to make a difference. . . . But then I feel even more guilty. It's the outcome of that is it doesn't really make a difference because they can't find a job because the job doesn't exist, or very few jobs exist. So we have given them a lot of self-confidence and hope, and new skill, and that's great, but they're still going to be sitting at home. It's just, that's not okay on some levels.

One strategy the educator was considering was the development of education and training in broader occupational skills, which would provide trainees more flexibility in the labor market while the weatherization marketplace either grew or stabilized.

Workforce Challenges. The mismatch in the green jobs labor market did not appear to be solely related to timing, however. The research participants identified gaps in the basic skills and knowledge of the workforce, as well as geographic gaps between the availability of training resources and the location of potential trainees. Table 5-4 summarizes the workforce challenges and the strategies adopted by the stakeholders to respond to them.

Table 5-4
Vermont GREEN Workforce Challenges and Strategies

Stakeholder	Challenge	Response strategy
Employer 1	Employees and potential recruits lack high school diploma and/or basic skills	Train and certify employees in Vermont Department of Labor employability certificate
Educator	Rural area with widely distributed student population	Modify policies and procedures for flexibility in training delivery
Workforce development representative	Rural area with widely distributed student population	Create new network of small contractors and connect it with training providers and programs

Employer 1 talked about the difficulty in finding job candidates who met the minimum entry requirement of a high school education. “This is a small area, and of course, the labor pool is always a question.” This employer had taken the edge off this challenge by taking part in the new Vermont Career Readiness Certificate administered by the Vermont Department of Labor. Employees and potential hires can receive support in improving their basic and employability skills, which are assessed against a nationally recognized WorkKeys assessment that results in an employability certificate. Employees of Employer 1 who achieve this certification received an increase in pay.

The educator and the workforce development representative identified gaps in the geographic distribution of schools and training providers and students, which created challenges in establishing a critical mass of trainees for programs. The educator talked about how the school reframed this problem and how that resulted in more flexibility in responding to this challenge.

One of the things we did was to try to rethink what a reasonable training program looks like. So, we typically have these benchmarks where we say, “Unless we have 12 people signed up for this training, we’re not going to offer it, and we’re only going to offer it once a month. So, if you miss it this month or we cancel it, you have to come [next month],” and that drives participation. But in this case, if we have clientele from the counselors who really need this training, then who are we to really say they can’t have it for 2 months?

So, we’ve had to rethink why we’re saying that, analyze that, analyze our costs—if it’s a cost-based issue—and develop solutions that might meet certain needs. We still have certain constraints, but right now, for instance, we have started saying to people, “Well, if you have three people or four people down in southeastern Vermont who are ready for this in 2 weeks and you can give us a classroom space somewhere, we’ll come down and teach it,” instead of waiting for the monthly offering in central Vermont or, you know, in some other area.

Similarly, the workforce development representative worked with small employers around the state to help them rethink their approach to accessing the training they needed to keep themselves and their employees current in a changing field.

In Vermont, where we have a lot of smaller employers—small in Vermont is like 10 [employees]. We have a lot of specialty, very creative, for example, energy efficiency building contractors. They’re pushing the limits of their knowledge of the technology of energy-efficient buildings. It’s one or two principals in the company who are pretty knowledgeable and then they take jobs out in the market and try to find a workforce. Companies like that can’t afford to ramp up extensive training programs for three or four people. But if we find a bunch of those companies, we pull them together and do a focus group and say, “Well, what if you were to work together, maybe get a training association to sponsor our projects?”

Resource Administration Challenges. Finally, each interviewee identified challenges related to the administration of public and, in particular, federal workforce development

resources. Table 5-5 summarizes the administrative challenges and the strategies adopted by the stakeholders to respond to them.

Table 5-5
Vermont GREEN Resource Administration Challenges and Strategies

Stakeholder	Challenge	Response strategy
Employer 2	Federal accounting and reporting procedures not aligned with internal records and practices	Develop new time accounting system to track training hours
Employer 1	Administration of multiple grants to multiple federal and state agencies	Hire a full-time manager to leverage and oversee management of government grants and programs
Workforce development representative	Potential for local competition for limited federal workforce funds	Ensure a coordinating role of the state and local WIB in grant proposals in response to federal SGAs
Workforce development representative	Develop a sustainable workforce development strategy with limited state funds	Use state funding to incent innovative workforce development programs and strategies and apply it to federal competitions for funds to bring programs to scale across the state

Employer 2 shared the difficulties it was having inside the firm adhering to the reporting requirements for the training support they received from Vermont GREEN. Though he acknowledged the need to account for the use of federal money, he thought that the accounting procedures were not compatible with the way that business was conducted in the firm.

We're kind of nimble. This is the training you want? Then we do it. Having to step back and go, "Who was involved in this training? How many hours did they do? What are their wages? Who did the training?" Some of the recordkeeping is a bit tedious; . . . it's a bit more than we expected it to be. It's slowed us down a bit. . . . "We can't do this training yet. We haven't figured out how to track it yet." There's a bit of that.

Employer 1 also faced challenges in administering government funding obtained from multiple state and federal sources, including the state and federal Department of Labor and the federal Department of Energy. It hired a full-time manager responsible for overseeing the acquisition, management, and strategic leveraging of these resources, which at best are not very

coordinated and at times work at cross-purposes with each other and with the mission or objectives of the firm.

Navigating the federal requirements of each of those grants, and the state requirements of some of those grants as well, each of them having different reporting procedures and mission statements in terms of the scope of the grants, and again, navigating those different requirements has been a full-time job in making sure that we aren't violating any of the contracts that we've set into.

The workforce development representative also talked about issues related to managing multiple funding opportunities, and in particular the politics that accompany that role in the state. He expressed a strong opinion about the need to ensure that workforce development funds follow the guidelines outlined in the Workforce Investment Act, which provides a coordinating role for the state and local WIBs. This feature of the act helped to minimize the potential for competition over scarce training and workforce development dollars. He expressed his concerns in this way.

The Workforce Investment Act and one of its primary purposes stresses a collaboration across federal funding streams. That's a central tenet of the Workforce Investment Act. Because things are not very well coordinated in Washington, they need to be coordinated well in the state to make the best use of the resource available. And when Department of Labor puts out a grant offering and does not specify that the state workforce investment or the local workforce investment board needs to be involved in some way, then basically they are working against the concept of collaboration across the agencies.

Because when it becomes a winner take all, agencies are more apt to think, "Well, maybe I can get the work by myself. I'm not required in this proposal to coordinate and align myself with any sort of state policies." So essentially ETA kind of undermines the role of state workforce planning and leadership by not requiring, as a minimum, a letter of support, if not some sort of action collaboration with the state and local workforce boards. So that's my soapbox.

That said, he also talked extensively about how the state Department of Labor was working to mix or balance their private, state, and federal funds to leverage a broad and sustainable workforce development strategy in Vermont to serve a variety of industries, including the green industry.

But we do have some state funds that are fairly flexible. We have to get the companies to apply for that. They can apply for a little as \$5,000 or \$10,000 up to \$100,000 or \$200,000, something like that. We would probably find a couple companies that wanted to try it. We would make them a small grant of \$5,000 or \$10,000 and see how the concept worked.

Using federal money for stuff like that is a lot more complicated. So the innovation tends to not come so much on the federal side unless you get a big project like the Vermont GREEN project. There's some interesting ideas in there, but they were often things that had evolved out of the state projects that had gone before.

State funds were used to pilot innovations which were then brought to scale with the use of federal funds. This perhaps explains Vermont GREEN's developmental approach, which was to pull together three separate strategies into a coordinated whole to service the needs of green industry and workers in the state.

Stakeholder Perceptions of the Vermont GREEN Career Pathways Model

The Vermont educator and the workforce development representative were aware of the Vermont career pathway initiative. The educator talked about efforts to improve science, technology, engineering, and manufacturing education and the need for a statewide environmental literacy curriculum that could be taught across districts. The workforce development representative described work under way to improve the alignment and articulation between secondary and postsecondary education and to encourage youth to complete high school and continue into postsecondary education. Neither interviewee tied these efforts to their work in green jobs workforce development in the state. It appeared that the career pathways model had yet to connect education and workforce development in the green jobs sector in Vermont and perhaps was working to evolve an alternative model. The features of the model are outlined in Table 5-6.

Table 5-6
Features of Vermont GREEN Career Pathways Model

- Short-term training linked to industry-recognized standards and credentials and/or to the internal processes and equipment of participating employers
- Short-term certificate training linked to job placement
- Short-term certificate training not articulated to a broader credential
- Provision of support and case management services separate from or not integrated with the provision of training and certification
- Counseling clients placed in training for which they are academically prepared to succeed
- Provision of uncoordinated, customized training and certification services to employers

A key principle in Vermont GREEN is that all training must be linked to industry-recognized credentials. Each training partner has incorporated existing industry-recognized training and certificates in developing and delivering programs. The two employers interviewed for this study were certifying their employees in internal equipment and processes but not in broader industrial credentials. In the case of one employer, employees who were certified received higher pay.

As described earlier, the training available through Vermont GREEN, including the training provided by the Center for Sustainability, was short-term training that led to industry-recognized certification in a green-related task. This and other training and certifications offered by Vermont GREEN appeared to be stand-alone efforts, for they were not systematically linked to further education and credentials in a green-related field. For example, the students in the Center for Sustainability might at some point transfer to a degree program in the school, but if they did, they did not carry over credit for their short-term weatherization training and certification they received from the center.

Additionally, there was little coordination between the training and other workforce services, such as the counseling and case management provided by the Vermont GREEN counselors. For example, the Center for Sustainability, a prime training provider, did not address

developmental needs of participants, nor did it provide education in deeper knowledge and occupational skills. Indeed, when asked to assess the skills and capacities of the Vermont GREEN students and their preparedness for the program, the educator's response indicated that students needed to possess baseline occupational skills and basic skills in order to succeed in the training.

With the community action programs, the counselors get that information beforehand, and they help screen the applicants because it's their job. They want to see their applicants be well prepared. So, they shouldn't be sending us people who don't meet those basic requirements. Indeed, the counselors only send those individuals who have, they determine, possess the basic skills required by the training.

Except for the referrals that the center received from the Vermont GREEN counselors and for a partnership between a women's agency and the two union training partnerships, the services provided by the Vermont GREEN counselors were largely separate from the training provided throughout the partnership.

The same can be said for the internal training within the two firms interviewed for this study. Though both employers talked about their plans to certify employees in company-specific processes, and in the case of Employer 1, customized one-of-a-kind equipment, they both also shared that they were incorporating similar skills and knowledge related to Lean manufacturing into their curriculum. It appeared that there is an opportunity for Vermont GREEN to bring these partners together to identify common needs and begin to identify skill standards and career pathways that will lead to broader and deeper occupational training. Both employers and the one educator in this study expressed an interest in pursuing this longer-term strategy.

Stakeholder Perceptions of Vermont GREEN Trainees

When asked to speak about the students and recipients of Vermont GREEN's programs and services, the interviewees did not have much to share. One reason for this is that many of the programs were still in development or just under way, so there were only a few students in the early phase of the training. Another reason is that in the case of the educator and the workforce development representative, their positions as policy-level administrators afforded them little interaction with participants. The educator did, however, imagine that successful completion of the program provided the trainees with a sense of personal accomplishment, which for some was dashed by the lack of a job for them in the skill area for which they had been trained.

In the case of the employers, they interestingly did not relate to their own employees who received training through the Vermont GREEN program as recipients. When asked about the program participants, they talked about their views of the participants in the external programs offered by other Vermont GREEN partners, and since they had little to no contact with this group, they had little to share. When asked about their impression of their own employees' experiences and motivation in the internal programs which were just then coming on line, they speculated that their employees would be eager to participate, to advance their skills, and to contribute in new ways inside the firm.

Findings: Vermont GREEN

There are four findings to the Vermont GREEN case study, including the quality and nature of the emerging sector partnership, the synchronization of the labor market, the emerging

career pathways model, and the quality and nature of jobs. These findings are summarized in Table 5-7 and explained in the text below.

Table 5-7
Vermont GREEN Case Findings

Finding	Vermont GREEN
The quality and nature of the sector partnership	Emerging network aiming to build a centralized institution to engage private-public partners in creating a new green economic and workforce development infrastructure in the state; the central organization brokers resources to deliver services to workers and employers with little program-level interaction among the stakeholders
Synchronizing the green jobs labor market	Training is out ahead of job creation
Emerging career pathways model	Workforce development career pathways model disconnected from credit-granting education
The nature of jobs	Some green jobs are good jobs

Finding 1: Quality of Partnership—Solid and Evolving Position of Vermont GREEN

There was a high level of enthusiasm and satisfaction among all those interviewed for this study for the mission of Vermont GREEN and a fairly high level of expressed commitment to working towards increasing participation in its programs and expanding its influence in the region. In addition, each interviewee had great respect as well as appreciation for the work of the Vermont GREEN staff in building the partnership and making all the various strategies and components of the project work well for all involved. Quotes like “they are just terrific,” “very dynamic,” and “extremely good” were used to describe the staff and work of Vermont GREEN.

One area that Vermont GREEN excelled in was communications. Many mentioned the Web site and how impressed they were with the useful information that it made available to the community. Though it is difficult to document, the Web site appeared to help partners to engage

in the issues and was having an impact on specific partners and perhaps the broader green sector in the region.

Another area that seemed to be resulting in positive gains for the individual partners as well as the broader workforce development system was in the creation of new pipelines to connect employers with the public or quasi-public workforce development system to recruit, assess or screen, and refer qualified workers for available jobs.

Finally, the initiative seemed to be very good at working with partners to leverage resources to extend programs and build new ones. Indeed, one challenge for the researcher in this study was to keep track of where the funding was coming from for all the initiatives under way across the network. Funds were being blended by Vermont GREEN and its training partners to extend the training to the largest number of individuals, building up a critical mass and lowering the per capita cost of training. In addition, each individual partner was combining resources from Vermont GREEN with internal as well as other external sources of funds to build out and integrate the new green training programs being launched by the partnership.

The solid reputation of Vermont GREEN, combined with this new infrastructure, may help to expand the partnership and extend it beyond the ETP grant.

Finding 2: Synchronization—Training Out Ahead of Job Creation

Some of the training and certification offered by Vermont GREEN was out ahead of the labor market and jobs. The weatherization training is a case in point. The state offered low-income residents financial assistance to weatherize their homes, and they assumed that the market would expand, partly due to the availability of workers with weatherization skills, to the broader market of homeowners with the resources to pay to weatherize their homes. But the new services were never taken up by the middle-income market.

Nevertheless, it was found that Vermont GREEN was well positioned to make new connections between the supply and demand cycles in the green jobs labor market. First, the direct engagement of all the partners in events like the Green Jobs Summit was a good way to bring the partners together to share perspectives and insights on emerging needs. Second, the one-on-one interviews now under way with employers in the green industry in collaboration with the WIB will also provide useful information on employers' current and anticipated needs. Vermont GREEN could consider ways to institutionalize these practices and expand its outreach to the employer community to keep the channels of communications open on evolving needs.

The customized training strategy could also be broadened to ensure the services respond to needs shared across the firms and contractors in the industry. Though the state workforce development system brings together employers to identify common needs and to collaborate on the delivery on common training needs, it appeared that Vermont GREEN's approach was to work with employers individually to identify and meet their internal training needs. Though some training will need to be customized to the specific equipment and internal procedures of individual companies, companies do share common needs, like training in Lean manufacturing principles. Taking a more coordinated approach to serving employers may help to broaden the scope of the training and certification and result in new portable credentials and new career ladders into higher-level work that could drive the development of training, and perhaps improve the timing of the skills supply and demand cycle in the green sector.

Finding 3: Emergence of a Workforce Development Career Pathways Model

Because the Vermont GREEN career pathways model emphasizes economic development and job outcomes, it is aligned with the workforce development career pathways model. However, there are gaps between the Vermont GREEN model and the ideal model. For

example, the training and certification offered across the Vermont GREEN system was not coordinated across the partnership. Currently, many of the people trained and certified by Vermont GREEN were only qualified for one green-related activity. More emphasis could be placed on longer-term training in broader occupational skills that is linked to a broader course of study leading to a credential or degree.

One way that Vermont GREEN could move toward this longer-term and broader system would be to explore whether and how a career pathways framework could be used to systematically link the separate training and certificates offered throughout the partnership to provide individuals with strong baseline skills and a series of green credentials that would offer more flexibility in the labor market.

In addition, the partnership and the industry might benefit from more integration with the community colleges and the broader career pathways effort under way in the state. This could be a matter of timing, as the state's green-sector pathway is still being developed. However, if Vermont GREEN were to align more closely with the community colleges, then the training and credentials partners now offer might be more readily rolled up into a broader system of education and credentialing in the future. It is acknowledged that more resources and more flexibility in the use of Vermont GREEN funding would be required before it could move in this direction. Currently, Vermont GREEN funding does not pay for tuition in longer-term training programs; it only supports infrastructure and delivery costs for the training partners. Perhaps funding for longer-term training and certification could be leveraged from other private and public sources.

Finding 4: Nature of Jobs—Green Jobs as Good Jobs

It appeared that at least in the case of the two manufacturing employers interviewed for this study, their movement into the green sector provided them an opportunity to rethink the

basic structure of their production process and to reorganize the work in ways that demanded more skills and provided more pay and advancement opportunities to workers. The availability of public economic and workforce development funds, including the funding from Vermont GREEN, allowed them to develop training and certification programs to help their workers meet the new skill requirements. In addition, they both intended to train entry-level workers as well as offer ongoing training to their employees. It seems that in both of these cases, the greening of the workplace required employers to upgrade the work and encouraged them to improve the structural conditions of work. Indeed, in the case of these two employers, the greening of the workplace was resulting in better, if not good, jobs for workers.

Chapter 6:

Renewable Northwest

(ReNW)

At the start of 2010, Oregon Manufacturing Extension Partnership (OMEP) received a \$5 million grant from the U.S. Department of Labor to launch Renewable Northwest (ReNW). ReNW is a public and private partnership in the renewable energy industry that involves six counties in Oregon (Clackamas, Multnomah, Marion, Polk, Washington, and Yamhill) and three contiguous counties in Washington (Clark, Cowlitz, and Wahkiakum). Its mission is to grow the region's renewable energy industry, infuse sustainable manufacturing practices into its supply chain, and develop workers with the skills required to work in the green energy industry. The partnership includes employers and industry associations, union apprenticeship programs, community colleges, and the public workforce development agencies. Profiles of the two employers, the two educational institutions, and the workforce development system representative who were interviewed appear in Boxes 8 to 12 in this chapter.

ReNW will expand and refine the regional skills infrastructure by connecting it to the renewable energy supply chain that it is working to grow in the region. OMEP administers ReNW. OMEP serves as the principal source of high-performance business and technical assistance for Oregon's manufacturing community and provides Lean enterprise training and implementation assistance to a variety of industry sectors. Through collaboration with the national network of manufacturing extension partnership (MEP) resource centers in over 400 locations nationwide, OMEP makes available integrated and standardized services to its regional manufacturers. Thus, OMEP is well versed in the needs of the manufacturing industry in Oregon

and is a key resource to manufacturing companies in modernizing their production system to improve competitiveness and move into new markets. ReNW projects that the energy training partnership (ETP) funds will help it to preserve and create 1,734 jobs in the renewable energy industries, including manufacturing, electric power, and biofuels.

Case Context

This section describes the context within which the ReNW ETP has emerged. The discussion is focused on the broader context that the partnership is responding to as well as the emerging features and developmental processes of a new infrastructure to support the growth of the green economy and prepare regional residents for green jobs. The discussion explores the green industry sector in the Northwest region, relevant features of and developments in the two states' education and workforce development systems, and the partnership's developmental strategies and initial programs.

The Green Industry Sector in the Northwest Region

Oregon is home to the most concentrated and fastest growing green jobs sector in the nation (PEW Charitable Trusts, 2009, http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf). There are approximately 51,402 green jobs in 5,025 firms; this is an estimated 3 percent of the state's private, state, and local government employment. Three industries in particular—construction, wholesale and retail trade, and administrative and waste services—account for approximately 47 percent of Oregon's green jobs. One percent of all Oregon jobs are in the clean energy sector (Oregon Employment Department, 2009, <http://www.qualityinfo.org/pubs/green/greening.pdf>).

ReNW Employer 2 attributed the growing green sector to the commitment of the people of Oregon to the natural environment. “Oregon has a very strong environmental sensitivity, and we care about our beautiful state. People care about that.” This commitment is perhaps why Oregon is a leader in public policies to protect and promote the environment and support green industries. In 1967, Oregon was the first state to adopt a comprehensive land use law to protect farms and the forest, and in 1971 it adopted the Oregon Bottle Bill, the first in the nation (Oregon Community College Green Initiative, 2010, <http://www.oregon.gov/CCWD/pdf/GreenFrameworkMay2010.pdf?ga=t>). Oregon was one of the first states to provide tax credits to companies involved in renewable energy production and retooling. Employer 2 also talked about how Oregon tax credits helped save his solar energy business when the market for his product all but died outside of Oregon.

They actually did have tax credits in the early ‘80s to go along with the federal credit, but then when the federal credit disappeared, the Oregon credit increased. Still, the public perception was that solar had disappeared. I think in 1985, I had installed about 100 systems and in 1986, I installed four. So, those tax credits really make a huge difference because it shows the public that the government is behind it and the public needs help to decide to do something like this.

So, I was a one-man shop for about 10 years, again, from 1985 to 1995, and then the Energy Trust of Oregon appeared and they offered an incentive that caused the solar industry in our state to flourish once again. New companies formed and lots more activity—so, last year, we did nearly 200 installations. At our high point when we were very busy during the summer, we had 28 employees.

Oregon’s tax policy has made a difference for this employer and apparently for the solar industry more broadly. Oregon is home to one of the largest solar manufacturing clusters in the country. Oregon is also home to one of the largest concentrations of wind-generated electricity in the nation. The supply chain for both of these emerging sectors is largely overseas, adding to

the cost of creating the infrastructure for this growing industry. Filling this gap is at the heart of the ReNW strategy, which will be discussed later in this chapter.

Oregon is leveraging its early leadership in green environmental and economic development policy by continuing to invest in the growth of green industries and green jobs. In 2009, the Oregon legislature passed House Bill 3300, which called for the creation of “a plan for a green job growth initiative to promote the development of emerging technologies and innovations that lead to, create or sustain family wage green jobs” (PEW Charitable Trusts, 2009, p. 2). The plan will establish a workforce and economic development strategy to guide the state’s investment in the green economy. The Oregon Business Development Department will lead new efforts to recruit, retain, and expand green industries and small businesses and to stimulate research and development in new green technology and innovation. The Oregon Workforce Investment Board (WIB) will develop the workforce plan to support industry growth and provide family-waged jobs (Hayes & Rafkind, 2010).

The legislation targeted four priority industries (energy efficiency, renewable energy production/generation, green manufacturing, and energy transmission and storage) and four second-tier priority sectors (green building and development, transportation, agriculture/sustainable forestry, and environmental technology and services). The initiative will take a sector approach by establishing industry councils in each of these sectors. The councils will guide the development of new green career pathway and training programs for high-growth jobs in these sectors (Hayes & Rafkind, 2010). ReNW, with its mission to develop the skills pipeline and jobs in the renewable industry, is well positioned to be a key partner in this initiative.

The Workforce Development and Education System

ReNW has roots in the U.S. Department of Labor Workforce Innovation in Regional Economic Development (WIRED) grant awarded in the region in 2007. The WIRED region included many of the contiguous counties that are also included in ReNW. The \$5 million WIRED grant was to build a pipeline of skilled workers to support and grow the advanced manufacturing sector in the region, including metals manufacturing, transportation equipment manufacturing, computer and electronics product manufacturing, chemicals, pharmaceuticals, and medical supplies manufacturing.

The initiative connected the community colleges and workforce and economic development agencies from across political jurisdictions and linked them to the manufacturing base in the region. The initiative sponsored a series of regional economic assessments and a workforce audit that drove the development of a comprehensive workforce development system to support the industry. The system now includes a centralized labor market information system and career pathways for manufacturing occupations, new partnerships between businesses and high schools to expose youth to manufacturing careers, new skills assessments and certifications in industry-recognized career readiness skills, and a new curriculum in leading-edge manufacturing processes and technologies. These efforts continue to result in public and private investment in workforce training in the region.

In addition to developing a regional skills infrastructure within the manufacturing sector, WIRED created a spirit of collaboration with the public workforce development system. It also resulted in strong working relationships among many of the ReNW partners because they now know each other's needs and strengths and know how to work together. This infrastructure gave the ReNW project a strong starting point, as this quote from the workforce development

representative involved in ReNW suggests: “So all of these WIBs that were involved with WIRED decided to sign on with this grant, and then OMEP was brought on.”

Educator 2, who is on the Washington State side of the regional partnership, described the impact of the WIRED grant in the region in this way.

And I think it’s been relatively successful, regarding trying to get more of our economic development agencies to start to act and take into account both sides of the river and so that we can align our resources and such. And so I think this grant, the ETP grant, as we call it, it’s kind of piggybacking on some of those efforts, definitely, in that spirit, that it’s going forward.

These investments in the region’s workforce development system notwithstanding, employment growth in Oregon is challenging because of the struggling state economy. As of the start of 2011, unemployment in Oregon remained stuck at high levels across the state and

Box 8. Profile: ReNW Employer 1

Employer 1 is a small, family-owned company with 75 employees in northwest Oregon. The company makes fiberglass and composites for component parts for transportation vehicles, cooling systems, and other products. All employees are certified by the American Composite Manufacturers Association as certified composite technicians. The certification requires a lengthy training program in the basics of composite materials and their manufacturing. The company has a certified instructor on staff that provides the necessary training to all new hires. Once the employee completes the training, he or she can take the national certification exam. Certified production workers are paid \$15 per hour. The company offers a full benefit package, including dental and health insurance and vacation and holiday pay, to all employees who are employed with the company for over 90 days.

In 2007 a consultant for the wind industry approached the owners and proposed that they supply the U.S. wind industry. Wind turbine blades are made of composite material, so there was need for the company’s core knowledge and expertise in the industry. After some research and planning, the company established two new divisions to supply the wind industry, a division to produce component parts for small wind turbines and grease rings for larger turbine service, and a division to inspect and repair the blades on wind turbines.

This was not an insignificant move. The company set a target of 25 percent of sales for the wind industry and invested in a new staffing plan and workforce development strategy to support the development of the wind turbine service and repair business. The move into component part manufacturing required a few minor adjustments to the plant and a reassignment of existing staff to the new division. The new service division proved more complex and challenging. The job sites are located at wind farms around the country, so employees must constantly travel. In addition, the work is seasonal and tied to temporary contracts, so when the job ends, the employees are furloughed. Finally, the work requires specialized skills and certification in wind technology and wind turbine maintenance and repair, which are hard to find.

These conditions make for a very mobile workforce and very high turnover in the division. In the 3 years since the division was established, the company has hired 100 people to keep the 30 positions in the division filled. Every time a crew goes out on a new or renewed contract, the company has to hire new people. The company had been working with the county WIB and area educators when the ETP opportunity emerged and quickly signed on to support the ReNW partnership and grant proposals in the hope it would bring resources to the community that could help respond to the specialized training needs of the wind industry.

surpassed national rates. According to the Oregon Employment Department, in the counties included in ReNW, unemployment rates ranged from 9 percent to 14 percent.

In response to this challenge, Oregon is building new capacity to ready its workforce for careers in the green economy. For example, WorkSource Oregon, the state's workforce development agency, launched the Green Career Pathways Statewide Roadmap Project as part of the Oregon Labor Market Initiative funded by the American Recovery and Reinvestment Act. A collaborative effort involving the Oregon Department of Community Colleges and Workforce Development, this project will develop statewide roadmaps in five to seven existing and emerging green occupations by May 2011.

Another joint venture between the community college and the workforce development systems is the Oregon Community College Green Initiative. A committee with representatives from each community college conducted a scan of all green activities, curricula, customized trainings, certifications, etc., offered throughout the system. A new green organizing framework was developed and used to organize all the offerings. The template provided a system-wide view, which brought to light the best practices, pockets of strengths, areas of weakness, redundancies, and gaps across the system.

Box 9. Profile: ReNW Employer 2

Employer 2 specializes in the sale, design, installation, and service of solar energy products with a focus on solar hot water, solar electrical (photovoltaic), and solar pool heating systems for homes and businesses. It is a locally owned company, operating independently since 1980. It has approximately 15 full-time employees, but the workforce can double during the busy summer season.

The company operates much like many other general contractors in the housing industry, except that its specialty is solar energy. Electricians, limited renewable technicians, who are midskilled individuals with a limited solar license in Oregon, and entry-level roofers work in the photovoltaic side of the business, while plumbers and workers with a solar thermal license (also a midskilled position) work in the solar thermal side of the company. They work with ReNW to recruit and train the extra workers they require to meet the seasonal demands of the industry.

ReNW Partnership Strategy and Programs

This overview illustrates that many activities are under way in Oregon to support the growing green industry sector in the region. ReNW aims to serve as a conduit between manufacturing suppliers to the green energy industry and these sundry statewide efforts to align education and workforce development resources with the needs of workers and industries in the renewable sector. This section reviews the ReNW strategies and programs that serve these aims, including the four-pronged program development and delivery strategy, the partner coordination strategy, and the program offerings.

Four-Pronged Development and Delivery Strategy

ReNW works with a wide variety of industry and workforce and economic development partners to deliver a four-pronged strategy, including an economic development strategy to link suppliers to the renewable electricity industry, a workforce development strategy to help the suppliers retool their production system and prepare their workforce with the skills they need to enter into this new market, a job placement strategy to place participants in green jobs, and a sustainability strategy to build out the partnership and sustain its activities beyond the ETP grant.

Prong 1: Economic Development Strategy. This strategy is aimed at cultivating new markets in the renewable electricity industry for the area’s small and mid-sized manufacturers. As a first step, OMEP will work with the renewable energy providers in the region to determine their manufacturing needs and the technical and training requirements for the production of their equipment and component parts.

Prong 2: Workforce Development Strategy. This scan will be coupled with ongoing work within the supplier firms to determine the training needs of the renewable energy industry

Box 10. Profile: ReNW Educator 1

Educator 1 is an administrator at the community college in the same Oregon county as the WIB representative and Employer 1 in this study. The community college serves the diverse education and workforce needs in the county, offering 55 less than 1-year career pathways, a 1-year certificate of completion, 30 2-year associate of science degrees, and a general studies degree. These career and technical education programs service approximately 38 percent of the student population. The college also offers the 2-year associate of arts Oregon transfer degree, which guarantees junior standing upon admission to any Oregon college or university. An estimated 29 percent of students transfer to a 4-year institution within a year of graduation. It also offers a full array of individualized instruction to help students achieve basic skills and credentials needed to enter into postsecondary certificate and degree programs, a robust community education program which served over 9,000 residents in 2008-2009, and customized training and development services to area businesses.

The college began to take green-related activities and programs seriously around 2005 when renewable energy started to become a “buzz word” in educational circles. Quickly the context shifted to a point where, for Educator 1, renewable energy and sustainability was “just about consuming my every free moment.”

Several events came together to create a critical mass within the college around green-related activities. First, the college facilities staff had begun to ‘green’ the college, which raised the college’s awareness about sustainability practices and renewable energy. Because of the close relationship among the facilities staff and instructional staff in the building and construction programs, interest in green quickly extended into instruction. Faculty partnered with facilities staff to incorporate the renewable technology being implemented on campus into real-time student instruction. For example, the renewable systems built on campus, including geothermal, solar thermal, solar electric, and a small wind turbine, provided a real-time lab for students.

In parallel to this, Oregon colleges were becoming more enmeshed in sustainability, and redundancy began to emerge in the renewable energy curriculum. The state asked community college leaders to compile an inventory of green activities, which ran the gamut from training in solar photovoltaic technology to sustainability topics in sociology courses.

The educator described this time as a “green whirlwind” where everyone was caught up in sharing their expertise to respond to the new renewable energy companies that had emerged in the region. This scan

and enthusiasm for green was in part motivated by the feeling that green was new and that the schools needed to create new programs and curriculum. Eventually, enthusiasm over the newness of green gave way to more information about the jobs in the renewable industry, and it became apparent that many of the jobs already existed. In 2007, the Oregon Employment Department published *The Greening of Oregon's Workforce*, which found that that these positions were "very technical, longstanding positions that had been around for years, and it was simply now applying them to sort of a green application." From that point on, the community college began to evolve programs that were green oriented by leveraging the strengths of the technical programs it was already offering. A system-wide effort began to identify which schools had content that could be leveraged to create programs for green-focused careers, and individual schools looked to ways to reconfigure their core occupational curriculum to prepare and connect students to the emerging specialty programs.

Box 11. Profile: ReNW Educator 2

Educator 2 is an administrator at a community college that serves one of the ReNW counties in Washington State. The college provides 2-year transfer degrees, technical training, and basic skills classes for 16,000 full-time and part-time students. These enrollment numbers make it one of the larger community colleges in the State of Washington's system of 34 community and technical colleges.

The educator was located in the part of the college that provided noncredit instruction, workforce development services, and customized training for business and industry. The department served about 9,200 enrollees per year, mainly through programs targeted to professional, business, and industry training. Because it was focused on the external community, the department worked very closely with the workforce development council and economic development organizations in the region, like the MEP.

in the region. In addition, the WIBs in each of the counties involved in the partnership will work with their industry councils in the renewable energy and manufacturing industries to assess needs, develop training, and recruit workers for upgraded training programs. This ongoing strategy results in continuous learning about the skill requirements of the emerging industry, which is feedback that the training providers can use to refine existing programs and develop new ones to prepare workers to meet emerging needs. While these analyses are under way, the workforce and training partners enroll and train workers in occupational and technical skills for in-demand occupations and skills in the targeted industries.

Prong 3: Job Placement Strategy. Finally, the partnership includes 13 employers, each of which agreed to consider ReNW trainees for new jobs. Oregon's *Green Jobs* report (Oregon Employment Department, 2009) projected that green jobs would grow by 14 percent between 2008 and 2010. The ReNW employers validated this finding by projecting the need for 775 renewable energy workers within the grant period. However, in the fourth quarter report to the U.S. Department of Labor on its performance on the ETP grant, ReNW reported that only 15 trainees had been placed in jobs. The report explained: "Project partners have been concerned about the effect of the current economic conditions on their ability to meet placement outcomes. As is the trend nationwide, companies are making due with smaller staff and hiring in low numbers" (Renewable Northwest, 2010, p. 8).

Prong 4: Sustainability Strategy. ReNW has been very successful in leveraging additional funds to support its efforts. In the first year of the partnership, 2010, ReNW leveraged a number of resources to bring to this process. OMEP received a \$200,000 grant from the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) MEP program to support its work with the suppliers. In the fourth quarter, which was the time this case was conducted, OMEP was awarded an additional \$1.5 million from NIST to extend the ReNW project to all regions of Oregon and Washington covered by OMEP and its Washington MEP subgrantee, Impact Washington. Many of the other ReNW partners also contributed funds to support outreach to business, program development, and participant training. The pooling of resources has resulted in the cumulative leverage of \$3 million in the first year of the ETP grant. This brings the total public investment in the renewable electricity industry in Oregon to \$8 million since the ETP grant was awarded in January 2010.

Box 12. Profile: ReNW Workforce Development System

The workforce development representative interviewed for this study worked for a WIB in the same ReNW county where Employer 1 and Educator 1 were located. The green industry sector was one of the industries targeted for support by the WIB. Though the industry was not well defined, the WIB was reaching out to businesses in the region in an attempt to help them identify options for growing their business by moving into the new and emerging green sector.

The WIB had been involved in the WIRED grant, which resulted in greater collaboration among all WIBs in the region. When the recession hit, the WIB was 'desperate' to help businesses in the region get back up and running again. It began an active outreach campaign to businesses and the economic development agencies in the state to formulate a strategy to help "shape or form the renewable energy sector" in the region and to find out the specialty training needs that it could help meet. The ReNW grant fit into this emerging agenda.

ReNW Partner Coordination Strategy

Thus, ReNW is helping to build new markets for regional manufacturers by connecting them to a new customer base and then helping them to retool their processes and their workforce to meet the demand. OMEP, the WIBs, and the community colleges are key partners in this process. Their work is closely aligned and coordinated. The coordination occurs largely through weekly phone calls involving all the key staff in OMEP and each of the WIBS. They share information and figure out the best approach to individual clients. Community colleges are involved in determining the service delivery strategy for clients. In Oregon, OMEP works with clients it introduces to the WIB, and the WIB informs them of the workforce development services and the training that they can fund. In addition, the WIBs are talking to other companies, and they bring OMEP in to help with modernization. Thus, there is a lot of back and forth, sharing of clients and pooling of resources. In Washington, the community college is also a key service provider. Educator 2 explained how staff from various agencies are co-located at the college, which helps to facilitate sharing and the coordination of services to employers.

Thus, ReNW aims to take the relationships established through WIRED and focus them on developing a training infrastructure targeted to support the emergence of a new manufacturing supplier network to the growing renewable energy sector in the region. ReNW includes many of the broad networks of training partners involved in WIRED so that they can help develop and deliver training and other services needed to help manufacturers retool to meet the needs of this emerging market. Industry associations and organized labor provide input on needed skills and training. Organized labor also provides pre-apprenticeship and apprentice training in their areas of expertise. Community colleges and other training providers offer training through their existing courses, which have been developed in close coordination with industry. The WorkSource system and area nonprofits identify and recruit unemployed workers for training. OMEP and the WIBs recruit incumbent workers through their outreach to business.

ReNW Training and Certification Programs

ReNW training is delivered by a variety of providers and through a variety of means, however all training must meet the same criteria. Training must be in the technical and occupational skills related to the renewable energy industries and must take place at times and locations convenient to participants. All training must lead to an industry-recognized credential or degree granted by an institution of higher education, a profession, or a trade association or organization. Table 6-1 lists all the training and certification programs available throughout the training partner network.

Table 6-1
ReNW Training and Certification by Training Provider

Training partner	Training and certification	Certificate and qualification
Organized labor, business, and industry association	Preapprenticeship Apprenticeship training for apprenticeship license credit	Entry into skilled trade apprenticeship /job

Training partner	Training and certification	Certificate and qualification
OMEP and Washington MEP	Lean-green assessments; value stream mapping; enhanced Lean skills; Lean-green champion	Certificates of completion recognized by manufacturers in the region
Community college partners	Renewable Energy Technology Certificate and/or AAS degree; Photovoltaic and Wind Energy Technology Certificates; Sustainable Engineering Certificate; Thermal and Electric Systems Installer Certificate; Green Manufacturing Foundations Certificate; Certified Sustainability Professional; LEED Certifications; Green Supply Chain Certificate; Sustainability Professional, Senior-Level Certificate; Lean Ecology and Sustainable Manufacturing Certificates (Society of Manufacturing Engineers Green Champion); Enhanced Lean Enterprise Certificate (Society of Manufacturing Engineers Bronze Level Lean Certification); Process Manufacturing and Technology Training Certificate and/or AAS degree; courses in micro-electronics technology or engineering technician including energy auditing software training, carbon strategies, and green purchasing	Stackable certificates and AAS degrees recognized by renewable energy companies and manufactures in region

ReNW Early Start-up Experiences

This section reviews the early start-up experiences of the ReNW partners interviewed for this study. It begins with a discussion of experiences that brought the individual stakeholders to their involvement in and support of ReNW; it next focuses on the interactions and relationships among the stakeholders that contribute to building the partnership and delivery of programs.

This section also includes a discussion of the challenges stakeholders face in the partnership and its programs and the strategies that they have employed to meet these challenges. Finally, this section explores the stakeholder perceptions of the career pathways model and of the trainees’ needs and experiences in ReNW. This section is followed by the findings of the ReNW case.

Vignettes of the start-up experiences appear in Boxes 13 to 16 in this chapter.

Stakeholder Green Experiences

As with the Vermont GREEN partners interviewed for this study, the ReNW interviewees moved in and out of different contexts to talk about the start-up phase of the ETP project. They shared stories of how the ETP funds brought new opportunity to connect, strengthen, and extend preexisting efforts to build the green economy in the region. For example, Educator 1 talked about how the ETP helped the school bring together a number of nascent green initiatives in the school and the Oregon community college system to build a new career pathway to support the emerging renewable energy sector in the state.

We had the expertise and, I guess, the forces had already kind of been mobilized or were easy to tap into in the sense of customized training staff that could help manage and work with companies and evolve relationships with companies to take our graduates. . . . I guess that's really where the college sees a fit and it's—renewable energy is a place we definitely want to be, absolutely without question want to be part of the endeavor as, I guess, several years worth of sort of mini efforts going on around campus when we were able to look at it. . . . So it was seeing that we had the infrastructure and a lot of the bits and pieces already in place. . . . We were well poised for the opportunity. It's really as simple as that.

Box 13. Start-Up Vignette: ReNW Employer 1

Fortunately at the time the company was hiring the first employees for its new wind turbine service division, a local community college was graduating a class from its new “wind school,” a year-long program leading to a renewable energy technician certificate. The company hired the entire class, and the program remains a central point of recruitment for them today. However, the wind school training lacked training in one important area required to repair wind turbines, which is knowledge and skill of composites to repair the blades. This expertise is lacking across the wind turbine repair industry, which according to the employer, gives the industry a bad name: “The thing with the wind schools are—and there's quite a few of them—wind turbine technicians, they don't have composite repair skill. . . . It's jobs changing the oil, rigging out the yass, electrical, mechanical, but not the composite portion, . . . and they're all [i.e., the wind blades] composite!”

Before the ReNW grant was awarded, the employer, who is an active member of the American Composite Manufacturers Association (ACMA), began to advocate for the development of a new national ACMA certification for wind blade repair that would include composite repair. With the aid of OMEP and the ETP grant, there are now resources to support this effort. Employer 1 is taking the lead in a multi-partner effort that includes area educators, the county WIB, and the national ACMA to develop a new training and certification program in wind blade repair that will benefit the entire wind industry. The employer and her staff are very involved in the local effort. In fact, a senior member of the employer's

staff is now on loan to the community college to help develop the curriculum, and several people in the company are working with the ACMA to develop a national certification.

The first pilot training, which included the employees of this company only, had just gotten under way at the time of the interview. Once the pilot is completed and evaluated, the community college will incorporate it into its ongoing program and make it available to all students.

Wind turbine repair jobs at the company will begin to require this specialized skill, and all employees will be required to take the certification exam once the ACMA makes it available. Existing employees looking for a leg up into a new wind industry or young people coming out of the wind school will find the wind repair technician job a good starting point in this emerging industry. The company pays \$20 an hour with benefits and, according to the employer the constant travel fosters good leadership skills. In addition, because the wind farm operators are always looking for trained people, many of the workers are picked up for permanent senior and management jobs at the wind farms. According to the employer, wind is a growing sector in which workers with the right skills may find a long-term career.

Supply-side interviewees, like the two educators and the workforce development representatives, linked the new funding to the reform efforts initiated in the region by the 2007 WIRED grant. These individuals saw ReNW as an opportunity to extend the WIRED infrastructure to the emerging renewable energy sector in the region. The WIB representative talked about how WIRED fostered collaboration among the WIBs in the region, which then laid the groundwork for their work together on the ReNW grant. “So our regions partnered together

Box 14. Start-Up Vignette: ReNW Employer 2

Solar system installation is a specialized skill set that the employer has difficulty finding among the trade workforce in the state. Mainly, there is “a whole lot of code” that needs to be learned. The company has seen failed inspections among a great number of systems installed by new people who were competent electricians and plumbers but did not know solar and its specific codes. Even trades people who have taken solar training sponsored by the trade apprenticeship programs face a learning curve. “They’re going to have to learn on the job just by trial and error with these inspections and such or with our more experienced people training them,” said the employer.

The company had taken steps to fill this gap. The owner, who was interviewed for this study, developed and taught a solar installation class at the community college. This 8-week course took students from the beginning to the end of selling and installing a solar system, but at a primer level; it was not enough to prepare someone to properly install a system. The company also participated in the state apprenticeship committee for the limited renewable technicians and the solar thermal license. Employees could take the initial exam and enter the apprenticeship program at the company. In addition, the company installed roof mock-ups in the back of the warehouse which it used to train employees in the basics of installing solar panels before they started drilling holes in customers’ roofs. However, much of the learning took place through on-the-job training. People who complete the apprenticeship earn \$20 per hour, and if they

continue with the company, they will continue to receive merit raises or may rise to supervisory roles, which paid in the range of \$24 to \$25 per hour.

The employer found one credential extremely valuable but rare among the workforce in Oregon: the National American Board of Certified Energy Practitioners' Solar Electric Installers certification. Currently, the training and the test are available online, but access is limited because it is very expensive. The employer thought that this was a very comprehensive and rigorous credential and believed that it should be more broadly available to workers in the industry.

The company had looked to ReNW for assistance with its training needs. Last year, ReNW helped the company recruit and train additional employees for the busy summer season. The company hired 12 people through the ReNW project, including electricians and rackers, and ReNW paid the company to provide the workers with on-the-job training in solar installation. The training subsidy, which was based on a percentage of the individual's wage, encouraged the company to retain six of the 12 employees over the slow winter months, whereas in previous years the company would have let most of the seasonal employees go over after the demand had diminished. The company planned to turn to ReNW in the future to hire for the summer season.

in the WIRED grant . . . 2007 to 2010. So we had already been working closely together. . . .

The partnerships were already in place, and collaboration was already occurring.”

Educator 2 also saw the link between WIRED and ReNW. He saw ReNW as an opportunity to extend the WIRED goals of building a multistate public workforce development system to meet the needs of the regional economy.

Box 15. Start-Up Vignette: ReNW Educator 1

The ReNW ETP grant ran parallel with two of the efforts at the college that came out of the broader effort to align green pathways across the Oregon community college system. One was the renewable energy service technology (REST) certificate and degree programs, and the other was the wind turbine repair training and certificate program, which was so important to Employer 1.

The REST program, which came out of the broader effort to align the green curriculum in the community college system, was completed and is being piloted with ReNW funding. The new wind blade repair certificate will be part of the REST career pathway. The college hired a member of the employer's staff to help develop and deliver the pilot curriculum for the wind blade repair. This curriculum will be shared throughout the Oregon community college system and will be made available nationally through the American Composite Manufacturers Association. Thus, the college was leveraging ReNW resources to align and integrate its programs within Oregon's career pathways system, as well as to contribute to a new national training and certificate program that will provide workers with new skills that are of great value to employers in the emerging wind sector.

The educator said that ETP funds resulted in these certificate programs, which represented a more coordinated and aligned approach to the needs of the renewable sector within the college. The educator

shared the factors that he needed to consider in tapping the ReNW grant to expand the nascent green programs at the school. He needed to ensure that the school had the internal capacity to respond: faculty expertise and facilities needed to be in place, and the curriculum needed to be evaluated and updated. He also needed to ensure that there would be jobs for the students of the new programs. He shared that these concerns were the reason why a workforce development effort requires a multistakeholder partnership. “I would hate to build something for nobody to come to, so making sure that we had, as best we could, that if we built this kind of training that we’d have people that would want to come to it that would come to it and utilizing maybe some skills they already had or wanted to develop.”

We had a WIRED regional grant that we had a 3-year project that . . . included colleges . . . on this side of the Columbia River [Washington State]. . . . That kind of set a precedent of trying to look at this region—even though it’s a bistate region, in reality, it’s one economy. And in the last couple of years, there’s been a real push. And I think it’s been relatively successful.

The supply-side partners also thought that the availability of funding was a significant motivator in the early stages of ReNW. The educators in particular were somewhat ambivalent about how outside funding sometimes drives decision making in the public workforce development system. For example, when Educator 1 was asked about the early motivation of the school in the renewable energy sector, he seemed somewhat embarrassed to admit that the funding was a prime factor. Also his ambivalence about whether public investments in the green economy would result in the purported social gains can be heard in his comments.

Box 16. Start-Up Vignette: ReNW Educator 2

All the green programming at the college was offered by the noncredit side of the house. Many of these courses have been designed and delivered through partnership with the MEP and the workforce development system. Green programs began in earnest with the availability of federal stimulus money. Much of the green training now provided has been integrated into the college’s ongoing Lean training, which is a mainstay of the customized training the college provides to the manufacturers in the region. The availability of the stimulus funds and its emphasis on green-related training motivated the college and its partners to think about how they could cast their programs in a green light. The educator shared that he thought that Lean manufacturing, unlike greening of information technology or accounting and other attempts at greening, did have a direct environmental impact. Lean manufacturing takes waste out of the production system, which saves money and lessens the net effect of the manufacturing process on the environment.

Consequently, the college used the stimulus funds and its relationship within the MEP to promote *Lean and Clean* training for employees of the region’s manufacturing sector. They invested in a new curriculum that came from Purdue University, which is focused on the waste management stream and is

articulated with the Manufacturing Skill Standards Council's production standards and the Society of Manufacturing Engineers' Lean principles. This training leads to a certificate of completion in green manufacturing. At the time of the interview, the college was preparing to pilot the training with 20 unemployed manufacturing workers using ReNW's ETP funding.

Another green program at the college was a weatherization program offered through a partnership with the county workforce development council and two other community colleges in the region. The program is the result of a \$100,000 grant from the state's American Recovery and Reinvestment Act money. It includes two certificates from the Building Performance Institute: the building analyst certificate and the weatherization installer's certificate. Several cohorts of unemployed workers have been trained through this effort, many of whom have been placed with contractors who provide state-funded weatherization services to low-income residents in Washington. This comprehensive program offers training, certification, and job placement in state-funded work. It was supported with stimulus money.

Soon the college will begin to offer the green manufacturing specialist training and certification, which is now available to incumbent workers through the college's partnership with the MEP to students referred to training by the one-stop center. This training and certification will be linked to efforts to place trainees in manufacturing jobs in the emerging renewable energy supply chain in the region. This effort is being partially paid out of the ReNW funds.

The availability of the stimulus funding and the relationship with ReNW has brought a new student population to the programs. In the past, all students were working professionals seeking continuing education units or were employees of the businesses that contracted for customized training. These students typically have good basic skills and require few, if any, support services. The ReNW students are displaced and unemployed workers who bring a new set of needs to the program, which has led it to rework its curriculum and reconsider its delivery strategy. In addition, the new funding streams have brought new partnerships, administrative requirements, and challenges that are also leading to change in the college.

Box 17. Start-Up Vignette: ReNW Workforce Development System

Several efforts were under way in the WIB to support ReNW's goal to support the development of a new manufacturing supply chain for the wind industry in the region. For example, a new *green alliance* of businesses, economic development, education, and unions was formed to foster more discussion about sustainability practices and green innovations in the county. The alliance worked with the WIB to create forums where businesses, the WIB, and other partners identify emerging market trends and strategize how to grow and sustain green industry in the area.

The alliance sponsored monthly 'listening panels' where groups of firms in the same line of business come together to discuss emerging practices that might generate new business and to identify the needs that the WIB might respond to with workforce development strategies and programs. In these forums, businesses learn about new lines of businesses that are emerging in the area and about options for expanding their business into new markets. The WIB staff also conducts extensive outreach to local firms to connect them with resources that might help them retain or grow jobs.

In addition, the governor's hold-back funds are earmarked for 'emerging industries,' which qualifies the green sector for additional training dollars. These funds are used to support incumbent worker training. Much of these funds are used to support *Lean and Clean* for manufacturing companies, which aligns well with the ReNW project goals and strategies.

Finally, the WIB sponsors an active green program for youth in the county. The WIB partners with the K-12 system to provide youth with experiences in green practices and industries. The WIB has teamed up with the schools to teach greening principles, such as Lean manufacturing and other sustainable practices. The WIB is also using American Recovery and Reinvestment Act funding to expand the summer youth program into green industries and careers. Funds were used to pay for green training and for green work experiences for youth during the summer months.

Even with this outreach, the WIB representative interviewed for this study found that jobs are just not out there in this difficult economy, which means that the demand for green jobs remains uncertain. Part of the challenge in developing a green jobs workforce strategy is the mixed signals set by a green energy market that is still evolving. First, they hear that there is a demand for solar panels, and then they hear that wind will outtake solar, so the market is still very unsettled. These mixed signals make it difficult for the WIB to plan a comprehensive response to the workforce development needs in the industry.

I guess first and foremost was the ability to use public funds—gosh, I'm gonna start sounding like a politician; I don't mean to do that. But we have a responsibility there to use—here's an opportunity to use public funds to benefit the world, to literally benefit the earth, and that's not something that comes along every day, and that energized a lot of faculty right away.

And so we saw that as a wonderful opportunity. A lot of folks saw or probably continue to see renewable energy and all things green as a panacea to economic recovery. That may in part be true; I don't think it's as much of a silver bullet as a lot of people thought. We see it, I guess, it's—and kind of an opportunity to add to our portfolio, if you will. . . . It opens the door to a whole new realm of job possibilities with a great deal of crossover into the existing technical disciplines.

Educator 2 was more direct in his comments about how funding was resulting in a new market for training, perhaps before the labor market was ready to absorb the new green skills.

One thing that I've observed with all this green stuff is we kind of refer to it as green frenzy early on. . . . When all the money kind of went let loose, it created its own market, you know; that's what happens. . . . I think it's important that we make sure when we're talking about green that we don't—what does that mean? I mean, green jobs. . . . Anecdotally I've seen where early on agencies, . . . if you do a program in a green area and created and trained workers, then you get like a certain—not a kickback, but you get like a, there's incentives built into most economic development system or with the workforce development system. And I guess my feeling is—and I've seen those same agencies now become almost somewhat neutral if not a little bit negative and suspicious of the term green—what does that really mean, because there's been sort of a fallout in terms of realizing that there's so much of it with hype at least from their perspective because this is my, this is just an anecdotal kind of observation from me.

The ambivalence over funding notwithstanding, the parties believed that their early start-up activities in ReNW helped them to learn about and develop more clarity around the definition of a green job and the needs of the renewable energy industry in the state. The workforce development representative shared that the WIB was sponsoring listening panels with industry, which have helped to bring shape to the ReNW program.

At one of the listening panels, we found out that a composite manufacturer in southwest Washington was creating these cylinders that would go into water pipes that would spin and create renewable energy in some fashion. So businesses were learning—gosh, my fiberglass contracts are dwindling because I'm not making as many RVs [recreational vehicles] as I have been in the past. But gosh, this is a line of work that we can go into to help build my business back up again. So it's the sharing of emerging practices within businesses, learning what their training needs are, and talking with the college, who we are close, close partners with.

Later in the interview, the representative returned to the subject of the listening panels and how they were helping the WIB and ReNW define and support the emerging green jobs sector.

But we're learning as we go, and I think that businesses are learning as we're convening businesses with these listening panels. . . . I think that's helping our businesses become more viable and looking at these different options for them.

Educator 2, who was very concerned that green training may be out ahead of the labor market, believed that ReNW had taken a very progressive approach to the industry that made training more demand driven.

I think one of the things about this grant that is more progressive is that it also is not just taking a company . . . that is . . . going to be trained in specific methodology; it's actually trying to give them knowledge and awareness of how they can plug into new pipelines of business—in this case, serving renewable energy sector. And so I think that's very progressive. And that brings another dimension to it and makes it somewhat more challenging, perhaps.

The employers did not share the broader perspective of where ReNW fit into the evolving workforce development infrastructure in the region. For example, they were largely unaware of WIRED and of the complementary programs and efforts under way outside of the ReNW project. Yet they did see their early involvement in the ReNW partnership as part of a long-term process to either move into or to strengthen the position of their individual firm in the renewable energy sector. In other words, their perspective, though narrow in terms of the workforce development system, was broad when it came to the trends and needs of their particular industry.

Employer 1 was an early advocate for the workforce development needs of the renewable energy sector in the region. Indeed, the employer had been working closely with the WIB and OMEP prior to the grant opportunity to carve together resources to develop a new wind blade service technician training and certification program that would benefit the entire wind industry, to include the employers outside of the ReNW region. Employer 1, along with the WIB representative and Educator 1, was involved in this project, which was focused on getting the composite training certification for wind blade repair technicians up and running in the early phases of the grant. It appeared that the preexisting working relationships allowed them to hit the ground running once the grant resources became available. Part of this early and quick start-

up was enabled by many of the preexisting relationships and programs in place in the region and nationally within the composite industry that were leveraged to make a valuable new credential available to workers in the region and, eventually, across the industry.

For example, once the funds were available, the college and the employer assembled a team of in-company experts on composites and educators from the school to develop the curriculum for a new composite training and certification program. Employer 1 engaged the American Composite Manufacturers Association, a national association with certifications in the composite industry, and convinced them to sponsor the effort and to help bring it to scale across the wind industry.

Both Educator 1 and the WIB representative talked about how this one training and certificate program would extend the renewable energy systems technology (REST) training program at the community college. Educator 1 described the program and how it was connected to a broader career pathway. He also explained how the new composite training and certification for wind technicians would sit within this broader system of industry credentials.

REST is a 2-year degree with a 1-year certificate option in renewable systems. It is fairly generic and offers a wide breadth of training required across the renewable energy sector, such as systems installation and repair, fluid power, hydraulics, etc. It also includes several courses in humanities and sociology in sustainability-related issues. Many of the courses already existed in the college; the REST framework allowed for them to be brought together in a credential to meet the needs of the renewable energy sector. Graduates would be qualified for any number of entry-level technical jobs in the emerging renewable energy sector. Since the program is articulated in a career pathway with another community college offering training in wind technology as well as

a 4-year program in geothermal energy offered by the University of Oregon, graduates could also continue on in their education in the renewable energy field.

The composite wind blade repair training and certification program, which was also under development at the time of the interview, would add another specialty to the renewable career pathway in the state. Educator 1 explained: “We are right now pilot testing a program that will end up being a career pathway; some of the same coursework in the REST degree will be applicable to a career pathway for these wind turbine blade repair techs.” The wind blade repair technician program will rest inside of a broader continuum of education that will provide workers with valued industry credentials.

The varied start-up experiences of the ReNW interviewees show that much of the early efforts have been focused on aligning supply-side programs and resources and connecting them more systematically to the needs of the renewable sector in the region.

Interaction and Relationships Within ReNW

The supply-side relationships fostered by WIRED coupled with the demand-side emphasis of ReNW and helped to foster dynamic interactions and new relationships among the various stakeholders in the renewable economy. Interviewees spoke at length about how they interacted with a wide variety of partners to identify and respond to economic and workforce development needs in the region. Evidence of interactions among employers and educators, as well as among multistakeholder groups, was found throughout the interviews.

Employer-Educator Interaction. There was evidence of significant education-employer interaction within the schools where both Educator 1 and Educator 2 worked. For example, the wind blade repair technician training and certification program included the direct involvement of Employer 1 and Educator 1. Though this interaction is resulting in new

programs to meet the specific needs of a ReNW employer, it is also building new training and certification programs that will expand the offerings at the school and fill a void in the workforce needs shared across the wind industry.

Employer 1 explained that the wind turbine work required a ‘vacuum-sealed system.’ This procedure entails specialized skills that are not available in the composite manufacturing or wind blade tech workforce. Employer 1 talked about how the company and the school pooled their knowledge and resources to deliver the new training to respond to these new skill needs.

There wasn’t a professor that knew how to do it. But we had an employee that does our research and development that knows how. He also taught a few college classes up at the college. So we had him, through the college, he’s hired by the college, teaching that class. That was the only way we could accommodate it. So . . . the college has been great and flexible in working with us.

The school lent a curriculum development specialist who did not know about composites; this individual worked very closely with the employee expert to design the curriculum.

Employer 1 explained how these two experts worked together to create the curriculum.

She knew nothing about composites, and so there was a lot of interaction with her and [the expert] and our in-house instructional staff who might teach part of the program. They did a lot of interviewing with our employees that actually went out on the wind job. She did a really good job on nailing down the important work, the job, the skills, and I was really impressed of how she was able to pick up and do the PowerPoint for the class and develop that whole curriculum.

The company’s expert was conducting a pilot training for company employees, and once it has been evaluated, the program will be turned over to the college, which will open the training to its students. So the employer is helping the school to develop the in-house expertise to deliver the program and to continue to service the needs of the local wind industry.

Meanwhile, the company also reached out to the American Composite Manufacturers Association, which is now working alongside the partners to develop a new national credential

and certification for the training. The association brought other employers to the table to provide input into the training and help validate the certification that the association will make broadly available throughout the industry.

The pilot training was under way at the time of the interview. Training took place at the worksite rather than at the school so that the students could be out on the floor practicing what they were learning. This hands-on experience would give the trainees a leg up when out on the worksite because Employer 1 said that it would “be able to go out and actually do repairs with very little instruction at the worksite.”

Employer 1 had already reaped benefits from this program. A national wind farm operator was considering awarding the company a national repair contract based primarily on the fact that employees would be trained and certified in wind blade repair work.

Multistakeholder Interactions. The workforce development representative talked about how parties in the supply-side systems collaborated to align and coordinate the interaction between the workforce development system and employers in the region. The representative commented on how the work of ReNW was part of a broader effort to coordinate across the entire public workforce development system to deliver programs to employers.

We have a group called the Business Edge, and this is a group of anyone in our region who’s doing outreach to businesses in our region to have a coordinated effort when we do outreach to businesses. So it’s economic development, it’s the educators, it’s us. . . . There’s all sorts of groups around that table, and they talk about what business needs are and how to have a coordinated effort when you go out to businesses. So everybody’s programs and all these different solutions that we can offer a business can be presented to that business together. We work—the college and businesses and all of us, I think, really work effectively and hopefully in a coordinated fashion together.

. . . We have regular meetings around this grant. We start out originally with meetings, I’m going to say every other week, and it’s now moved on to once a month. Although we’re in contact a lot—I mean, on phone, via email, often. And the college has been out to Employer 1; we actually have a training that we’re delivering on-site at Employer 1

right now. So the college is in really close contact with businesses in our region. I see effective partnerships being built there.

Educator 1 talked about how the supply-side institutional collaboration had been embedded into the structure of the college. The WIB and the economic development agency have jointed funded a subcontractor who was housed alongside the customized training division at the college. “So we have this kind of triad, if you will, of instruction, of customized training which is the outreach branch of the college . . . and workforce department, who’s dealing with all the adult and dislocated workers.” The educator shared how the parties coordinated to serve the needs of employer and workers in the community in the context of a project designed to help a company skill up for a new contract.

Some of us have better relationships in one area, some in the other, so we’re pooling our resources in order to be able to recruit qualified companies and let them know about what opportunity exists, and then getting them connected into the [Lean and Clean] program.

. . . Our work parallels very closely. I mean, that’s probably one of the challenges, frankly, is aligning three different groups that do similar types of work, but also work in complementary [ways]. In some cases, they can each do a specific—like, for example, Lean process improvement training; well, we can do that, the college can, all day long, but so can MEP. So in some cases we might, almost, compete with each other. We don’t, but we do offer services. In some cases, we hire them to do it, but we also have the ability to do it ourselves.

So there’s an example where there’s a parallel capability, but in this case, what is unique about this opportunity is we have not, at least I have not in the 5½ years that I’ve been here, been involved in a project where we’ve done this on the scale, and actually creating a, I guess you would say, a matrix of offerings that were put together by all three agencies at the same time in a way that’s trying to be complementary and we don’t want to step on each other’s toes and we’re not going after—in other words, we’re in a concert, orchestrated and strategic way, going after the key players.

Educator 2 credited the ReNW grant for closer coordination among all the supply-side agencies in their interaction with employers in the region.

I don’t know that this would have come together without the grant. And not that we don’t work together, but it’s not like this. We would work together like managing that

triangle, maybe we would work with the workforce development council a lot, we might work with the MEP, but they wouldn't necessarily all be working together. And certainly, if we would, it wouldn't be anything on the scale of this. This is a different level. So the real winner, the focus on the winner is the community, not so much the individual agency.

Start-up Challenges and Strategies

The ReNW partners interviewed for this study shared challenges that were related to the development of a supportive partnership infrastructure, synchronizing the supply and demand cycles, workforce challenges, and challenges related to the administration of partnership resources.

Infrastructure. ReNW's infrastructure challenges related to a lack of training expertise and a shift in the student population and their needs, which prevented the education system from helping employers mitigate the challenges associated with the high turnover of skilled workers in the region. Table 6-2 summarizes the infrastructure challenges and the strategies adopted by the stakeholders to alleviate them.

Table 6-2
ReNW Infrastructure Challenges and Strategies

Stakeholder	Challenge	Response strategies
Employer 1	Lack of skilled workers	Create training and certification infrastructure to provide more skilled workers in the region and nationally
Employer 2	Lack of skilled workers	Engage in workforce development activities and programs to provide more skilled workers in the region
Educator 1	Lack of expertise to meet needs and develop/deliver training for green jobs	Swap employees to transfer knowledge across boundaries: the school hired an expert from the employer workforce to develop and deliver pilot training, and the employer provided a faculty member internship to learn about the industry

Stakeholder	Challenge	Response strategies
Educator 2	Shift in customized training division's student population to include displaced and underemployed workers	Learn and adjust services and processes, including new student assessments and screening processes to ensure students have the basic skills to succeed in training

Educators 1 and 2 shared structural challenges that hampered their ability to respond to the new needs of the emerging renewable energy industry. Educator 1 talked about the challenge in finding the faculty with the expertise to deliver the new REST and wind blade repair technician certification programs. This problem was resolved through a partnership with Employer 1, wherein the school hired an industrial expert out to the plant to develop and deliver the pilot training, and the employer provided an internship for a faculty member so he could gain first-hand knowledge of the job requirements in the industry.

Educator 2's infrastructure challenge was related to the new student population and mission that came with the stimulus money that was accepted by the school's customized training division where Educator 2 was located. In the past, the division had largely served incumbent workers participating in customized training and professionals seeking continuing education units. The new funding opened the division's program to displaced workers who brought new needs and new challenges to the division.

Working with the dislocated worker audience, you have individuals who are in difficult places in their lives because they're in different places with not having income coming in, there could be morale issues there, and so it's just a different dynamic, and there's different motivations there.

Educator 2 identified the challenge as needing to learn by trial and error to respond to the new students' needs associated with this shift in the division's student population. For example, in the early days of the program, the employment office referred the students to the program and the school did not screen students, so many students were not prepared to keep up with the

demands of the program. In response, the college worked with employment services to develop a more robust assessment to evaluate the students' knowledge and determine whether they were prepared to meet the demands of the program. An example of such an assessment is the one that the college designed and is implementing to recruit displaced workers into the new green manufacturing specialist certification program, which was funded by the ReNW grant.

For example, . . . [the assessment for the] green manufacturing specialist program, . . . it's really focusing on verifying that they have work experience in the manufacturing environment, but then also that they also have some basic math knowledge, that they have a certain level of knowledge of process improvement. . . .

We . . . have subject matter expert or the faculty interview the students, not relying exclusively on the unemployment office because the unemployment office will not have the subject matter expertise to really assess whether somebody—they can do some assessments, but we're finding that it's the very specific assessments that make a difference.

So the screening, and it's not just the screening, it's actually the assessment, I would say, is very important for the dislocated worker audience.

Employer 1 and Employer 2 talked about challenges related to the structure of the renewable energy labor market, which presented problems related to the recruitment and retention of skilled employees. Both these employers were in the renewable sector, where most of the jobs were seasonal, which meant that skilled workers were often furloughed. Employer 1 (wind) workers, who were trained by the employer, also had employees hired away by their clients, which contributed to a very high turnover rate. Structurally, Employer 2 (solar) was organized as a contractor who relied on a statewide apprenticeship program for skilled workers, but also trained and certified employees for jobs in the firm. Both employers made a great investment in training individuals who they were at great risk of losing to a growing industry demand for their specialized skills. Employer 1 was working within the broader political economy of the region and the national industry to develop new training and certification to

ensure a larger supply of skilled workers, whereas Employer 2 was engaged in a number of local activities to help train workers, including supporting the state apprenticeship system, conducting classes at the local community college, and working with ReNW to provide on-the-job training.

Synchronizing the Supply and Demand. ReNW stakeholders faced uncertainty in the emerging green industry and labor market, which created several significant challenges related to aligning the supply and demand side of the green labor market. Table 6-3 summarizes these challenges and the strategies the stakeholders have developed in mitigate and address them.

Table 6-3
ReNW Synchronization Challenges and Strategies

Stakeholder	Challenge	Response strategies
Supply-side stakeholders	Uncertainty in green market and persistent recession restraining job growth	<ul style="list-style-type: none"> • Rely on data to scan economic trends and patterns • Maintain positive attitude
Employers	Uncertain regulatory environment, which made investments in new markets and skills risky	<ul style="list-style-type: none"> • Advocate for stable industry tax incentives to stabilize investment in industry and worker skills

ReNW is based on the assumption that if small to midsized manufacturers were aligned within the renewable energy industry supply chain, they would create new green manufacturing jobs. This is a long-term strategy, so the interviewees were still uncertain whether the underlying assumption would prove true. At the time of the interview, the three new certification programs funded by ReNW, the green manufacturing specialist training in Washington, and the REST certification and wind turbine blade repair certification programs in Oregon, were all in the pilot stage. Interviewees were hopeful that there would be jobs at the end of the training for the trainees.

Educator 1 thought that the economy was showing signs of recovery that would result in benefits to the trainees.

The economy keeps me nervous, but that's starting to break around here a bit. We've actually got job requests in now that we can't fill. [We] haven't seen that for 3 or 4 years, and that being in manufacturing technology. But some of those companies have some overlap into renewable energy as well.

The workforce development representative expressed frustration over the persistent recession, but also saw a positive sign in the potential new service contract award for Employer 1, which would result in new jobs for renewable energy systems technicians and potentially more students for the new wind blade service technician program.

Educator 1 shared concern about the overemphasis on the green sector in economic development, but he also talked about how he thought that broad technical activities and skills would lead to secure careers for individuals and broader economic recovery in the state.

A lot of folks saw or probably continue to see renewable energy and all things green as a panacea to economic recovery. That may in part be true; I don't think it's as much of a silver bullet as a lot of people thought. We see it, I guess, as we offer a lot of technical programs and we see it as certainly another technical program we can offer, but it's—and kind of add to our portfolio, if you will. But it opens the door to a whole new realm of job possibilities with a great deal of crossover into the existing technical disciplines. And encouraging—giving people more job opportunities and more chances to get, benefit Oregon's economy and kind of bolster ourselves here.

Although the supply-side interviewees were generally positive that the public workforce development system was aligned with business and could meet the long-term workforce development needs in the region, the employers confronted systematic challenges and risk in the renewable marketplace. They were keenly aware that the renewable industry was evolving and that it was uncertain whether their investments in wind and solar would continue to pay off. Both Employer 1 and Employer 2 talked about how a long-term tax policy would bring new interest and stability to the sector. Employer 1 explained the challenge in this way.

It's fast paced, and it changes quite a bit year to year. I think one thing that's a little difficult is because we don't have—our tax credits for green jobs is renewed every 2 years or so, so it tends to make things a little uncertain. . . .

At the federal level, we pass legislation every 2 years whether to support the wind or not, and so when you're gearing up to have a career, a lifetime career, and not knowing how that industry is going to survive or make it, I think puts people a little uneasy.

The workforce development representative talked about how the uncertainty in the market created anxiety in the public system over decisions for how to invest public workforce development funds.

It's been difficult with the economy the way it is, and because the green industries are still not well defined—I mean, we're getting a better handle on it. But the demand still really is uncertain. First we were hearing that solar panels were big, and then there was a glut of solar panels. Thank gosh that wasn't in our region that we were training people to manufacture solar panels. I think it was in the Portland metro. But what we, primarily in our region, we're focusing on wind, the wind renewable energy industry.

Thus, it appeared that several of the interviewees were keenly aware that skills and training were important factors in the renewable energy industry and that workforce development strategies must be combined with stable economic policies to ensure growth in the industry.

Workforce Challenges. ReNW stakeholders faced workforce challenges related to the lack of specialty skills and high turnover among the workforce, as well as the emerging and unclear nature of green jobs, which sent mixed signals to potential new recruits to the industry.

Table 6-4 summarizes these challenges and the strategies the stakeholders have developed to address them.

Table 6-4
ReNW Workforce Challenges

Stakeholder	Challenge	Response strategies
Employer 1/2	Lack of specialty skills and expertise in workforce, which create credibility issues for the industry and cost time and money	Create/adopt training and certification infrastructure to provide more skilled workers in the region and nationally
Employer 1/2	High turnover of skilled workers	Create/adopt training and certification
Supply side	Appeal of, yet lack of understanding about, 'green' jobs	Provide realistic labor market information to potential recruits to ensure they understand the working conditions in the industry

Ironically, concerns over the uncertainty in the green labor market and its ability to absorb ReNW trainees and other workers with green skills were expressed alongside frustrations over the lack of skilled workers for the green-related tasks and jobs that currently did exist. Employer 1 talked about how the lack of expertise in composite repair in the wind farm maintenance industry was hurting the reputation of every firm in the sector. “Because the wind blade repair . . . is a complicated process . . . and there were a lot of people out there that didn’t have the skills . . . trying to do those repairs and it was kind of giving the industry a bad name.” This motivated the employer to engage ReNW and other partners in the development of a new training and certification program.

Employer 2 talked about how the lack of specialty skills available to the industry cost time and money.

There really are very specific things that are different about solar electric and such that are not intuitive to them [journey-level electricians]. I think that’s probably what gave them—I’ll give you a small example.

We have a big inverter—a big box on the wall—that has a big space that’s empty on it. Just below that, there’s a small box, a disconnect. There are three labels that need to be on that disconnect, and you have to crowd them on to fit them. These electricians kept putting the labels on the big inverter because there was lots of space for the labels and they thought that made sense. They were more visible, more readable, and the disconnect and the inverter were right next to each other anyway. So, it seemed like the thing to do.

Every time that happened, we failed an inspection and we had to send somebody back to pull them off the inverter and put them on the disconnect like they’re supposed to be. So, we had five crews led by electricians who were all doing the wrong thing—little things, petty things—but still going back and fixing all that was a huge cost and loss of energy.

Employer 2 advocated for the broad-scale adoption and distribution of the North American Board of Certified Energy Practitioners certifications, which he saw as a rigorous and valuable credential that would help to ensure workers had the skills required by the industry.

They come to me and say, “I’m NABCEP certified.” I jump on them because I know that they’re qualified. . . . So funneling people through that, encouraging people for that, making funds available, loans, it is pretty expensive training to get. I do think that’s the most pertinent training there is for this industry. I think federal legislation that would recognize those certifications and get into place consideration for people having those certifications to be able to do some portion of the solar installation in maybe all states . . . might be a worthy goal.

The seasonal nature of the work, coupled with the scarcity of workers with the requisite specialty skills, led to significant churning in the labor market for the workers hired by both employers. In the first 3 years of the new wind services division, Employer 1 hired over 100 people for 30 positions. Many employees were lost due to the stress over the constant travel and the seasonal nature of the work. In addition, Employer 1’s competitors and clients hired away the more experienced workers. Employer 1 thought that these poaching practices were beneficial for individual employees because they were often hired into permanent jobs that offered promotional opportunities, but it was difficult for the company to keep up with the constant turnover.

Some of the interviewees talked about some of the appeal of the ‘green’ economy and ‘green’ jobs to workers seeking meaningful work and careers. Educator 1 talked about how the greening of technical jobs, and the career pathway they offer, is generating new interest in these careers among the younger generation.

Renewable energy has an awful lot of rote, I guess—traditional manufacturing, electronics, process control, welding, fabrication, all that stuff, just laced through it. But young people are very attracted to it, so it’s a way to maybe get young people, their high school counselors, parents, teachers, etc., interested in some very good-paying careers that do, because of our partnerships with schools like the Oregon Institute of Technology, have—that are not terminal, that are not terminal after 1 year of training or a 2-year degree. They can go onto 4-year degrees and turn those technical hands-on kinds of jobs into engineering careers. So there’s an entire career pathway opportunity that exists for those that choose to take advantage of it.

On the other hand, Employer 2 spoke about how the appeal of green jobs often masked the difficult nature of the work in the solar installation industry. He advised people who came to the introductory class on solar installation at the community college to really consider the nature of the work before they invested time and money in new skills to enter into the field.

Maybe half the class, every time without fail, are people who are either looking for a career change or they're very young, just got out of high school; they have no idea what they're going to do with their lives, and they think solar might be something good. I always tell those folks that it's just hard work. Yes, you're doing something nice. You're making the world better. But it's hard, hard work. You're on hot roofs. You're working in attics. It's dangerous. It doesn't pay well. If I can't scare them off with all that, they must be committed!

Resource Management and Administrative Challenges. ReNW stakeholder management and administrative challenges related to performance on the ETP grant and the increased volume of grant-funded training that competed with other missions within the education system. Table 6-5 summarizes these challenges and the strategies the stakeholders have developed in mitigate them.

Table 6-5
ReNW Resource Management and Administrative Challenges and Strategies

Stakeholder	Challenge	Response strategies
Supply side	The recession, which limits job growth and ETP placement performance	<ul style="list-style-type: none"> • Continue investing in ReNW's economic development strategy
Educator 2	Stimulus funds that increase the volume of training and detract from performance in the core mission	<ul style="list-style-type: none"> • Serve institutional needs • Resist the temptation to bring on new capacity that is unsustainable in the long term

Several of the supply-side stakeholders expressed concern over the recession and how it affected ReNW's placements. They remained hopeful that ReNW's economic development strategies would yield positive results.

Educator 2 shared that the noncredit division in the college created eight new programs in the last 2 years (2009-2010) to train displaced workers referred by the workforce development council and ReNW. The division was 95 percent self-funded, so the increased grant-funded training was changing the division's financial structure and taking away from the marketing activities required for a viable fee-for-service program. Educator 2 talked about the long-term consequences of this internal shift, which he believed was often overlooked by education administrators.

Stimulus and grant-based programs like this will go away, and we know that with the timeline, it's not going to be possible to hire a lot of staff just for that program because we have various union rules and such that would prevent that. They would then become a permanent employee that can create a fiscal liability for us going forward that we would not be able to support. So we have to kind of do the extra work with what we've got. . . .

Stakeholder Perceptions of the ReNW Career Pathways Model

Though the career pathways model for the renewable energy industry in Oregon continues to evolve, it appeared that the Renewable Energy Systems Technician (REST) program was central. REST is a broad-based program in the foundational skills and knowledge required across the renewable sector. It is connected to two specialty degrees in the wind industry and to baccalaureate-level programs in geothermal technology and engineering. Graduates receive industry-recognized certificates that qualify them for renewable jobs and apply towards degrees. Figure 6-1 shows how REST fits into a career pathway.

GUEST CAREER PATHWAYS Renewable Energy Technology (RET) Copy
 Oregon Skill Set: Industrial and Engineering Systems

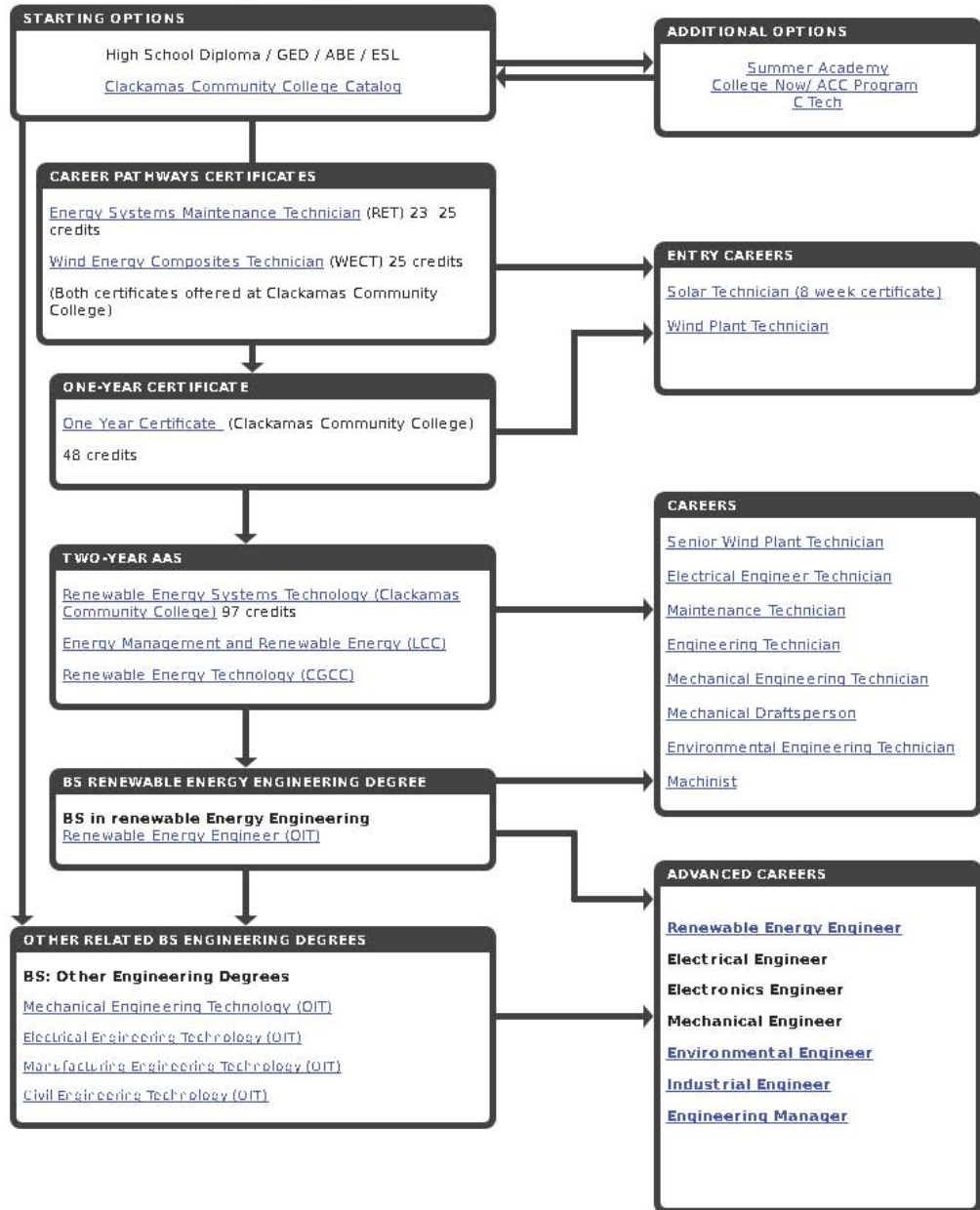


Figure 6-1. Career pathway for renewable energy technology in Oregon.

Employer 1 and Employer 2 were not aware of the broader career pathways work in the state community college system; however, they both shared that they understood the value of and need for industry-recognized credentials to drive new education and training programs in their industry. Each employer also expressed the importance of the continuum of education to ensure workers have the skills they need to take on new work and remain current in a continuously changing field. Both sought to fill gaps in the specialty knowledge and skills required in the emerging wind and solar sectors by working to develop or promote new industry-recognized training and certification programs. Employer 1 sought to link the new program to a broader continuum of education available through the community college. Employer 2 advocated for new training and certification within the skilled trades apprenticeship system.

Both employers recognized gaps in the training and certification for the specialty skills required in their industry. Both in their own way were active advocates for improvements to the training and certification systems in the industry.

The Washington side of ReNW operated a different model for training and certification of workers in green skills. The model offered industry-recognized credentials but was not aligned with existing education and training programs, like community college or apprenticeship programs. Educator 2 saw the value in connecting industrial training to academic credit, but this link was not easy to make given the structure of the college and the location of ReNW in the customized training division.

Stakeholder Perceptions of ReNW Trainees

When asked to describe participants' experiences in ReNW-sponsored programs, some of the interviewees could not provide a detailed response because they had little interaction with the participants. Employer 2, for example, said he did not know what motivated the employees he

recruited through ReNW on an on-the-job training award, but he did speculate that their primary motivation was that they needed or wanted a job. The workforce development representative had second-hand information from the service provider partners who thought that participants were having a positive experience working with the counselors and accessing the available training.

Educator 2 also could not share much information about the participants' experience because they had not yet begun to implement the displaced worker component of the green manufacturing specialist training. They had piloted with incumbent workers who participated in the training as part of a customized training program offered to their employer. But since these participants were required to take the training as part of their jobs, the educator could not really speak to their personal motivation and experiences. He did, however, surmise that these participants found value in the training because it offered the opportunity for them to enhance their skill sets.

Employer 1 was the only interviewee who had direct interaction with the participants in the pilot wind blade repair technician program because they were company employees. Many of the employees came from the wind school training program offered by a community college in North Oregon, whereas others were college students looking for summer work. They were all men between the ages of 20 and 35, and most were single. The employer thought that many of them were motivated by a career in an energy-related field.

I think they want to . . . be able to get a job, and they want to be better; it puts them on a higher level than anybody else to have that certification. So they'll get hired either by like a Siemens or Vestas or somebody like us, who does the servicing.

In speaking with many of the trainees in the pilot program, Employer 1 learned that they were enjoying the training mainly because it was contextualized in the workplace, which allowed them to get out on the factory floor and apply what they were learning in the program.

Educator 1 had a broader view of the student population in both the pilot wind blade repair training and the REST program. Both programs were partially funded by ReNW, so many of the participants were grant recipients. When asked about the participants, Educator 1 described them as a diverse group that tended to be a little younger than the typical career and technical education students at the college. This was because the renewable energy program was very appealing to high school students who were drawn to the renewable energy field for altruistic reasons. “Everybody kind of wants to get into renewable energy. . . . They want to do the right thing for the world.” In addition to young people, the program drew older students who were seeking to re-skill so that they could enter into a growing and secure field. Thus, the student population for the REST program was coming from a number of avenues.

The educator had received anecdotal feedback from faculty in a wide variety of programs, including the REST program, that student ‘quality’ has been up for the past year and a half or so. “By and large in the college, we are experiencing better-prepared technical students, and sadly that’s a bi-product of the economy because a lot of them have been displaced or laid off from present jobs.”

Educator 1 also thought that the students were motivated by the career pathways model upon which the REST program is based.

Likewise, a career pathway is a way for somebody to say, “Oh, wow, that’s 15 credits and I’m working but I could do that. I could do that. I could get started and better my skills.” [It] is a doable chunk of education that if done right can actually serve as an endorsement to something they’re already doing, or certainly give them the opportunity to do more. And allows them to, in a consumable way, to make a lifestyle change that will accommodate both what is probably a full-time working schedule or—and education.

In summary, the diverse programs and strategies that ReNW supported resulted in a wide range of participants who came to these programs with diverse needs and motivations that could not be met with a one-size-fits-all approach.

Findings: ReNW

There are four findings for the ReNW case study, including the quality and nature of the emerging sector partnership, synchronization of the labor market, the emerging career pathways model, and the quality and nature of jobs. These findings are summarized in Table 6-6 and explained in the text below.

Table 6-6
ReNW Case Findings

Finding	ReNW
The quality and nature of the sector partnership	Decentralized network of stakeholders who directly engage each other in a preexisting and evolving green economic and workforce development infrastructure to develop multiple programs and initiatives
Challenges and strategies for synchronizing the green jobs labor market	Short-term concern that training is out ahead of job creation, coupled with long-term optimism that ReNW’s economic development strategy will deliver new green jobs
Career pathway model in use	Multiple models: education and workforce development career pathways models
The nature of green jobs	Green jobs with some good qualities, but the seasonal nature of the jobs leads to unstable employment with few external mechanisms to facilitate job transitions.

Finding 1: Decentralized Nature of the ReNW Sector Partnership

All interviewees, except for Employer 2, were highly engaged in ReNW activities. Each was very familiar with the grant’s overall strategy and was actively involved in both the design and delivery of the grant deliverables. What was very striking about these discussions was that

ReNW appeared more as a program planning and service delivery strategy that was being implemented through a series of parallel supply-side and supply-demand-side partnerships. ReNW did not appear as a new institution that housed or represented a ‘sector partnership’ or a workforce intermediary, such as the industry-driven sector partnerships found in economic and workforce development best-practice literature. Rather, the many examples of collaboration among the ReNW partners revealed a loosely coupled, decentralized partnership structure that helped to leverage the collaborative spirit that was established in the region by the WIRED grant activities. Though ReNW is credited as the impetus for much of the interaction among the stakeholders today, it did not appear as a central organizing agent in any of the stories shared by the participants about their workforce development efforts in the region.

Rather, the partners interviewed for this study supported the goals of the ReNW grant through a decentralized network of relationships between the supply-side institutions that came together to organize a response to individual employer or client needs. This collaborative approach allowed each respective program as well as the broader system to have a larger impact on the regional economy and in effect was bringing the workforce development system for the renewable energy industry to scale in the region. This was true even though employer involvement remained mainly one-on-one interactions at the service level of the exchange.

Finding 2: Synchronizing the Labor Market

While many of the interviewees expressed concerns over whether the economic development activities central to ReNW’s strategy would result in jobs in the short term, all were fairly confident that the long-term labor market for individuals with training and credentials that were being developed with ReNW funds would provide jobs and career opportunities for graduates. It was too early to judge whether the current training programs were aligned with the

labor market that exists today, as much of the training was in the pilot stage. However, both employers interviewed for this study planned to hire individuals within the next few months, and both were relying on ReNW to find the workers with the requisite specialty skills for these jobs.

In addition, the various employer outreach and engagement strategies under way in the region, to include the WIB listening panels and the collaborative Lean and Clean outreach described by Educator 1, may also provide ongoing feedback on worker requirements that can be used to by educators to enhance training programs. It also appears that both educational institutions that were examined in this study were flexible enough to adjust their training and services to respond to the evolving demands of an evolving labor market landscape.

Finding 3: Multiple Career Pathways Models

It appeared that at least two career pathways models were operating in ReNW. The Oregon model emphasized career and technical education in broad occupational skills, as well as training in industry-specific specialty skills, and was articulated with K-12 as well as baccalaureate-level programs. In addition, both the Washington and Oregon models emphasized economic development in the renewable energy supply chain and job outcomes for unemployed workers. Consequently, there were trace elements of both the education and workforce development career pathways model operating in the ReNW ETP.

One gap was that neither educator spoke about the availability of ‘bridge’ programs to meet the remediation or developmental needs of individuals who were not prepared to succeed in career-related education and training. Indeed, Educator 1 talked about how the bar for entry into these programs and for the quality of the students entering into career and technical education in the school had risen significantly in recent years.

The Oregon community college system targeted renewable energy for career pathways development, so it should be no surprise that several public-sector ReNW participants in Oregon had knowledge of the model. It appeared that they and others were drawing upon the model's features to develop new programs for the industry. Indeed, Educator 1 and the workforce development representative used the term "career pathways" several times in their interviews. Their understanding of the model's basic features could be heard in the way they described their work to develop the renewable energy system technicians program and the wind blade composite repair technicians program and in how they explained the way the two programs fit into a broader continuum of education and career advancement. The program for wind certification is nested inside of REST, which is a broader educational continuum that allows students to continue a course of study while using their credential to find a good job in the wind industry with career potential.

The certifications in weatherization in Oregon and the green manufacturing specialist training in Washington were short-term training programs leading to certification in industry-recognized credentials and were not articulated with a longer-term career pathway. These efforts were closely aligned with an economic development strategy to generate new markets for area employers who, in turn, would hire skilled workers trained through these programs. The emphasis on economic growth and job placement aligned these efforts more closely with the workforce development career pathways model. However, Educator 2 did acknowledge that this model could be enhanced if it were aligned with a broader continuum of education and credentialing.

The operation of two career pathways models in ReNW illustrates that the models are not mutually exclusive and that stakeholders need a variety of approaches and programs to respond

to the needs of the emerging green economy and of businesses and workers in a region that is struggling to recover from the recession.

Finding 4: Evolving Nature of Green Jobs

The green jobs that were the subject of much of the discussion with the two employers interviewed for this study—the wind blade service technician and the solar installer—provided decent entry-level pay (\$15-\$20/hour) and benefits. Each employer also talked about the availability of career advancement opportunities in these jobs for workers who continued in their training and who gained more experience in the industry. By these standards, these jobs can be judged as good jobs. However, these jobs are also seasonal and reside in industries that are not very stable, so workers face a certain amount of short-term financial and long-term career-oriented risk. The availability and the increased recognition of the training and certificates in renewable energy occupations and skills, like the North American Board of Certified Energy Practitioners certifications, the REST certification, and the wind blade repair certification, may help to provide job security. But there may also be need for new mechanisms, like those found in the apprenticeship system, to help workers transition from one job to the next in the fluid renewable industry.

Chapter 7:

Discussion and Cross-Case Analysis of Green Job Career Pathways

This chapter presents the analysis of the two partnerships and the green jobs career pathways models that are emerging to support the training and certification needs of workers and employers in the emerging green economy in Vermont and in the nine contiguous counties in Oregon and Washington encompassed by ReNW. The discussion begins with an analysis of the needs and experiences of each peer group in the energy training partnership (ETP): the employers, educators, and workforce development practitioners. This discussion provides the basis for comparing the findings or themes of each case.

The cross-case analysis is followed by an analysis of the implications of these findings for the literature on career pathways and green jobs, to include whether and how the case confirms the series of propositions that claim that green jobs and career pathways are an arranged marriage on the path to a 21st-century workforce development system. The chapter concludes with a discussion of the implications of this study for workforce development practice, policy, and research. It should be noted that the data are too limited to validate the literature on green jobs career pathways. The purpose of this chapter is to share whether and how the propositions about green jobs pathways appear in the context of the two cases or in the views and experiences shared by the individuals interviewed in this study.

Stakeholder Experiences and Needs

Employers

Four employers were interviewed for this study, two involved in Vermont GREEN and two participating in ReNW. The two Vermont GREEN employers were manufacturers in the early stages of launching a new green product line. The two ReNW employers were contractors providing installation and repair services in the renewable industry. The ReNW employers were at opposite ends of the business development cycle: ReNW Employer 1 was just starting out in the green sector, whereas Employer 2 had been in the business for over 30 years. This section discusses the salient features of these four employers' experiences and needs in a green industry and the ETP. Since both employers in each case are in similar industries, this section will first describe the experiences and needs of the two Vermont GREEN employers and then the experiences and needs of the ReNW employers. Table 7-1 provides a summary of the experiences and needs of the four employers.

Vermont GREEN Employers' Experiences and Needs. The two Vermont GREEN employers interviewed for this study were manufacturers producing new renewable energy products. Employer 1 was supplying the auto and other industries, and Employer 2 was producing new green products to sell directly to consumers. Both employers were building new manufacturing lines to produce new green products, so their move into the green market required internal change. In the case of Employer 1, this change involved a total transformation of the production process, including a new facility, new technology, and new processes and administrative systems. All manufacturing jobs, including engineering and assembly jobs, were significantly upgraded, and workers needed training and certification in new processes and in the entire system. Employer 2, who was in an earlier stage of product development, was less clear

Table 7-1

Summary of Employers' Experiences and Needs in Green Industry

Theme	VT E1	VT E2	ReNW E1	ReNW E2
Industry	Manufacturing: capacitor supplier to auto/ other industries	Manufacturer: solar consumer products	Installation and repair: wind	Installation and repair: solar
State of green development in firm	Intermediate: built new plant and designed new manufacturing process to produce new product; bringing new plant and assembly lines on line	Early: product design under way, hired new product manager to design production, marketing and sales processes	Intermediate: serving clients while developing new training and certification to upgrade employee skills	Mature: 31 years in business
Implications of greening for jobs	Upgrade all jobs to accommodate change in production process, assembly, engineering, management	Unclear of specific impacts beyond the need to hire new installers and train some assemblers in new specialty skills	New and emerging occupation, wind repair technician	Specialty skills for installers, electricians, and plumbers
Green jobs	132 new assembly jobs \$12.90 per hour Full benefits Advancement opportunity	New marketing and installation jobs \$11.00–\$15.00 per hour for assembly jobs Full benefits	Seasonal wind repair jobs \$20.00 per hour Full benefits Advancement opportunity	Seasonal solar installation jobs \$10.00–\$20.00 per hour depending on skill Apprenticeship opportunity
Pressing workforce challenge	Long sales cycles; hard to predict staffing levels	Long sales cycles; hard to predict skills needs and staffing levels	High turnover and lack of specialty skills among workforce	Lack of specialty skills among workforce
Role of ETP	Internal training and certification	Internal training and certification	Development and pilot of industry training and certification	Training subsidy

Theme	VT E1	VT E2	ReNW E1	ReNW E2
Role in ETP	Sponsored tours of new plant for ETP stakeholders	Assisted in planning Green Jobs Summit	Engaged in design and delivery of training	Not aware of or involved in ETP

about how the new product would affect the production system and assembly jobs. A product manager had been hired and was in the process of figuring out the new system. Employer 2 did anticipate that the new system would require a few new specialty skills among the assembly workers so it was developing a new in-house training and certification program to cross-train workers to work on the new product line.

Both employers expected that these changes would result in new jobs in the company. Employer 1 projected that it would hire 132 new assembly workers by 2014. Since it was receiving a state wage subsidy for these hires, the starting salary was set at \$12.90 per hour. Employer 2 did not have a specific number of new jobs projected. The pay for assembly jobs at the firm ranged from \$11.00 to \$15.00 per hour. According to O*NET, these two employers paid slightly over the national median wage for team assembly jobs, which was \$12.89 per hour in 2009. Both firms provided a full benefit package. Employer 1 saw great career potential in these jobs, especially after the new system rolled out and people engaged in continuous learning to keep pace with the anticipated changes. Employer 2 was less clear on the career potential of the assembly jobs, though he did emphasize that his employees were excited that the new product line would allow them to make a meaningful contribution to the environment through their work.

These two employers shared a challenge in figuring out how to synchronize the labor market. With limited experience in the new green market, neither employer could predict the sales cycle. They both knew they needed to hire new workers and train their workforce to take on the new work and that this would require planning and time to implement. But they were

fearful of taking on this task before the new orders were placed and they knew they could afford the extra staffing costs. Both had received support from Vermont GREEN and the state in the form of training and wage subsidies, which they acknowledged as being helpful to them in striking a balance between these two opposing needs.

In addition, both employers looked to Vermont GREEN for support in developing internal training and certifications in the new work systems, equipment, and tasks for their employees. Employer 1 appeared to be developing a broad-based curriculum in advanced manufacturing that would help individuals develop portable knowledge and skills, even though the certification would not be recognized outside of the employer's internal job structure. The elements of the training and certification planned by Employer 2 were less clear. However, both internal trainings shared common elements, including Lean manufacturing and training in new green markets. Thus, there appeared to be an opportunity for Vermont GREEN to think and act more broadly in its approach to the manufacturing sector.

While both employers played minor roles in Vermont GREEN, both also expressed interest in becoming more involved. Employer 1 sponsored tours of the new facility for other stakeholders seeking to know more about how to prepare workers for the new jobs that were expected in the firm. Employer 2 was actively involved in the planning of the Green Jobs Summit sponsored by Vermont GREEN in 2010.

ReNW Employers' Experiences and Needs. The two ReNW employers interviewed for this study were engaged in the installation and/or repair of renewable energy systems. Employer 1 was a composite manufacturer that had developed a new line of business in wind farm maintenance and repair. Employer 2 was a longstanding solar system installation contractor in the region. Both employers required specialized skills that were not broadly available in the

labor market. Employer 1 required expertise in wind blade repair, which involved knowledge and expertise in composites. No such training was available in wind schools or through other resources, so Employer 1 was working with ReNW and the American Composite Manufacturers Association (ACMA) to build and pilot a new wind blade repair technician training and certification, which they would pilot in the region and make broadly available to the industry. Employer 2 required expertise in solar installation, including knowledge of the codes and of the particular systems being installed. Though apprenticeship programs in the region provided this training, the employer suggested that since these skills were best learned on the job, many skilled trade workers did not come to his firm job ready. This employer was working with ReNW to provide on-the-job training in solar installation to the workers he hired for the busy summer season.

In both cases, the jobs were seasonal jobs requiring specialized skills. Both employers provided employees with training and experience to develop portable skills. Employer 1 was taking steps to ensure that the new wind blade repair training was accompanied by a nationally recognized industry credential that would bring more value to the individual in the labor market. Employer 2 relied on the state apprenticeship to credential his semiskilled installers. He mentioned that a national credential already existed in the hire-level skills he valued—the National American Board of Certified Energy Practitioners installation certification—but it was expensive, so the training and credential were not broadly available to individuals and thus in the industry. Employer 1 paid \$20.00 per hour for the wind repair technician job, and Employer 2 paid \$10.00 to \$20.00 per hour for the variety of semiskilled and skilled trade jobs in the firm. Again, these employers paid at or slightly above the national median salary for these jobs. According to O*NET, the median for wind service technicians in 2009 was \$17.00 per hour, and

the median for solar installers was \$16.34 per hour. Both employers paid full benefits. Though Employer 1 did not offer career advancement opportunities, employees with credentials in wind technology were often hired by the wind farms for higher-paying, more secure jobs. Employees of Employer 2 had the opportunity to advance through the apprenticeship system as well as receive pay increases the longer they stayed with the company.

Both employers viewed ReNW as a source of extra financial support for preexisting needs and projects. Employer 1 had already been working with the workforce investment board (WIB), Educator 1, and the ACMA to carve together the resources needed to develop and pilot a new national training and certification for wind blade repair. The ReNW ETP grant was a boost to this effort, since it allowed the parties to get it off the ground and bring it to scale. Employer 2 drew on the ETP to hire and train the workers he needed for the summer season. This on-the-job training was of value to the individual employees and the regional industry because it gave the employees new skills they needed to work in the industry while compensating Employer 2 for investing in the training. Employer 2 also taught a community college course on introduction to solar installation. Thus, both employers were investing time and expertise in building the skills they needed to engage in the renewable industry in their region.

Although Employer 1 was engaged with several of the individual partners, she did not appear to be involved in the centralized planning and coordination of the partnership itself. Employer 2 reported that he was not aware of the overall ETP partnership and its broader activities in the region.

Table 7-2 displays a summary of the green jobs provided by these four employers and identifies the training and certification programs that employers either provide or encourage to prepare workers for these jobs.

Table 7-2

Employers' Jobs Impacted by Greening of Work, Required Training and Certification, Providers

Green job	VT E1	VT E2	NW E1	NW E2	Training/ credential current	Training/ credential needed	Providers
Cross-trained assembly tech	X				High school/GED; trained/certified on in-house equipment and processes; Lean; corporate history/philosophy; basic skills; six sigma; ERP	Associate's degree in advanced manufacturing; work readiness training	Internal trainers; vendors; proprietary
Cross-trained assembly tech		X			High school/GED; trained/certified on in-house equipment and processes; Lean	Associate's degree in engineering	Internal trainers; vendors; proprietary
Merchandising		X					
Electricians		X			Electrician's license		
Electricians				X	Electrician's license	OJT in solar installation code; NABCEP installer training and certification	Apprenticeship program
Engineers	X				ERP; experiments; geometric design and tolerance; CAT software		Internal trainers; vendors; proprietary
Installers		X			OJT		
Installers				X	OJT		
Limited Renewal Tech				X	Apprenticeship; limited renewal tech license		Apprenticeship (OJT)
Marketing		X					
Plumbers		X			Plumber's license		
Plumbers				X	Plumber's license	OJT in solar code; NABCEP installer training and certification	Apprenticeship program
Racking specialists				X	OJT		
Solar water heating specialist				X	Apprenticeship; solar thermal license		Apprenticeship (OJT)
Wind blade repair technicians			X		ACMA wind blade repair tech training and certification		E1

OJT indicates on-the-job training; ERP, enterprise resource planning; CAT, computer-aided transcription; ACMA, American Composite Manufacturers Association; NABCEP, North American Board of Certified Energy Practitioners.

Educators

Three educators were interviewed for this study. One was involved in Vermont GREEN, and two were involved in ReNW. Each was active in the green industry and green labor market prior to the ETP, so their green-related programs extend beyond the grant-funded activities. Table 7-3 summarizes the three educators' experiences and needs in the green industry and the ETP. Following the table is a discussion of these experiences and needs, first in Vermont GREEN and then in ReNW.

Vermont GREEN Educator's Experiences and Needs. Vermont GREEN Educator 1 represented a new Center for Sustainability at a private technical college. It was at the front edge of the college's strategic plan to offer new 4-year degrees in technical fields related to the green sector. The center's mission was to build new capacity at the college to support green industry in the state, which would help to create jobs for the school's graduates. The center also partnered with the state office of employment opportunity and Vermont GREEN to provide noncredit, certificate-oriented training in value-added skills required by the building and commercial contractors to unemployed Vermont residents. The training and certification were not articulated to other degree-granting programs at the college; rather, the training led to industry-recognized credentials. This training is paid for by the Vermont Office of Employment Opportunity or by contractors in the region.

The educator assisted with the start up of Vermont GREEN by leveraging the ongoing weatherization program at the center and aligning it with the emerging Vermont GREEN network of counselors and job developers. The center director was active on all levels of the Vermont GREEN partnership. She participated in the leadership committee, where she contributed to strategic planning. She spoke about Vermont GREEN as though it was an

Table 7-3

Summary of Educators' Experiences and Needs in Green Industry

Theme	VT Ed1	RW Ed1	RW Ed2
Center	Center for Sustainability at a technical college	Workforce division at a community college	Customized training division at a community college
Mission	Build new capacity at college to support green industry and create green jobs	Provide career and technical education, customized training, and workforce development; certifications articulate with degrees	Provide noncredit customized training and workforce development (new mission)
Green activities	Deliver green training and certification; advocate and assist college to adopt green policies and programs	Develop and deliver green training and certification programs; contribute to development of statewide green career pathways	Deliver green training and certification; provide Green and Lean consulting services to employers
Green training and certifications	Noncredit, career-oriented, skills-based, value added for builders, commercial contractors: i.e., weatherization, LEED	Renewable Energy Systems Tech (REST) 1-year certification and 2-year degree options articulated to specialty degrees (wind school) and 4-year degrees (engineering) throughout the Oregon community college and university system; Wind Blade Repair Technician, new specialty embedded in REST	Lean and Green certification; six-sigma certification; Green Manufacturing Specialist Training purchased from NIST MEP; weatherization
Student support services	Not available; provided by VT GREEN counselors	Not available	Not available
Student pipeline	Vermont GREEN counselors, contractors in region	Multiple	WIB; employers; professional associations
Interaction with employers	VT GREEN policy-level only, no interaction in program delivery	Collaborate and share resources in support of the development and delivery of training and certification	Provide direct services to employers: Lean and Green consulting, green-related training and certification to employees
Role of ETP	Vehicle to broader economic development process and relationships; generate valuable feedback on services; pipeline for students	Funding source for program development and delivery	Funding source for program development and delivery
Role in ETP	Leveraged weatherization training to assist with grant application; paid from ETP grant to advise on policy and communications	Develop and delivery training and certification programs	Subgrantee, program service provider in WA state

NIST indicates National Institute of Standards and Technology; MEP, manufacturing extension partnership.

emerging institution with its own development needs, which the center could support with programs and technical assistance.

Many of the participants were referred by the Vermont GREEN counselors. The ETP grant paid for a job placement coordinator to find jobs for trainees, as well as for a portion of the director's salary to compensate for her role as a policy advisor to Vermont GREEN. According to the educator, the training was fairly challenging, so participants needed basic skills and some industry knowledge in order to succeed. Since the center did not provide support services, only students who had these basic qualifications were referred to the program by the counselors.

The major benefit to the center from involvement in Vermont GREEN was the opportunity to work in the broader political economy and to understand and learn to navigate the full system of economic and workforce development in the green sector in the state. The partnership also allowed the director to build relationships and get valuable feedback that allowed the group to 'course correct' and troubleshoot problems before they led to dissatisfaction among students and stakeholders.

Ironically, however, the educator reported very little direct interaction with employers around curriculum and program development. Indeed, the educator was not involved in, nor was she very knowledgeable of, the in-house training that Vermont GREEN was supporting for Employer 1 and Employer 2.

ReNW Educators' Experiences and Needs. On the other hand, the two educators involved in ReNW were very engaged in hands-on program development and implementation activities with individual green employers in the region. These two educators represented community colleges in the two states involved in the ETP, Oregon and Washington.

Educator 1 represented a community college in Oregon, which has targeted and invested state funds in the development of green jobs pathways across the education system. Educator 2 represented a community college in Washington. Though Washington acknowledged the growth of the green sector, it also found that many of the green jobs resided in traditional industries and occupations, and its career pathways efforts were aimed at these broader industrial sectors. The result of this difference was that the work of Educator 1 was nested in an expanding continuum of green jobs education in the state community college system, whereas the work of Educator 2 involved training much like that of Vermont GREEN—short-term, noncredit, certificate-oriented training in value-added skills in both weatherization and manufacturing.

The location of each educator in their respective colleges also seemed to make a difference in the programs they contributed to the ETP. Educator 1 resided in a division of the college that aligned a number of missions and programs related to career and technical education, customized training, and workforce development. The division collaborated closely with the state employment department to recruit employers for incumbent worker training projects as well as for job placements for graduates and trainees. Training ranged from short-term certificates to longer-term degree programs. Certificates resided in a continuum of education that qualified trainees for jobs while they also continued in their education towards a degree at the community college and beyond through further specialty training or a 4-year college degree program.

ReNW Educator 2 resided in a noncredit, customized training division at the college that traditionally worked with employers and professional groups to provide programs designed to meet the skill needs of area employers and professions. With the availability of the stimulus money, the division had collaborated with the Workforce Development Council to open its

programs, as well as to develop new ones to service underemployed and unemployed workers in the region. Though these programs provided industry-recognized certificates, they were not aligned with the credit-granting programs in the college. One challenge in taking on an unemployed student population was that the college had to design a new screening process to ensure that students had the basic knowledge and skills to complete the training. The division did not offer developmental courses or support services, so individuals who did not pass the screening were not accepted into the program.

These structural variations did not seem to affect the role each educator played in ReNW or the process they used to engage in ETP-sponsored projects. Both educators described their early experience in the ETP in a similar way. Each leveraged existing albeit small projects and relationships and aligned them to support ReNW's two-pronged economic and workforce strategy and, in so doing, succeeded in bringing their projects to a broader scale in the region.

Workforce Development Representatives

Two workforce development representatives were interviewed for this study. One was involved in Vermont GREEN; the other was involved in ReNW. Table 7-4 summarizes the green jobs agenda of the workforce boards where these two representatives worked. The Vermont workforce development representative was involved early on in the development of Vermont GREEN's proposal and had continued to engage at the policy level. The Oregon workforce development representative was not involved in the original grant proposal but was involved in the collaboration between Employer 1 and Educator 1 to develop the wind blade repair technician training, and she was also involved in the WIB's Green Advisory Council, which facilitated the WIB's outreach and strategic planning in the green sector.

Table 7-4
Workforce Development Green Jobs Agenda and Supports

Green jobs agenda/support	ReNW	Vermont
Labor market information studies	Construction and now going broader; planned interviews with 100 green employers in state	All green industries
Training and programs	Solar apprenticeship, incumbent worker training	Incumbent worker training (Lean manufacturing), summer youth employment in green jobs
Targeted sector/ clusters and outreach strategies	Composite suppliers (200 jobs in next 5 years), small contractors in need of green specialty training (video library), convening planning meetings	Variety of green industries, green alliance and sector listening panels
Green workforce development goals	Fill gap in education for non-college-bound youth and adults who need quick training and credentials to find jobs	Help employers out of recession and create jobs: bring employers together with educators to identify needs that they can fill with incumbent training and workforce development strategies
Green program workforce development strategy	Pilot local, garner interest and support, prove concept, and bring to scale by accessing federal funds like ETP	Network in industry, bring information to WIB, and use it for strategic planning

The workforce development representative in Vermont described Vermont GREEN as part of a broader strategy in the workforce system to fill the gap in the education and training infrastructure for non-college-bound youth and working adults by providing short-term training in skills and credentials that had value in the labor market. This may explain why when he was asked to talk about the career pathways model in development in Vermont; he described it as an effort to build a broad, 7-16 education continuum that leads to a college degree. It did not appear that he made a connection between the certificate and job training programs that were sponsored by the workforce development system and the career pathways development that was occurring in the broader education system in Vermont. In Oregon, on the other hand, the workforce development representative talked in great detail about how the wind blade repair technician

program fit into a broader career pathway in renewable service technology that was in development in the community college system.

In Vermont, the workforce development representative helped with outreach to many of the ETP partners who had small-scale projects in the green industry and convinced them to sign onto the grant with a promise that the new resources and the new organization focused on the needs of the green industry would help them to take their project to scale. He continued to be an active participant in the partnership, with his biggest priority being helping the ETP leadership to develop a sustainability strategy that would allow them to grow and continue the partnership past the grant. He shared that the workforce system reached out to employers, often in small clusters, to help them identify needs and collaborate on projects that the WIB would fund as a pilot. If successful, these projects would be taken to scale by leveraging funds from a variety of sources, to include national grant programs like the ETP.

He talked about how he brokered the relationship between the educators and employers in the region to develop the training program needed in these efforts. His description may help to explain why Vermont GREEN has emerged as a mediator between employers and educators, rather than as a forum that brought both stakeholders together to collaborate on program design. Because the workforce development representative did not believe that educators and employers could have a productive or efficient discussion on skill needs and educational requirements, he often positioned himself and his staff as a conduit between the two, working with employers to identify needs and then helping educators to translate the needs into relevant training. It appeared that Vermont GREEN may have adopted a similar approach.

The ReNW workforce development representative talked about a different approach to the industry in Oregon. The WIBs established listening panels where firms gathered with each

other and with supply-side stakeholders like WIBs and education to identify opportunities to grow the industry and identify the training needs that could support that growth. Educators were directly involved in these problem-solving and planning activities, as seen with Educator 1's involvement in the wind blade repair program and Educator 2's engagement with area manufacturers.

In light of this summary, it can be said that the workforce development representatives and the WIBs played a vital role in formation of both ETPs and that they continue to contribute to its development and long-term sustainability through their outreach to partners and their involvement in strategic planning and program development.

Cross-Case Comparisons

The preceding discussion about the experiences and roles of each stakeholder group within and across the partnerships revealed significant differences in the early start-up experiences of the two ETPs. Table 7-5, which compares the findings from the two cases, also highlights differences between the cases.

These findings are now discussed in light of the analysis of the experience and roles of the representatives of the three stakeholder groups. This analysis brings to light how the early start-up experiences of each partnership have been affected by the differences in the context of each case.

Table 7-5
Case Findings

	Vermont GREEN	ReNW
The quality and nature of the sector partnership	Emerging network aiming to build a centralized institution to engage private-public partners in creating a new green economic and workforce development infrastructure in the state; the central organization brokers resources to deliver services to workers and employers with little program-level interaction among the stakeholders	Decentralized network of stakeholders who directly engage each other in a preexisting and evolving green economic and workforce development infrastructure to develop multiple programs and initiatives
Challenges and strategies for synchronizing the green jobs labor market	Training is out ahead of job creation	Short-term concern that training is out ahead of job creation, long-term optimism that ReNW's economic development strategy will deliver new green jobs
Career pathway model in use	Workforce development career pathways model disconnected from credit-granting education	Multiple models: education and workforce development career pathways models
The nature of green jobs	Some green jobs are good jobs, with potential to increase skill and wages and provide training and advancement opportunities	Green jobs have some good qualities, but seasonal nature of jobs leads to unstable employment with few external mechanisms to facilitate job transitions

The Quality and Nature of the Sector Partnership

The major difference in the nature of the two partnerships was that Vermont GREEN appeared as a new institutional entity, whereas ReNW was more of a region-wide planning process among preexisting institutions in the region. These differences seemed to matter for how the stakeholders interacted with each other in the process of developing the strategies, programs, and services funded by the ETP grant.

In Vermont GREEN, the ETP emerged as a centralized institution with a mission to connect and engage public and private partners to advocate for new policies and build a new

strategy to support the green sector in the state. Vermont GREEN established a complex organizational structure that included several layers of networks and committees through which it operated programs and plans for the future of the initiative. It supported operational and program planning committees among the service providers, as well as policy and strategic committees and events focused on creating a stronger and more supportive policy and institutional context in the state for green business and green jobs and on ensuring the sustainability of Vermont GREEN. Indeed, much of the interaction that occurred between employers and the supply-side actors in Vermont GREEN occurred at the strategic level. Although the two employers as well as the educator interviewed for this study saw the value of these broader efforts, they were unclear or they could not share details about how this engagement actually connected to their work in Vermont GREEN or how these efforts might result in long-term change in the state. Indeed, as Employer 2 talked about his experience with the Job Summit sponsored by Vermont GREEN, he shared that he somehow thought they missed an opportunity to achieve more results and that they had much to learn from other states who were already doing this—and by ‘this’ he meant building sector partnerships.

On the other hand, in ReNW the formal institution of the ETP was background to the activities of a decentralized network of workforce and economic development institutions already engaged in a variety of green and other economic and workforce development projects, which the ETP grant helped to focus on the renewable industry. In this light, ReNW appeared more as a funded effort to build and enhance the capacity of other institutions in the region to collaborate in the development of a response to the needs of the renewable industry.

In ReNW, there were no policy-level meetings and events, only operational and program development meetings among service providers and between them and their clients. There were

no policy summits to engage employer partners outside of the meetings aimed at developing programs to meet their needs. Other institutional stakeholders, like the WIB, the community colleges, and the MEP convened and engaged employers and others in efforts to identify needs and plan both customized and system-wide programs in response. It did not appear that these engagements were concerned with high-level policy or strategy; rather, these interactions were focused on the nuts and bolts of program and service delivery.

The difference here may lie in the context of the two regions. The continuous counties in Oregon and Washington State included in ReNW were also parties to a 2007 WIRED grant that focused on building a new workforce development infrastructure in the manufacturing sector. Many of the supply-side partners interviewed for this study were engaged in that effort, and to the person they all spoke about how the new ETP funds were allowing them to continue to build upon and refine programs and relationships that were initiated under WIRED. In addition, Educator 1 talked about the powerful developmental effect that the Oregon community college green initiative had on his ability to build a program, which itself was nested in a broader career pathway to fill a significant gap identified by a ReNW partner. Finally, both educators in ReNW, through their partnerships with the MEP and the WIBs, had the ability to respond to a broader set of developmental needs of employers seeking to enter new green markets. The MEP had a direct relationship with local employers and hands-on knowledge of the state of the region's production system. In addition, the MEPs are part of a broader national network which they can tap for additional information and resources. ReNW and its partners were but one node in a broad network of relationships that ReNW could mobilize to meet a variety of workforce and economic development needs facing employers seeking to move into the new green sector.

Vermont GREEN lacked such a broader context and network. Indeed, it may be that it took as its mission to begin to build a similar, broader context in Vermont, which may explain why it was seen as an institution rather than a process. Indeed, Vermont may need an institution like Vermont GREEN to build the relationships and connect the dots, something that had already occurred in Oregon and Washington. Vermont GREEN was truly in the early start-up stage, whereas ReNW was extending a preexisting set of efforts, including WIRED, into the renewable energy industry and its supply chain.

The Challenges and Strategies for Synchronizing the Green Jobs Labor Market

It appeared that the workforce development strategy in ReNW was out ahead of the Vermont GREEN strategy, again due to the differences in the developmental state of the two partnerships. Vermont GREEN was training workers and building new training programs for anticipated jobs, whereas ReNW was working with employers to train workers for jobs that already existed. It remains to be seen whether there will be need for this new training once the current demand for skilled workers is met with the first few rounds of training.

In Vermont GREEN, the weatherization training, funded by the state Office of Employment Opportunity, was already up and running when the ETP grant became available. In addition, the WIB was already engaged with many of the employers, helping them develop in-house training, and the project has allowed these efforts to be brought to a bigger scale. In both scenarios, the training was being planned as part of a broader, government-supported strategy to create green jobs. In the weatherization project, the Office of Employment Opportunity had also provided funding for low-income residents to retrofit their homes, thus opening up a new demand for weatherization skills in the state. Employer 1 had received two multimillion-dollar awards from the U.S. Department of Energy to move into a new green market, build a state-of-

the-art production facility, and create up to 135 new jobs. Vermont GREEN funds were being used to develop the training needed for existing and new workers in skills required by the new production facility. But in both cases, the jobs were still anticipated and did not yet exist on a mass scale.

While these training strategies were being implemented, Vermont GREEN had launched several strategies to support economic growth in the green industry and create new demand for workers with green skills. It was working with the state WIB to conduct a survey of employers' needs and had sponsored a green jobs summit to identify policies needed to foster economic development. At the time of the interview, the economic development-related activities in Vermont GREEN remained at a very high level of abstraction.

In ReNW, economic development was one of the two fundamental strategies from the beginning of the project. It had built in activities to stimulate a new green market for area manufacturers and also included funds for the provision of direct services to manufacturers that would help them enter into and successfully compete in these markets. ReNW's relationship with the MEPs in Oregon and Washington was central to this strategy. These two entities had the capacity and the relationships to help put economic development out ahead of, or on a parallel line with, workforce development strategies in the region.

In speaking with Educator 2 and the workforce development representative in ReNW, it was clear that the relationship between the MEP, educators, and the WIBs in the region had been initially established through the WIRED grant. Indeed, both talked about how the three parties had restructured their workforce to foster collaboration among the institutions to deliver services to employers. Educator 2 talked about how the ReNW grant was helping to solidify and strengthen this preexisting relationship and structure.

Structurally, ReNW had connected the dots between the workforce and economic development resources in the region, whereas Vermont GREEN had yet to accomplish this. Thus, Vermont GREEN currently lacked the capacity to help its employers engage in activities that would strengthen their internal capacity to enter into new markets.

The Career Pathways Models in Use

Several models and conceptualizations of career pathways were in operation in both Vermont GREEN and ReNW. The Vermont GREEN and the ReNW Washington models were closely aligned with the workforce development model, which links training to a high-growth industry and emphasizes short-term programs leading to an industry-recognized credential and placement in a job. In both cases, there were gaps between the program and the idealized model because this training was not linked to a broader continuum of education leading to higher credentials and degrees.

In ReNW Oregon, the community college partner appeared to support at least two career pathways models: the workforce development career model, which emphasizes economic development and job outcomes, as well as the education model, which is concerned with the educational advancement and program completion among students in courses of study and credentials linked to real careers in the region. The wind blade service technician and the weatherization training in development at the college resembled the workforce development model yet were linked to a broader course of study through the renewable energy systems technician (REST) program, which was offered as a certificate and for credit at the college.

Another reason it can be said that the career pathways model in ReNW resembles the education model is because ReNW placed the community college, in both Oregon and Washington, at the center of its career pathways efforts. In the idealized educational career

pathway model, the community college takes the lead in engaging employers and other stakeholders in garnering input into the design of new curricula, assessments, and certifications. This model is bigger than one program at one school; rather, it promotes a system-wide effort among all community colleges to align and articulate curricula across all levels of education and all schools to improve access, shorten the time required to acquire credentials, and ensure the sharing of scarce resources throughout the system. The interview with ReNW Educator 1 revealed that this broad framework was operating in Oregon and was instrumental to his ability to respond to the emerging needs of the renewable energy industry with two new programs, REST and the wind blade repair technician training and certification. In Oregon, the community college system and individual schools were taking the lead in developing these efforts, while ReNW, the sector partnership, remained in the background as a funding agent for part of this effort.

Similarly, Vermont GREEN was more in line with the workforce career pathways model, because this model, like Vermont GREEN, puts the sector partnership at the center of a demand-driven workforce development system. Vermont GREEN, in collaboration with the WIB, was interviewing businesses, and the WIB was actively engaging employers in small groups to identify needs that the educators could address as they crafted a training strategy. The Vermont GREEN workforce development representative was intentional in his efforts to place Vermont GREEN as well as the WIB at the center of the emerging workforce development system to ensure that training was driven by economic needs rather than by a curriculum or by what may be construed as an overemphasis on learning and development to hold people back from getting a job and developing practical skills.

The workforce development representative offered that he thought that educators were not well enough aware of the needs of business and that they were overly concerned with how to fit those needs into preexisting curriculum models and programs. What is required, he suggested, was an intermediary who understood the demands of production, could efficiently work with employers to identify skill gaps, and who also had relationships with and knowledge of the education system to help them respond in real time with relevant, short-term training to help employers meet skill gaps. What was lacking in his model was a strategy for linking this short-term, value-added training to a broader continuum of education that would help workers to attain higher levels of education and degrees.

This mixing of models may also reveal two fundamental challenges related to the development of a training and certification system for workers in the emerging renewable sector. One challenge involves striking the right balance between short-term career-oriented training that helps students find jobs and general education in a knowledge area that will ensure long-term employability. The second challenge involves ensuring that the short-term training and industrial credentials are meaningful. These two challenges were expressed by ReNW Educator 1 in this way.

Well, first and foremost, we have got to be exceedingly careful that people do not view career pathways as the be-all end-all to education, that they are terminal because there couldn't be a greater recipe for disaster and disservice to a student. Career pathway is simply a stopping-out point that, if designed right, will make you employable. But, for god's sakes, keep going to school; do not stop there.

So that's the first, I guess, big caution. The second is we say it to ourselves and I'll say it to anybody else: we've got to be darned sure we make meaningful career pathways. So if you chunk a degree down to 15 credits, is it fluff? What does it really do? Who are you really serving?

ReNW Educator 1 was in a better position to address these challenges than ReNW Educator 2 and Vermont GREEN Educator 1 because the program resided in a broader context within the educational system. Educator 1 could draw upon both the educational career pathway model and resources to ensure that the ReNW programs were not ‘terminal’ but linked to continued education leading to a higher degree. He could also work with ReNW partners to ensure that the ‘chunked’ credentials were linked to real jobs in area industries.

Although ReNW Educator 2 had the industry relationships needed to ensure that the short-term training offered in his division was meaningful in the labor market, the programs were not linked to continued education in a career pathway. Training in the ReNW-sponsored green manufacturing specialist program was ‘terminal.’ Workers would benefit from this training by obtaining skills that may help them find and keep a job, but the training would not help them achieve a degree or credential and skills that would provide long-term employment security and career opportunities. Employer 2 recognized the benefits to linking short-term training in industry skills to a broader education career pathway, but he also acknowledged the need for broader institutional context and support to develop an education career pathway. A single program cannot establish a pathway; it is, by its nature, a system-wide effort.

The Nature of Green Jobs

The green jobs offered by the employers in these two cases were different. The Vermont GREEN employers were both manufacturers, and the ReNW employers were both in the renewable installation and repair industry. Though these different industries resulted in different working conditions that affected the nature of green jobs, this study also found similarities across the two sites in the participants’ perceptions of some of the essential qualities shared by all green jobs. First the differences between the green jobs in the two industrial contexts are discussed.

This discussion will be followed by a summary of the perceived nature of green jobs that was shared by stakeholders across the two ETP sites.

The jobs available through the two manufacturing employers in the Vermont GREEN case were undergoing change as a result of the new green product lines being adopted at each company. It appeared that this change had moved both employers towards a more flexible work system that required workers to be cross-trained, and in the case of Employer 1, workers' skills also needed to be upgraded to enable them to function in a new, advanced manufacturing setting. This employer also anticipated that the new production system would require workers to participate in continuous learning and that it would also offer workers many new opportunities for advancement. Employer 1 planned to offer an additional wage to workers in this transition, although it was clear that part of this decision was tied to the state's requirement for the wage subsidy they were receiving to train their workers. Because the new work product had not yet rolled out in Employer 2's facility, he was less certain about how jobs would change; he was only certain that the jobs would change. He anticipated that the change would require workers to be cross-trained in all assembly work, and he noted that this change would bring a wage increase for workers. However, he was less clear on whether the new green product line would result in more advancement opportunity for manufacturing workers in the company. So it appeared that movement to new green markets for these two manufacturing employers required workers to have additional skills, which had the potential to increase wages. Whether new green jobs would result in new and significant opportunity structures in these settings remained an unanswered question.

In ReNW, the two employers interviewed for this study were operating established renewable businesses. They both had difficulty finding workers that were properly trained in the

specialty skills they required. This did not hold them back from entering into these markets, but the lack of specialty skills created quality problems which took time and resources to manage. Both employers were very clear on the training and certifications that were needed to fill the skills gap, but the problem was that the training and certifications were not broadly available. In addition, they each had established wage structures that were higher than the industry average, and they both were clear that the industry and their firms offered workers long-training and career opportunities. In other words, the green installation and repair labor market described by the ReNW employers was more structured than the green manufacturing labor market described by the Vermont GREEN employers.

On the other hand, both ReNW employers talked about other qualities of the green jobs that they offered that may make them less desirable for some workers. For example, they both talked about the seasonal nature of the jobs, which brought unstable work. The jobs were also physically demanding, and the wind job often required extensive travel which created work-family balance issues. Finally, the uncertain nature of the industry brought a level of risk that individual investment in training and certification and in learning the job would not result in a long-term career.

Despite these structural differences between the green jobs across the two sites, there were several perceptions about the nature of green jobs that were shared by many of the stakeholders interviewed for this study. For example, many believed that many green jobs were intrinsically rewarding because they provided an opportunity to contribute to an improved environment and quality of life in a community. People also thought that these intrinsic rewards would result in more youth considering green occupations, including skilled trades and technical jobs for a career. In addition, several believed that because green jobs require broad

occupational knowledge and technical skills, they also provide workers with opportunities to develop valuable skills and to enter and advance in a stable and rewarding career. Finally, many believe that green industries and green jobs in non-green industries are poised for long-term growth, and so they predict that they will become a source of meaningful and secure employment in the future.

An Arranged Marriage: Implications for Literature on Career Pathways and Green Jobs

The literature review identified a series of propositions that claim that the 21st-century workforce development system would emerge from an arranged marriage between green jobs and career pathways. This claim was supported by the argument that as the education system worked with employers and others in the emerging green jobs labor market to develop new green job training and certifications, the interaction would pressure both educators and employers to make significant changes. Educators would yield to the development pressures of their work with employers by making structural changes to align the education and work continuum and to integrate basic, academic, and technical education. Likewise, employers would build new opportunities to ensure workers apply the new technical skills. The increased use of skills in the workplace would foster continuous learning and improve the wages and the conditions for low-wage workers and jobs. The experience of working together would lead to new learning about how to develop and use the 21st-century technical skills that are important in work across the entire economy. This learning fostered by work to create a new green workplace could be leveraged to make improvements to education and work in other fields, and eventually these changes would become commonplace in the education system.

Literature on Career Pathways

According to the literature, these outcomes are more easily achieved through the use of a career pathways model that incorporates planning templates to align the hierarchy of skills in the workplace with a continuum of education that is modularized into short-term certificates linked to jobs and aligned with a broader course of study leading to a degree. Even though features of the career pathways model were observed in the three programs examined in the two ETPs, the program described by ReNW Educator 1 in Oregon contained a sufficient number of the features to conclude that it conformed to the model. Table 7-6 illustrates this point. The table contains the five required critical elements of the U.S. Department of Labor’s career pathways SGA, and it uses these elements as categories of the career pathways features contained in the SGA as well as in the literature on career pathways. The features contained in the literature but not in the SGA are in the shaded rows. The table shows which features were observed in each of the three education programs included in this study.

Table 7-6
Comparison of ETP Training Programs with Career Pathways Features Found in the Literature

Required elements in the Department of Labor career pathway solicitation for grant applications and best practices in literature	Vt Ed1	ReNW Ed1	ReNW Ed2
<i>Evidence-based program development and implementation strategies</i>			
Strategies to accelerate education and career advancement regardless of their skills at the entry point			
Articulation agreements governing the transfer of credit between institutions		X	
Instructional strategies that make work a central context for learning	X	X	X
Cohort learning strategies designed to enable participants to pursue coursework with the same classmates over a fixed period of time	X	X	X
Strategies to address the needs of working adults by accommodating student work schedules	X	X	
Dual enrollment			
Competency-based education based on employer needs		X	
Integration of industrial skill standards and assessments		X	X
Integration of academic and technical education		X	
Integration of basic and technical education			
Training in foundational skills of occupation		X	

Required elements in the Department of Labor career pathway solicitation for grant applications and best practices in literature	Vt Ed1	ReNW Ed1	ReNW Ed2
<i>Assessment-based support services to support student completing training and transitioning along a career pathway</i>			
Assessments and services that enable students to progress as quickly as possible through a career pathway			
Assessments of academic skill levels, aptitudes, abilities, and support service needs	X		X
Assessments to award credit for prior learning			
Graphic career pathways which counselors use to advise students		X	
Academic advising, career coaching, and individual career development	X		
Wrap-around support, particularly at critical points of transition	X		
Open access to ease movement in and out of education and work			
Job placement services	X		
Work readiness support			
Job search training			
Internships and other forms of work experience			
<i>Substantive involvement of employers in the development and implementation of career pathways programs</i>			
Alignment of training with the skill needs of industries important to the local labor market		X	
Consultation with employers to determine skill requirements		X	
Consultation with employers to determine skill progression in in-demand occupations		X	
Employer involvement, with them play a critical role in providing worksite training		X	X
Employer hiring of program participants		X	X
Employer assurance that national standards suit local needs		X	
Work in firms to customize solutions to performance problems and improve/upgrade low-skilled jobs		X	X
<i>Strong partnerships between eligible institutions, employers and industry organizations, and other relevant stakeholders</i>			
Implementation of projects through a close partnership with other organizations in the community	X	X	X
Strong partnerships between relevant organizations to encourage tight coordination in the delivery of services (ABE, developmental education, skills development, and postsecondary education)	X		
Strong role of the public system in the career pathways program	X	X	X
Partner streamlining and connection of processes to allow for more coordination and integration of services			X
Shared leadership			X
<i>Effective mechanisms for implementing systematic change</i>			
Systematic change to align funding streams of organizations that provide education, training, workforce development, and support services		X	X
Strategies to identify funding and policies that will enable the continued operations of project	X		
Alignment and integration of missions/programs across the community college		X	X
A focus on continuous improvement			

Required elements in the Department of Labor career pathway solicitation for grant applications and best practices in literature	Vt Ed1	ReNW Ed1	ReNW Ed2
Use of data-driven processes to identify targets and gaps, design pathways, track outcomes, evaluate, and support decision making			X
Emphasis on improved student learning and completion rates			
Emphasis on employment outcomes for students	X		
Emphasis on economic growth	X	X	X

Table 7-6 strengthens the conclusion that Oregon’s adoption of the career pathways model for green jobs at the system-wide level set the context for a robust career pathways program to emerge in ReNW. The table shows that the ReNW Education 1 model contains many of the best practices and strategies for institutional and instructional reform advocated for in the career pathways literature. Most of the features listed in this category cannot be made at the program level; rather, they require policy-level, structural reforms.

Table 7-6 also shows a gap in assessment and support services shared by the three education programs examined in this study. Although each program partnered with the regional WIB, and in Vermont with social service agencies, to recruit unemployed and underemployed workers into the program, each educator talked about the need for students to come to their program prepared to succeed. None of the programs offered the support services required to help students with developmental needs. As the Vermont GREEN educator explained, these individuals work with the counselors to find assistance elsewhere. Separated from the education institution, there is a better than average chance that the developmental support that these individuals receive will not be contextualized in job-related skills training and will not be linked to a broader course of study leading to a marketable credential. The assessment described in these programs was used as a screen to keep unprepared students out of the college programs, which reinforces the finding that the programs and jobs in this study presented barriers to entry for people with remedial and developmental needs.

This finding challenges some of the propositions in the literature about the potential for green jobs to provide pathways out of poverty for low-skilled, low-waged workers. Some of the literature says that because green jobs have low barriers to entry, they are suitable for workers with barriers to employment. Further, it is claimed that workers with barriers to employment will seek green jobs, and employers will choose to hire them for green jobs. When these and other propositions about green jobs and career pathways were put forth to the nine interviewees, most disagreed that green jobs are suitable for people who face barriers to entry, as shown in Table 7-7. This finding supports the argument in the literature about the need for developmental programs that are aligned with and connected to the broader career pathways and green jobs training programs observed in this study.

Table 7-7
Propositions about Green Jobs Career Pathways Presented to the Nine Interviewees

Proposition	VT Emp1	VT Emp2	NW Emp1	NW Emp2	VT Ed1	NW Ed1	NW Ed2	VT WFD	NW WFD
Green jobs provide opportunity to build career pathways for individuals to move in and out of school and work to advance to better-paying jobs and higher levels of education over time. (All)	MA	A	A	A	MA	A	MA	A	MA
Green jobs pathways ensure students and working learners are trained in the skills that employers need. (All)	MA	A	A	A	D	D	MA	MA	MA
More workers with green skills and higher levels of education will help employers grow their business and provide more jobs in the region. (All)	D	A	A	A	A	A	A	A	A
Competitors in an industry will collaborate to develop common skill standards to guide the development of training and certification to prepare student and workers to fill growing jobs in the region. (All)	MA	A	A	A	A	A	MD	A	A
Green jobs are good jobs because they provide meaningful work and family-supporting wages and benefits. (All)	MA	A	A	A	A	MA	MA	MA	A

Proposition	VT Emp1	VT Emp2	NW Emp1	NW Emp2	VT Ed1	NW Ed1	NW Ed2	VT WFD	NW WFD
Entry-level green jobs are linked through a career ladder to a higher-paying job. (All)	MA	MA	A	D	A	A	D	A	A
Green jobs are suitable for people who face barriers to employment because there are low barriers to entry. (All)	D	MA	A	D	D	D	D	D	MA
People who face barriers to employment are interested in green jobs. (All)	A	A	A	D	DNK	A	D	MA	A
Employers in green businesses are willing to hire workers with barriers to employment for green jobs. (All)	MA	D	A	MA	A	D	MD	A	DNK
Green job pathways help educators at all levels align and articulate curriculum so that students are prepared to succeed at the next higher level of education. (Ed and WFD)					A	A	A	A	A
Green job pathways provide an opportunity for more integration and coordination between career and technical education and academic education. (Ed only)					A	A	A		
Green job pathways provide an opportunity for educators to modularize the curriculum to provide certificates that help students advance in the workplace while they continue in a course of study that leads to a degree. (Ed only)					A	A	A		
Green job pathways help to align public workforce and economic development systems to make them more responsive to industry and employers. (WFD only)								A	A
Green jobs can improve the labor market information system and data tracking and evaluation of publicly funded workforce development programs. (WFD only)								A	A

A indicates agree; D, disagree; DNK, do not know; MA, modified agree; MD, modified disagree; Emp, employer; Ed, educator; WFD, workforce development representative.

Literature on Green Jobs

The three definitions of green jobs, including the industrial, the occupational/process, and the normative, were operating in both cases. For example, green jobs were talked about as being related to specific industries, like the solar industry. Green was also described as a process by

which existing jobs are retrofitted with new specialty skills to take on new green-related work. None of the four employers had created totally new jobs; they each had the need for enhanced specialty skills to be added to the core functions of existing jobs and occupations. Even ReNW Employer 1 and Educator 1 who were collaborating on the new wind blade repair technician training and certification understood that this new occupation required a core set of mechanical and trade skills that already existed in the labor market.

Aspects of the normative definition were also affirmed by the interviewees. Almost everyone talked about the social value of green jobs and how the image of green work energized incumbent workers and attracted new recruits to technical fields. While all agreed that green jobs provide opportunity for meaningful work, some acknowledged that the working conditions were difficult and that the pay was not enough to keep pace with the cost of living. The seasonal nature of some of the jobs also created insecurities that led to questions about whether green jobs were good jobs.

Both cases also affirmed many of the features of green jobs, the green industry, and green workforce development identified in the literature, as shown in Table 7-8. In terms of the dynamics of the green labor market, evidence in both cases suggested that green jobs were skilled jobs that offered meaningful work with advancement opportunities and that required skills in short supply. There was little evidence to suggest that green jobs have low barriers to entry, or that interviewees thought that there were shortages of workers in the core industries that were becoming green. The cases were silent on whether green jobs could be outsourced and whether restrictions on job training funds led to a lack of support for training in the core skills of occupations in the green sector.

Table 7-8

Features of Green Jobs in the Literature as Affirmed or Disconfirmed by Each Case

Features of green jobs	Vermont GREEN	ReNW
<i>Green jobs labor market dynamics</i>		
Must be economic-led job growth, can't train into growth	Disconfirm	Affirm
Good jobs (pay and benefits)	Affirm	Affirm
Local jobs that cannot be outsourced	Silent	Silent
Skilled jobs, new specialty for a core occupation	Affirm	Affirm
Meaningful work	Affirm	Affirm
Shortages in new specialist skills among existing workforce	Affirm	Affirm
Worker shortages in core industries that are going green	Disconfirm	Disconfirm
Low barriers to entry	Disconfirm	Disconfirm
Advancement and mobility opportunities	Affirm	Affirm
<i>Green industry dynamics</i>		
Virtuous growth cycle/radiating growth	Affirm	Affirm
Job growth checked by decline in carbon-based industry	Silent	Silent
Risky investment climate	Affirm	Affirm
Need for government intervention and incentives in the market	Affirm	Affirm
<i>Workforce development challenges</i>		
Traditional workforce development strategies aimed at in-demand jobs, not emerging	Affirm	Affirm
Unstable industry makes it difficult to target jobs for development	Affirm	Affirm
No map/logic to integrate existing training and certification	Disconfirm	Disconfirm
Restrictions on job training funds do not support need for training in core skills of occupations in green sector	Affirm	Affirm
Little critical mass in jobs/employers makes sector hard to serve	Affirm	Silent

The cases also affirmed many of the features about the green industries identified in the literature. For example, the cases affirmed that people believe that green products will bring about green-related work so they anticipated a radiating growth cycle in green jobs. However, both cases affirmed that this cycle may be hindered by the risky investment climate that makes investors hesitant to capitalize on green industries. The awareness of the interviewees of this risk is perhaps one reason why they also affirmed the need for government intervention and investment in new green markets. The cases were silent on whether a decline in employment in the carbon-based industry would check the net employment growth due to new green jobs.

Several of the workforce development challenges related to green jobs in the literature were also affirmed. The instability of the industry and the unsuitability of traditional workforce development strategies for emerging green jobs were affirmed in both cases. Many of the supply-side study participants talked about how their work in green jobs required new learning to figure out how to identify and respond to an uncertain demand. Many of the findings related to syncing the supply and demand sides affirmed this challenge. ReNW acknowledged these challenges, but it appeared to have more strategies, including the listening panels and the two-pronged development strategy, to address them. The lack of a critical mass of green jobs and employers was certainly a challenge for Vermont GREEN.

However, the cases disconfirmed that the lack of a map or logic for certification was a problem for workforce development, although for different reasons. This did not appear as a problem for the Vermont interviewees, perhaps because the short-term, certificate-driven training strategy did not require, nor did it foster, a full view of the labor market and the opportunities or needs that may or may not exist to integrate the wide range of trainings and programs. In Oregon ReNW, on the other hand, the system-wide framework or logic established by the state community college system guided Educator 1 and other community colleges to collaborate on the development or creation of new green programs and credentials. The overall framework, coupled with the consensus that green jobs already existed in the form of technical jobs conducting new green tasks, also helped to connect and blend resources from existing programs.

An Arranged Marriage: Green Jobs Career Pathways

According to the literature, green jobs and career pathways promote systemic change to education and the quality of jobs because as employers and educators interact to create new green training and certification programs, they learn new and effective methods to develop and

use 21st-century technical skills. Table 7-9 summarizes the structural changes related to the early start-up of new green jobs/programs and/or the ETP observed in the firms and the educational programs in this study. First change in the four firms is discussed, followed by a discussion of the change observed in the education programs.

Table 7-9
Structural Change in Firms and Education Programs in This Study

Employers	Educators
Vermont GREEN	
<p>New external regulation (customer demand and/or conditions of federal grants) foster structural change in production that upgrades:</p> <ul style="list-style-type: none"> • System performance • Conditions of work (new training, new skill, increased compensation, potentially new structural advancement opportunities) <p>Change is specific and potentially limited to the internal labor market of each firm.</p>	<p>Limited-interaction, broad workforce initiative lead to:</p> <ul style="list-style-type: none"> • Structural adjustments to program (problem solve delivery, new flexible delivery formats and policies) • New insight regarding limitations of short-term training and new awareness of value of education and training in foundation and occupational knowledge and skill • Structural constraints in ability to respond to broader needs
ReNW	
<p>Entry into (wind) or growth within (solar) renewable energy installation and repair markets bring increased demand and competition for trades and technical workers with specialty skills.</p> <p>Seasonal nature of work leads to turnover, which requires specialty skills to be broadly distributed in external labor market.</p> <p>These factors lead employers to advocate for and engage in change to external training and certification for specialty skills.</p>	<p>Educator 1: New external resource (stimulus money) brings new partners (Workforce Development Council) and student population and fosters change in:</p> <ul style="list-style-type: none"> • Business and funding model • Blending of once-separate missions (customized training and workforce development) • Student recruitment and assessment • Faculty roles/skills <p>Educator 2: Adoption/development of green career pathways model by broader context of community college system fosters flexibility to respond to emerging skill needs with new stackable credential (wind blade repair technician).</p>

Change in Employers' Firms. The Vermont GREEN employers were in the process of making structural changes to accommodate the new green product lines. Although these transitions were aided by new training programs, the change certainly had not grown out of systematic interaction with educators. These employers were making changes in response to their understanding of the skill requirement of the new systems and equipment they were putting into place, the standards required by the new customers and/or their understanding of the customers' needs, and the requirements of the external government funds that they were drawing upon to support their transition that mediated job standards. These employers made new investments of time and resources in worker training and certification, but since these investments were internally focused they did not have the reciprocal effect of improving the effectiveness of the educational system to respond to ongoing needs of the industry. Indeed, these changes were limited to the internal labor market of each firm. The question remains whether these employers have enough influence or are positioned to distribute these changes to other firms in the sector.

The ReNW employers operated in the renewable installation and repair industry, which provided largely seasonal work and drew from an external labor market that is structured to meet needs across firms. The result is that the available workers were not fully prepared to meet the needs of these two specialized employers. Employer 2 hired electricians and plumbers and Employer 1 hired newly trained energy technicians, which appeared as an emerging occupation that integrated knowledge and skill from across several of the skilled trades. Both employers were working within the broader education and workforce development systems both locally and nationally to advocate for and contribute to the development of new training and certification that would help to integrate new specialty skills and make them more broadly available in the

labor market. Thus, the changes that these employers promoted in the labor market were more likely to become distributed throughout the region as well as the industry.

Change in Education Programs. On the education side, for example, Vermont GREEN Educator 1 talked about how the opportunity to interact with employers and other stakeholders in her program resulted in real-time feedback that the school used to course-correct ongoing programs. Direct engagement with industry groups also led to more flexibility inside the center in the class times, locations, and enrollment requirements. On a longer-term horizon, the educator's interaction in the partnership led her to understand the limitations of the short-term certificate training programs and encouraged her to think about offering broader education and credentials that would help students withstand the fluctuations in the labor market. Her interaction in Vermont GREEN led her to value a broader education continuum. The question is whether she will garner the support inside the school and the broader system and acquire the resources needed to extend and enhance the center's short-term training programs.

ReNW Educator 2 was more directly connected with employers than the Vermont educator because of his location in the college's customized training division. Change was occurring in the division because the stimulus funds opened programs developed for incumbent workers to the unemployed, which brought a new relationship and increased interaction with the workforce development council. New contextualized recruitment and assessment systems were in place, and the faculty was learning to adjust to a new type of student, one with limited educational experiences but with greater needs for learning and credentials. New administrative challenges were changing the business model of the division, which could have long-term consequences for the role and position of the center in the college and in the workforce development system. It appeared that the once-narrow mission of the customized training

division was broadening and changing the structure and nature of the programs they offered. It was too soon to determine the long-term consequences of these changes to the division and to the role of the college in the area of the workforce development system.

The most significant departure from the traditional curriculum-driven model of education was observed in the description offered by ReNW Educator 1 of the REST and wind blade repair technician program. The educator as well as Employer 1 and the ReNW workforce development representative shared several perspectives about these two separated but tightly coordinated programs. The educator emphasized how the programs were linked to a broader curriculum of education that would allow students to continue in their education while working in a career-related job. The employer emphasized the career potential for the students who had the credentials, and she also talked about how the new credential would improve the quality of the work in the industry. The workforce development representative talked about how she expected REST career pathways to strengthen the system's ability to respond to employer needs. However, none of the three interviewees talked about the need to make structural change to accommodate the training or integrate the certificate into the workplace. Perhaps this was because the employer and the educator in this scenario had already made systematic changes to education and work that facilitated and quickened their ability to work together to develop a new industry credential.

Implications for Workforce Development Policy and Practice

This study provides several lessons to inform workforce development policy and practice. These lessons are summarized in Table 7-10 and discussed in this final section.

Table 7-10
Lessons Learned

Policy	Practice
<ul style="list-style-type: none"> • External regulation has a formative role in improving job quality. • Investments in an integrated workforce and economic development strategy have a formative role in creating a demand-driven system. • State and local education and workforce development agencies have a formative role in creating partnerships and responsive programs. 	<ul style="list-style-type: none"> • Build a responsive system through the flexible application of best-practice models. • Use the tension between the need for short- and long-term training to build new pathways. • Build new capacity to respond to the needs of green jobs/industries by connecting existing resources.

Policy

This study has several lessons that can inform workforce development policy, including the formative role of external regulation such as enhanced customer requirements and minimum job quality standards linked to public funding, the formative role of investments in the development of an integrated economic and workforce development strategy, and the formative role of the state and local education and workforce development agencies.

Formative Role of External Regulation in Improving Job Quality. The influence of the multiple external factors on green job quality affirms the proposition in the literature that new government investments in the green industry may also enhance social benefits to include increased wages and opportunities for advanced training. In Vermont GREEN, where the two employers interviewed for this study did not directly interact with the educators and others in the partnership, the external requirements imposed by customers for increased quality and by the government economic development funds for a minimum wage helped to change the jobs for the better. In this study, the workforce development policies that provide resources to employers to hire and train workers were also accompanied by minimum standards for pay and the quality of

training, and these requirements seemed to have had an impact on the quality of the new jobs inside the two firms.

Formative Role of Investments in an Integrated Workforce and Economic Development Strategy to Create a More Demand-Driven System. Secondly, the investment of public job training funds would be greatly enhanced if recipients were required to target industries and then synchronize workforce development with economic development activities and services to employers. It appeared that the ReNW partnership had more capacity to synchronize the supply and demand side of the labor market. This capacity resided in the preexisting WIRED infrastructure, which connected education and workforce and economic development in the region, which allowed the ETP to leverage more resources and gave it more flexibility to respond to the fluctuations in the labor market. ReNW's workforce and economic development strategy enabled a multilevel intervention in an emerging market. This strategy, which sought to align the area's surplus manufacturing capacity with the unmet needs in the growing renewable energy industry, was designed to put job creation out ahead of the training. New training coming into line, like the wind blade repair technician and the green manufacturing specialist programs, will have the benefit of knowledge of the jobs that result from these interventions into the industry. This sequence helps to resolve some of the green jobs workforce development challenges.

Though these direct interventions had not yet resulted in a significant number of new jobs in the ReNW network, the parties continued to be optimistic that once the region recovered from the recession, the jobs would come back and the workforce development system would be prepared to respond with training and skilled workers. Future nationally funded competitive job

training programs might be enhanced if economic interventions were broader and if closer coordination between workforce and economic development was required.

The wind blade repair technician training and certification program that is in development in ReNW is an example of a good investment of public workforce development funds that can be replicated and encouraged through policy. The effort involves a local employer-education partnership building out a new training and certification program to meet a skills gap in the local workforce. The process of involving the ACMA, a national industry certifying body, in the development of standards and assessments ensures that this investment in local capacity can be replicated across the industry. This process of bringing efforts to scale by connecting local initiatives with national resources was also observed in Vermont. Indeed, Vermont GREEN was explained as a series of disconnected local initiatives that were brought to scale by the opportunity offered through the national ETP funds. National funds should be invested in initiatives that have the capacity and relationships to bring local efforts to scale regionally and across an industry.

Formative Role of State and Local Education and Workforce Development

Agencies. The Oregon state community college green alliance and the state's green jobs legislation, as well as the direct intervention and coalition building role of the state and local workforce development agencies, played a large role in creating the context and providing the framework for collaboration and innovation in ReNW. The full breadth and flexibility offered to students by the REST and the wind blade service technician programs were made possible by the college's ability to offer stackable credentials and to feed students into articulated programs offering advanced degree and specialty credentials. These and other features of the community college's programs and strategy were facilitated by the work of the entire community college

system to align and articulate green courses and programs. This finding implies a large role for the state education system in creating the context for the development of career pathways. An active role of the state education agency, as well as local education and workforce development agencies and programs, should be encouraged in national policies and programs.

In addition, the workforce development system in Vermont played a formative role in creating the conditions and in forming the relationships required to bring about a successful ETP grant. This institutional actor is focused on the long-term sustainability of the ETP by working to provide valid data, expanding the partners involved in the initiative, seeking additional funding, and linking the partnership to broader workforce and economic development activities in the state.

Practice

This study also offers many lessons for workforce development practice, including building a responsive system through the flexible application of best practice models, using a program design that balances the need for short- and long-term training and certification, and building new capacity to respond to the needs of green jobs/industries by connecting existing resources.

Build Responsive System Through Flexible Application of Best Practices. This study illustrates how important it is for workforce practitioners to keep in mind those best-practice models such as sector partnerships and career pathways are only effective if they emerge from within local conditions and circumstances. The two ETPs offer very different sector partnership models. Vermont GREEN was developing into a centralized institution with the mission of advocating for and fostering new relationships between the green industry and the supply-side programs and resources in the state. In Vermont, community action agencies were central

conduits in local communities, connecting people with jobs and local small businesses with economic development resources. They were trusted local mediators who were now seeking to leverage local relationships and bring them to scale to affect change in state policy. Though they might benefit from closer ties with the state education system, they were clear that their objective was to build alternative training and career pathways for state citizens by increasing the availability and access to short-term training leading to valuable credentials and jobs. Though this model does not fully conform to the system-wide sector partnership and the career pathways models promoted in the literature, Vermont GREEN is organizing local networks and resources to bring them to scale so that they can improve conditions under which these networks operate.

ReNW offered a very different model of a funding agent for a decentralized network of supply- and demand-side partners engaged in a range of local programs and initiatives that together will create new green markets and green jobs education and training capacity in the state. Relationships, resources, and frameworks were in place for ReNW to leverage, so though it appeared that their effort was more focused and developed than that of Vermont GREEN, it was because ReNW had more state and local capacity to leverage in the early stages of the grant. The career pathways framework in Oregon was more advanced compared to the best-practice model precisely because the overall context supported the full expression of the model. Workforce development practice could be enhanced by an awareness of the local conditions that are so important to building new capacity to build effective programs.

Use Tension Between the Need for Short- and Long-Term Training to Build New Pathways. The existence of a broader system in Oregon did not diminish the results that are being achieved through the more limited or specialized training and certification strategies in play in Washington and Vermont. However, this is not to say that workforce development

practitioners cannot learn more about balancing the tension that exists between broad versus specialty training from this study. In Vermont, the employer training was very focused on the internal needs of the employer. Coincidentally, Employer 1's needs conformed to the advanced manufacturing model, which requires broad skills and general knowledge that are portable because they are valued by many employers. In addition, Employer 1 was a highly visible stakeholder in Vermont industry, for it has taken very bold steps to build a business in the state, which in part has been made possible by government grants and subsidies. There is potential for Employer 1 to set new standards for jobs and training in the Vermont labor market. Other employers seeking similar benefits may follow suit. Workers are already seeking jobs at the facility because of the training and opportunities for advancement. Local educators are visiting the facility to learn more about the new skill requirements and job opportunity. So although the investment in the in-house training and certification for this one employer on the surface appears as narrow specialty training with little long-term benefits to the broader workforce and education system, the potential exists for this initiative to set new standards that will drive long-term change in the labor market. Workforce development practice can be enhanced by a more nuanced understanding of the value of short-term training for individuals as well as the broader workforce development system. Although broad general education is more important in the 21st century, effective short-term training, strategically linked to formative efforts in area industry, can have a powerful effect if properly positioned and managed.

Build New Capacity to Respond to Needs of Green Jobs/Industries by Connecting Existing Resources. The nuanced understanding of the dynamics between short- and long-term training raises the final practice implication of this study, which is related to the latent potential in communities to meet the needs of the green labor market. Although White, Dresser, and

Rogers (2010) called for a national framework to organize and validate good green jobs training and certification, this study found that there is great potential in working locally to build a new green jobs workforce development infrastructure, which later may be connected with other efforts to create a broader organizing framework.

The Oregon Green Jobs Report, which concluded that the majority of green jobs were long-established occupations that were being affected by new green technologies and processes, had a powerful effect in organizing the new green career pathways in the state. Existing programs were combined in new ways to help prepare students to work in the green sector. The emerging green framework provided a platform for the development of the wind blade service tech training and certification, which will be made available to the entire industry through the project's affiliation with a national industry association. Similarly, ReNW Employer 2 understood the value of an existing national certification, which he would like to see made broadly available locally.

A new national framework for green training and certification will only be effective once there is sufficient local understanding and valuing of green credentials. Until a critical mass of educators and green employers use green training and credentials, there is little practical experience upon which to judge the value of the credentials that currently exist. Workforce development practitioners can play an important role in educating employers and educators about the current local resources they tap, adapt, and expand to meet local needs.

Conclusion

The case material was much too limited to affirm or disconfirm the proposition that green jobs and career pathways foster developmental change to education and work. However, there is evidence to suggest that educator and employer interaction has benefits to both, which were

widely recognized by the participants in this study. The evidence also suggests that contextual factors affect whether educators and employers will make structural change, as well as the type of change that they make. For example, ReNW Educator 1 had the most flexibility in building new career pathways because the school resided in a broader system of education that had targeted and provided policy and resources to support career pathways development in the renewable industry. Vermont Employer 1 was also making significant changes that enhanced the quality of the jobs in the firm. These changes were linked to a series of contextual factors that brought new external standards and regulation to bear on the organization of work and the management of employees. The power of these multiple external restrictions and requirements to affect internal change that improved the quality of green jobs seems to indicate that the productivity of the marriage of green jobs and career pathways will depend upon many more contextual factors than just the interaction among educators and employers.

References

- Abt Associates Inc. & Metis Associates. (2005). *A Jobs Initiative research brief: Approaches to measuring and tracking career advancement*. Washington, DC: Annie E. Casey Foundation. Retrieved from <http://www.aecf.org/upload/publicationfiles/fes3622h957.pdf>. Accessed 1/8/11.
- AFL-CIO Working for America Institute. (1998). *Basics: Workforce Investment Act of 1998*. (1998). Washington DC: Author. Retrieved from <http://www.workingforamerica.org/actionbriefs/basics-01.htm>. Accessed 1/8/11.
- Agrawal, A., Alssid, J. L., Bird, K., Goldberg, M., Hess, S., Jacobs, J., . . . Warford, L. (2007). *Career pathways as a systemic framework: Rethinking education for student success in college and careers*. Washington, DC: League for Innovation in the Community College. Retrieved from <http://www.league.org/league/projects/ccti/files/SystemicFramework.pdf>. Accessed 1/8/11.
- Almandsmith, S., Walshok, M., Magill, K., Toms Baker, L., Surko, P., Vencill, M., Smith, T., Betesh, H., Drury, D., Cambron, T., Lara, K., & Goldrig, T. (2009). *The power of partnership: American regions collaborating for economic competitiveness. 2009 Generation I WIRED interim evaluation report*. Oakland, CA: Berkeley Policy Associates. Retrieved from http://wdr.doleta.gov/research/FullText_Documents/The%20Power%20of%20Partnership%20-%20American%20Regions%20Collaborating%20for%20Economic%20Competitiveness%202009%20Generation%20I%20WIRED%20Interim%20Evaluation%20Report.pdf. Accessed 1/11/11.

- Alssid, J. L., Gruber, D., Jenkins, D., Mazzeo, C., Roberts, B., & Stanback-Stroud, R. (2002). *Building a career pathways system: Promising practices in community college-centered workforce development*. New York, NY: Workforce Strategy Center. Retrieved from <http://net.educause.edu/ir/library/pdf/eqm03111.pdf>. Accessed 1/8/11.
- Alssid, J. L., Gruber, D., Jenkins, D., Mazzeo, C., Roberts, B., & Stanback-Stroud, R. (2005). Engaging institutions in workforce development: Career pathways for disadvantaged adults. *New Directions for Institutional Research*, 128, 83-97.
- Anderberg, M. (2008). *Green collar workers and other mythical creatures*. Austin, TX: Texas Workforce Commission.
- Appelbaum, E., & Batt, R. L. (1994). *The new American workplace: Transforming work systems in the United States*. Ithaca, NY: ILR Press.
- Appelbaum, E., Bernhardt, A., & Murnane, R. E. (Eds.). (2003). *Low wage America: How employers are reshaping opportunity in the workplace*. New York, NY: Russell Sage. Retrieved from <http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1150&context=ilrreview&sei-redir=1#search=%22Low%20wage%20America%3A%20How%20employers%20reshaping%20opportunity%20workplace%22>. Accessed 1/8/11.
- Atkinson, R. D. (1998). *Building new skills for the new economy* [PPI Backgrounder]. Retrieved from <http://www.ppionline.org/ndol/print.cfm?contentid=1379>. Accessed 10/6/10.
- Bailey, T., & Merritt, D. (1995). *Making sense of industry-based skill standards*. Berkeley, CA: National Center for Research in Vocational Education. Retrieved from <http://vocserve.berkeley.edu/Summaries/777sum.html>. Accessed 10/6/10.

- Baran, B., Michon, S., Teegarden, S., Giordond, L., & Lodewick, K. (2010). *Implementing the National Fund for Workforce Solutions: Second annual national evaluation report*. Boston, MA: National Fund for Workforce Solutions. Retrieved from <http://nfwsolutions.org/sites/default/files/2009-10%20National%20Evaluation%20Report-FINAL.pdf>. Accessed 1/11/11.
- Barnett, E. A. (Ed.). (2008). *Changing systems, changing lives: The broader impact of the College & Career Transitions Initiative*. Washington, DC: League for Innovation in the Community College. Retrieved from <http://www.league.org/league/projects/ccti/files/changing.pdf>. Accessed 1/8/11.
- Beebel, A. E., & Walleri, R. D. (2005). The neglected majority: 20th anniversary! *Community College Journal*, 75(5), 38-43. Retrieved from <http://www.ncccrp.org/images/CCJBeebeWalleriArticleFinal.pdf>. Accessed 11/1/10.
- Bernhardt, A. & Bailey, T. (1998). Improving worker welfare in the age of flexibility. *Challenge*, 41(5), 16-44.
- Bluestone, B., & Bluestone, I. (1992). *Negotiating the future: A labor perspective on American business*. New York, NY: Basic Books.
- Bozell, M. R., & Liston, C. D. (2010). *Building effective green energy programs in community colleges*. New York, NY: Workforce Strategy Center. Retrieved from <http://www.cccco.edu/Portals/4/EWD/BuildingEffectiveGreenEnergyProgramsinCCs.pdf>. Accessed 1/8/11.
- Cappelli, P. (1997). *Change at work*. New York, NY: Oxford University Press.
- Carnevale, A. P. (1991). *America and the new economy*. San Francisco, CA: Jossey-Bass.

- Carnevale, A. P., Smith, N., & Strohl, J. (2010). *Help wanted: Projections of jobs and education requirements through 2018*. Washington, DC: Georgetown University Center on Education and the Workforce. Retrieved from <http://cew.georgetown.edu/jobs2018/>. Accessed 1/8/11.
- Cleantech. (2009, April 1). Clean technology venture investment falls to \$1 billion in 1Q09 (Press release). San Francisco, CA: Author. Retrieved from <http://cleantech.com/about/pressreleases/040109.cfm>. Accessed 1/8/11.
- Cleantech. (2010, October 1). Cleantech Group finds global clean technology venture investment on course, despite a decline in 3Q10 investment (Press release). San Francisco, CA: Author. Retrieved from <http://cleantech.com/about/pressreleases/3Q10-investments.cfm>. Accessed 1/8/11.
- Commission on the Skills of the American Workforce. (1990). *America's choice: High skills or low wages!* Washington, DC: National Center on Education and the Economy.
- CVCAC. (2010). *Vermont Green project. Part II. Technical proposal*. Barre, VT: Author.
- Dierdoff, E. C., Norton, J. J., Drewes, D. W., Kroustalis, C. M., Rivkin, D., & Lewis, P. (2009). *Greening the world of work: Implications for O*NET-SOC and new and emerging occupations (O*NET Research & Technical Reports)*. Washington, DC: U.S. Department of Labor. Retrieved from <http://www.onetcenter.org/reports/Green.html>. Accessed 1/8/11.
- Drabenstott, M. (2005). *A review of the federal role in regional economic development*. Kansas City: Center for the Study of Rural America, Federal Reserve Bank of Kansas City. Retrieved from <http://ideas.repec.org/b/fip/fedkmo/2005arotfrfire.html>. Accessed 10/15/10.

- Dresser, L., & Rogers, J. (1999). Sectoral strategies of labour market reform: Emerging evidence from the United States. In V. Wieringen, F. Attwell, & G. Attwell (Eds.), *Vocational and adult education in Europe*. Dordrecht, Netherlands: Kluwer Academic.
- Fisher, J. (2006). *The Carl D. Perkins Career and Technical Education Act of 2006: State plan*. Montpelier, VT: Vermont Department of Education.
- Fitzgerald, J. (2000). *Community colleges as labor market intermediaries: Building career ladders for low wage workers*. New York, NY: New School University, Community Development Center.
- Geertz, C. (1973). *The interpretation of cultures: Selected essays*. New York, NY: Basic Books.
- Giloth, R. P. (Ed.). (2004). *Workforce intermediaries for the 21st century*. New York, NY: American Assembly, Columbia University.
- Goerner, S. J., Dyck, R. G., & Langerroos, D. (2008). *The new science of sustainability: Building a foundation for great change*. Chapel Hill, NC: Triangle Center for Complex Systems.
- Gordon, K., Hays, J., Walsh, J., Hendricks, B., & White, S. (2008). *Green-collar jobs in America's cities: Building pathways out of poverty and careers in the clean energy economy*. Washington, DC: Alliance & Green for All. Retrieved from <http://www.apolloalliance.org/downloads/greencollarjobs.pdf>. Accessed 1/20/11.
- Governing Council of the United Nations Environment Programme. (2010). *Emerging policy issues: Environment in the multilateral system*. Paper presented at the Eleventh Special Session of the Governing Council/Global Ministerial Environment Forum, Bali, Indonesia. Retrieved from http://www.rona.unep.org/documents/partnerships/GreenEconomy/UNEP-GCSS-XI-10-add1-background_paper_on_GE.pdf. Accessed 1/6/11.

- Gregson, J. A. (2010). A conceptual framework for green career and technical education: Sustainability and the development of a green collar workforce. *Journal of Technical Education and Training*, 2(1). Retrieved from http://www.public.iastate.edu/~laanan/ACTER/pdfs/Framework_Green_Career.pdf. Accessed 2/1/11.
- Grubb, W. N. (Ed.). (1995). *Education through occupations. Vol. 1. Approaches to integrating academic and vocational education*. New York, NY: Teachers College Press, Columbia University.
- Grubb, W. N., & Lazerson, M. (2005). The educational gospel and the role of vocationalism in American education. *American Journal of Education*, 111, 297-319.
- H.R. 2847. (2007). *Green Jobs Act of 2007*. Retrieved from <http://www.govtrack.us/congress/bill.xpd?bill=h110-2847>. Accessed 1/6/11.
- Halperin, S. (1988a). *The forgotten half: Non college youth in America*. Washington, DC: William T. Grant Foundation Commission on Work, Family and Citizenship.
- Halperin, S. (1988b). *The forgotten half: Pathway to success for America's youth and young families*. Washington, DC: William T. Grant Foundation Commission on Work, Family and Citizenship.
- Hayes, C., & Rafkind, D. (2010). *Green jobs growth plan 2011–1019*. Bend, OR: Workforce Oregon and 3EStrategies.
- Hinckley, R., & Hull, D. (2007). *Adult career pathways: Providing a second chance in public education*. Washington, DC: CORD Communications. Accessed 1/9/11.
- Holzer, H. J., & Lerman, R. I. (2007). *America's forgotten middle-skill jobs: Education and training requirements in the next decade and beyond*. Washington, DC: Workforce

- Alliance. Retrieved from http://www.urban.org/UploadedPDF/411633_forgottenjobs.pdf. Accessed 1/11/11.
- Houseman, S. N. (1995). *Job growth and the quality of jobs in the U.S. economy*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Hughes, K. L., & Karp, M. M. (2006). *Strengthening transitions by encouraging career pathways: A look at state policies and practices (CCRC Brief Number 30)*. New York, NY: Community College Research Center, Columbia University. Retrieved from <http://ccrc.tc.columbia.edu/Collection.asp?cid=35>. Accessed 12/1/10.
- Hull, D. (2004). *Career pathways: The next generation of tech prep*. Washington, DC: CORD. Retrieved from [http://www.cord.org/uploadedfiles/Career%20Pathways--Next%20Generation%20of%20Tech%20Prep%20\(Nov%2004\).pdf](http://www.cord.org/uploadedfiles/Career%20Pathways--Next%20Generation%20of%20Tech%20Prep%20(Nov%2004).pdf). Accessed 1/21/11.
- Hull, D. (2005). *Career pathways: Education with a purpose*. Washington, DC: CORD.
- International Labour Organization. (2002). *Learning and training for work in the knowledge society*. Geneva, Switzerland: Author. Retrieved from
- Jacobs, J. A., & Winslow, S. (2003). Welfare reform and enrollment in postsecondary education. *Annals of American Academy of Political and Social Science*, 586, 194-217.
- Jenkins, D. (2006). *Career pathways: Aligning public resources to support individual and regional economic advancement in the knowledge economy*. Washington, DC: Workforce Strategy Center. Retrieved from http://www.workforcestrategy.org/images/pdfs/publications/WSC_pathways8.17.06.pdf. Accessed 12/1/10.
- Jenkins, D. (2008). *Bridges to opportunity for unprepared adults: A state policy guide for community college leaders*. New York, NY: Bridges to Opportunities Initiative.

- Retrieved from http://www.fordfoundation.org/pdfs/library/Bridges_to_Opportunity_for_Underprepared_Adults.pdf. Accessed 1/15/11.
- Jenkins, D., & Spence, C. (2006). *The career pathways how-to guide*. New York, NY: Workforce Strategy Center.
- Johns, L. S., Buyrm, A., & Gorte, J. F. (1986). *Technology and structural unemployment: Reemploying displaced adults*. Washington, DC: U.S. Congress, Office of Technology Assessment. Retrieved from <http://www.fas.org/ota/reports/8632.pdf>. Accessed 1/8/11.
- Johnston, W. B., & Packer, A. E. (1987). *Workforce 2000: Work and workers for the 21st century*. Indianapolis, IN: Hudson Institute.
- Jones, V. (2008). *The green collar economy: How one solution can fix our two biggest problems*. New York, NY: Harper One.
- Kumhof, M., & Ranciere, R. (2010). *Inequity, leverage, and crises*. Washington, DC: International Monetary Fund. Retrieved from <http://www.imf.org/external/pubs/ft/wp/2010/wp10268.pdf>. Accessed 1/12/11.
- Lewis, M. V. (2008). Effectiveness of previous initiatives similar to programs of study: Tech prep, career pathways, and youth apprenticeships. *Career and Technical Education Research*, 33(3), 165-188.
- Liebowitz, M., & Taylor, J. (2004). *Breaking through: Helping low-skilled adults enter and succeed in college and careers*. Boston, MA: Jobs for the Future.
- Marshall, R., & Tucker, M. (1992). *Thinking for a living: Education and the wealth of nations*. New York, NY: Basic Books.
- Mazzeo, C., Roberts, B., Spence, C., & Strawn, J. (2006). *Working together: Aligning state systems and policies for individual and regional prosperity*. New York, NY: Workforce

- Strategy Center. Retrieved from http://www.workforcestrategy.org/images/pdfs/publications/WSC_workingtogether_12.1.06_3.pdf. Accessed 1/8/11.
- Molina, M., Neubauer, M., Sciortino, M., Nowak, S., Vaidyanathan, S., Kaufman, N., & Chittum, A. (2010). *The 2010 state energy efficiency scorecard*. Washington, DC: American Council for an Energy-Efficient Economy. Retrieved from <http://www.aceee.org/sites/default/files/publications/researchreports/e107.pdf>. Accessed 3/4/11.
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for American educational reform*. Washington, DC: Author. Retrieved from <http://www2.ed.gov/pubs/NatAtRisk/index.html>. Accessed 1/8/11.
- National Skills Coalition. (2010). *The issues*. Retrieved from <http://www.nationalskillscoalition.org/the-issues/>. Accessed 10/16//10.
- Oregon Community College Green Initiative. (2010). *Oregon Community College Green Initiative: Green framework*. Salem, OR: Author. Retrieved from <http://www.oregon.gov/CCWD/pdf/GreenFrameworkMay2010.pdf?ga=t>. Accessed 1/8/11.
- Oregon Employment Department Workforce and Economic Research Division. (2009). *The greening of Oregon's workforce: Jobs, wages and training*. Salem, OR: Author. Retrieved from <http://www.qualityinfo.org/pubs/green/greening.pdf>. Accessed 10/15/10.
- Parnell, D. (1985). *The neglected majority*. Washington, DC: American Association of Community and Junior Colleges.
- PEW Charitable Trusts. (2009). *The clean energy economy: Repowering jobs, businesses and investments across America*. Washington, DC: Author. Retrieved from

http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf.

Accessed 1/8/11.

Pinderhughes, R. R. (2007). *Green collar jobs: An analysis of the capacity of green businesses to provide high quality jobs for men and women with barriers to employment*. Berkeley, CA: City of Berkeley, CA.

Plastrik, P., Seltezer, M., & Taylor, J. (2003). *Changing labor markets: A systems approach to reform. Jobs for the future*. Washington, DC: The Annie E. Casey Foundation. Retrieved from <http://www.aecf.org/upload/publicationfiles/changinglabormarkets.pdf>. Accessed 1/8/11.

Prince, D., & Jenkins, D. (2005). *Building pathways to success for low-skilled adult students: Lessons for community college policy and practice from a statewide longitudinal tracking study*. New York, NY: Columbia University Teachers College, Community College Research Center.

Recovery.gov. (2010). *Recipient reports for Q4 2010*. Retrieved from <http://www.recovery.gov/Pages/default.aspx?q=content/investments>. Accessed 9/24/10.

Regional Skills Partnerships. (2000). In Office of Adult Services (Ed.). Washington, DC: U.S. Department of Labor.

Renewable Northwest. (2010). *Quarterly narrative progress report ARRA High Growth and Emerging Industries (HGEL) grants green capacity building grantees SGA/DFA PY-08-21*. Portland, OR: Author.

Renner, M., Sweeney, S., & Kubit, J. (2008). *Green jobs: Towards decent work in a sustainable, low-carbon world*. Nairobi, Kenya: United Nations Environment Programme. Retrieved

- from http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf. Accessed 1/8/11.
- Ruffing, K. (2006). *The history of career clusters*. Washington, DC: National Association of State Directors of Career and Technical Education Consortium.
- Scully, E., & Marschall, D. (1996). *Labor's stake in voluntary skill standards: An introduction to skill standards and labor perspectives*. Washington, DC: Human Resource Development Institute, AFL-CIO.
- Soares, L. (2009). *Working learners: Educating our entire workforce for success in the 21st century*. Washington, DC: Center for American Progress.
- Speth, J. G. (2010). Towards a new economy and a new politics. *Solutions*, 1(5), 33-41.
Retrieved from <http://www.thesolutionsjournal.com/node/619>. Accessed 1/6/11.
- Stephens, R. P. (2009). *Charting a path: An exploration of the statewide career pathway efforts in Arkansas, Kentucky, Oregon, Washington and Wisconsin*. Seattle, WA: Seattle Jobs Initiative. Retrieved from http://www.workingpoorfamilies.org/pdfs/Career_Pathways_Report.pdf. Accessed 1/8/11.
- Stillwell, R., & Hoffman, L. (2008). *Public school graduates and dropouts from the common core of data: School year 2005–06* (NCES 2008-353rev). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008353rev>. Accessed 10/16/10.
- Stone, J. R. (2010, March). It isn't easy being green, or is it? *Techniques*, 42-45.
- Theis, A. (2009). *Guide to adult education for work: Transforming adult education to grow a skilled workforce*. Washington, DC: National Center on Education and the Economy.

- Retrieved from http://www.ncee.org/wp-content/uploads/2010/09/adult_ed_work_guide.pdf. Accessed 10/16/10.
- U.S. Department of Energy. (n.d.). Climate change. Retrieved from <http://www.energy.gov/environment/climatechange.htm>. Accessed 1/6/11.
- U.S. Department of Labor. (2000). *Skills shortages, partnership training/systems building demonstration programs (SGA/DFA 00-102): Labor Department awards \$10 million to help communities in 11 states and District of Columbia craft strategies to close critical skills gaps and create jobs* (Press Release). Retrieved from <http://www.doleta.gov/grants/awards/00-102award.cfm>. Accessed 9/24/10.
- U.S. Department of Labor. (2007). *The road to WIRED*. Retrieved from <http://www.doleta.gov/wired/about/roadToWired.cfm>. Accessed 3/18/11.
- U.S. Department of Labor, Employment and Training Administration. (2009). *The greening of registered apprenticeship: An environmental scan of the impact of green jobs on registered apprenticeship and implications for workforce development*. Washington, DC: Author. Retrieved from http://www.doleta.gov/oa/pdf/Greening_Apprenticeship.pdf. Accessed 11/1/10.
- van Lier, P., Woodrum, A., & Gordon, K. (2010). *Mapping green career pathways: Job training infrastructure and opportunities in Ohio*. San Francisco, CA: Apollo Alliance.
- Vermont Environmental Consortium. (2009). *Vermont's environmental sector: Identifying green workforce training needs and opportunities*. Norwich, VT: Author.
- Vermont GREEN. (2010). *Part II. Technical proposal—CVCAC ViGREEN project*. Barre, VT: Author.

- Vinovskis, M. A. (1999). *The road to Charlottesville: The 1989 education summit*. Washington, DC: National Education Goals Panel.
- Warford, L. (Ed.). (2006). *Pathways to student success: Case studies from the College and Career Transitions Initiative*. Washington, DC: League for Innovation in the Community College.
- White, S., Dresser, L., & Rogers, J. (2010). *Greener skills: How credentials create value in the clean energy economy*. Madison, WI: Center on Wisconsin Strategy. Retrieved from <http://www.cows.org/pdf/rp-greenerkills.pdf>. Accessed 10/11/10.
- White, S., & Walsh, J. (2008). *Greener pathways: Jobs and workforce development in the clean energy economy*. Madison, WI: Center on Wisconsin Strategies.
- White House Office of the Press Secretary. (2010). *President Obama to announce launch of Skills for America's Future: Program will create job training programs in all 50 states* (Press Release). Retrieved from <http://www.whitehouse.gov/the-press-office/2010/10/04/president-obama-announce-launch-skills-america-s-future>. Accessed 10/16/10.
- Wills, J. (1995). *Voluntary skill standards and certification. Skill standards: A primer*. Washington, DC: U.S. Department of Labor Employment and Training Administration. Retrieved from <http://wdr.doleta.gov/opr/fulltext/95-voluntary.pdf>. Accessed 10/8/10.
- Wonacott, M. (2003). *History and evolution of vocational and career-technical education: A compilation*. Washington, DC: Office of Education Research and Improvement.
- Workforce Information Council Green Jobs Study Group. (2009). *Measurement and analysis of employment in the green economy: Workforce Information Council Green Jobs Study Group Final Report*. Washington, DC: Bureau of Labor Statistics. Retrieved from

<http://www.workforceinfocouncil.org/Documents/WICGreenJobsStudyGroupReport-2009-10-01t.pdf>. Accessed 1/8/11.

Workforce Strategy Initiative. (n.d.). *WSI history*. Retrieved from

<http://www.aspenwsi.org/about-history.asp>. Accessed 10/25/10.

Appendix A:

Converging Paths on the Road to a 21st-Century Workforce Development System

This section provides a high-level summary of the key legislation affecting education and workforce development as well as executive-level program initiatives in the two public systems that provide resources and guidance for workforce preparation and workforce development: the U.S. Department of Labor's workforce development policies and programs and the Department of Education's career and technical education policies and initiatives. Excluded from this review are the formative developments that occurred in other federal agencies, as well as in state and local communities, that also contributed to the evolving state-of-the-art in workforce development. The researcher believes the developmental pathway of the agenda and policy framework for the current-day workforce development system in the U.S. set the stage for the emergence of the career pathways model as a key mechanism for reform and program development.

The 1980s: The Emerging Agenda

The 1970s was a time of great social unrest in the United States, which brought to light systematic poverty and disparate educational outcomes for students, particularly for poor students of color (Vinovskis, 1999). At the same time, American communities were struggling to respond to the dramatic shifts in the American economy, which had resulted in the large-scale loss of middle-class manufacturing jobs (AFL-CIO Working for America Institute, 1998). While relatively low-skilled, well-paying manufacturing jobs were on the decline, the service sector

was growing. Yet, these jobs demanded new knowledge and new skills that were not generally available among the U.S. population at the time.

A prevailing consensus had emerged in policy circles about the failing condition of American schools. Many remedies were offered, including once again eliminating the U.S. Department of Education and turning the control of education over to the states. Secretary of Education Bell, in response to growing criticism, established the National Commission on Education Excellence to provide balanced review of the status of U.S. education. The commissioners were unanimous in their conclusions about the declining state of education in the U.S. (Vinovskis, 1999).

Their report, *A Nation at Risk: The Imperative for American Education Reform* (National Commission on Excellence in Education, 1983), was a scathing critique of the state of American education. Citing poor outcomes such as 23 million functionally illiterate Americans and declining achievement test scores, the commission warned that a “rising tide of mediocrity” had crippled the nation’s schools. Left unchecked, a chasm in U.S. society would emerge to separate an educated elite from a growing number of ill-informed citizens. The economic shifts were trending towards an increased reliance on knowledge workers, which would place further stress on a failing system. The U.S. democracy and economy were at risk unless swift action was taken to improve school performance and student outcomes.

The commission called for a renewed emphasis on basic skills, the adoption of more rigorous and measurable standards, higher expectations for student academic performance, and improved teaching and leadership in schools. Though the commission made a strong connection between the future direction of work and student learning, it put forth no recommendations for how to bridge these two distinct areas of activity.

Early responses presented a more nuanced perspective of the educational “crisis.” Two follow-up reports closely examined the relationship between education and work and concluded that a push for higher academic achievement to the exclusion of strategies for building new learning and opportunity structures for non–college-bound youth would be a disservice to students and to the emerging economy.

In his book *The Neglected Majority*, Dale Parnell (1985) examined the experience of the majority of U.S. youth whom he called “ordinary students.” He argued that these students were being short-changed by a focus within the system on the needs of high- and low-performing students. He envisioned a system of education that would establish new pathways to success for the middle 80 percent of students who did not aspire to a bachelor’s degree. Though the 4-year degree had become a new gold standard in society, there was little proof that a bachelor’s degree was required for labor market success. Indeed, 80 percent of people with an associate’s degree or some college earned as much as those with a bachelor’s degree (Beebel & Walleri, 2005).

Parnell laid out a framework for a new program of study to prepare ‘ordinary students’ to succeed in the growing technical labor market. The program would combine high school with community college programs to create a tech-prep/associate-degree program. Beginning in the 11th grade, students would combine high school- and college-level training for their last 2 years of high school and then continue with 2 years of study at a community or junior college to complete an associate’s degree. Courses would balance vocational and academic study in order to provide students with a solid foundation in math and science, as well as the technical skills required to apply them in real-world settings. There would be less emphasis on standardized tests and an increased emphasis on competence assessments. Such a program, he argued, would provide the vast majority of American students with a new benchmark for academic success

while also preparing them for the emerging technical labor market (Beebel & Walleri, 2005; Parnell, 1985).

Parnell's recommendations for an improved system of vocational and technical preparation were echoed in two reports entitled *The Forgotten Half* (Halperin, 1988a, 1988b) produced by the William T. Grant Commission on Work, Family and Citizenship. The reports documented the experiences of the 20 million non-college-bound youth who faced a myriad of difficulties securing productive and meaningful work upon graduation from high school. Students lacked structural pathways to follow as they navigated their transition from school to work. The report called for policies and programs that would expose school-aged youth to the world of work and facilitate their entry into the labor market upon completion of high school.

While *The Nation at Risk* (National Commission on Excellence in Education, 1983), *The Forgotten Majority* (Parnell, 1985), and *The Forgotten Half* (Halperin, 1988a, 1988b) set forth an agenda for education reform, officials at the U.S. Department of Labor began to examine the relevancy of the nation's labor market policies and programs. In the mid 1980s, the Assistant Secretary of Labor commissioned a study of how the current economic and demographic trends would change the composition and needs of the U.S. workforce at the beginning of the 21st century. The final report, *Workforce 2000* (Johnston & Packer, 1987), confirmed the findings of the education reports, which was that U.S. workers would need new skills and new attitudes to succeed in a changing economy. Though education reform was essential, it was not a sufficient response to the shifts that were occurring in the U.S. economy and the demographics of the workforce. Additional reforms to the U.S. labor market and human resources policies and systems were also required.

According to *Workforce 2000* (Johnston & Packer, 1987), in the year 2000, the U.S. economy would be more reliant on the service sector than manufacturing for new jobs and for economic growth. Success in this transition would require at least two things: increased productivity in this service sector and a workforce with medium to high levels of education and skills to fill the growing number of technical and professional jobs in these industries. Further, in the year 2000, white males would make up only 15 percent of the new entrants into the labor market, compared to 47 percent in 1987. If change did not occur in the way American schools prepared the future workforce and U.S. businesses utilized and developed its human resources, then these anticipated shifts in the job market would serve to perpetuate existing structural inequities in society and thwart future potential for economic growth and expansion. At the same time, the slow growth in the overall size of the U.S. workforce presented unprecedented opportunities to integrate women and disadvantaged minorities into the mainstream labor market in new and meaningful ways. Capitalizing on these new opportunities would take significant new investments and reforms in education as well as a variety of new economic, labor market, and workplace policies and programs to improve the performance of service-sector industries and ensure equal access to work and learning.

Though many then and now disputed the widespread critique of the U.S. education system contained in the *Nation at Risk* and to some degree these other reports (Grubb & Lazerson, 2005; Hughes & Karp, 2006; Lewis, 2008; Vinovskis, 1999), few now disagree over the immediate and long-term impact they have had on the direction of public education and workforce policy in the United States. These reports laid out the philosophical underpinnings (Grubb & Lazerson, 2005) and mobilized public support for a reform agenda (Vinovskis, 1999)

that would help shape the U.S. education and workforce development systems in the three decades that followed (Grubb & Lazerson, 2005; Lewis, 2008; Ruffing, 2006).

Grubb and Larzerson (2005) described the philosophical underpinning of the emerging reform agenda in this way:

The Knowledge Revolution (or the Information Society or the Communications Revolution) is changing the nature of work, shifting away from occupations rooted in industrial production to occupations associated with knowledge and information. This transformation has both increased the skills required for new occupations and undated the three R's, enhancing the importance of "higher-order" skills, including communications skills, problem solving skills and reasoning. Obtaining these skills normally requires formal schooling past the high school level, so that some college—though not necessarily a baccalaureate degree—will be necessary for the jobs of the future. . . . [Additionally,] individuals are likely to find their skills becoming obsolete because of the fast pace of technological change. To keep up with advances in technology and also to change employment as firms innovate, workers must engage in Lifelong Learning. (pp. 289-290)

In response to growing public concern over the state of U.S. education, governors and school districts launched what Vinovskis (1999) called the first wave of educational reforms. States and local school districts adopted new policies aimed at improving teaching and learning in schools. Local reforms expanded high school graduation requirements, established minimum competency standards, and issued merit pay for teachers. The second-wave reforms, which came later in the decade, took aim at improving the management of the public school system.

National reforms began in earnest in 1984 with two legislation actions, amendments to the Adult Education Act and the passage of the Carl Perkins Vocational Education Act. These acts brought education reforms, to include a new role for career and technical education in the U.S. political economy (Ruffing, 2006).

Johns, Buyrm, and Gorte (1986) described the changes to the Adult Education Act enacted by Congress in 1984. The 1984 amendment increased the federal funding for state adult education programs and extended the provision of adult education beyond schools and nonprofits

by allowing funds to go to projects run by for-profit organizations. Additional funds were set aside for special projects such as the improvement competency-based adult education programs and new cooperative ventures among businesses, schools, and community organizations (Johns et al., 1986).

The same year, Congress also made significant changes to the federal vocational education program by enacting the Carl D. Perkins Vocational Education Act (Johns et al., 1986). The Act placed more emphasis on the development of academic knowledge and skills in vocational education. It included new academic achievement measures for vocational programs in schools and endorsed the use of funds for the development of programs that integrated vocational learning into academic programs (Lewis, 2008). Additional funds were included for the provision of services to special population groups and for the improvement and expansion of vocational education. States were provided greater control over the use of federal funds to improve, innovate, and expand vocational education and to foster greater involvement of the private sector in the planning and provision of programs (Johns et al., 1986).

In addition, the Act called for more alignment between vocational education and the labor market. For example, greater emphasis was placed on vocational education programs for adults. The Act also called for more coordination among federally funded programs for adults, including Adult Education Act and Job Training Partnership Act programs (Johns et al., 1986). On the national level, new funds were included for research into strategies to improve worker training and retraining, development of new curricula, and methods for assessing the educational impacts of changing technology and jobs (Johns et al., 1986).

Meanwhile, the governors' efforts to improve the performance of schools gradually placed them at the forefront of the emerging education reform movement. During the 1985

meeting of the National Governors Association, the governors established seven task forces to develop a new accountability framework that would help the governors trade some of their power to regulate local schools for better results in student performance (Vinovskis, 1999). This initiative concluded with seven tasks that all governors agreed to implement, in effect setting the stage for a national agenda for state reform of schools.

The end of the decade brought the election of a new president, George H. Bush, who campaigned on the desire to become known as the “education president” (Vinovskis, 1999). The governors, seeking to capitalize on this pledge, quickly invited the president-elect to join them in their efforts to “establish long range goals and targets for educational improvement” (Vinovskis, 1999, p. 25). After a series of negotiations, President Bush addressed the National Governors Association meeting in July 1989 and invited the governors to join him in an educational summit to “set the stage for a series of educational proposals and national goals” (Vinovskis, 1999, p. 33). Leading the summit preparation efforts for the association were Governors Carroll Campbell (R-SC) and Bill Clinton (D-AK), with Governor Clinton pushing for the summit to conclude with a consensus on a list of national goals for the improvement of state-run schools. President Bush signaled his intentions for a substantive outcome for the summit when he “agreed to work with the governors to develop a set of national performance goals” (Vinovskis, 1999, p. 35).

The summit was held on September 28-29 at the University of Virginia at Charlottesville. It concluded with four areas of agreement: (1) the establishment of a process for setting national education goals; (2) greater flexibility and enhanced accountability in the use of federal resources to meet goals, which would include both regulatory and legislative change; (3) new

state-by-state efforts to restructure the education system; and (4) annual report cards on the progress towards achieving national goals (Vinovskis, 1999, p. 39).

The governors continued to work with the Bush Administration to develop national education goals (see Table A-1). As the timeline continued into the 1990s, those national education goals became the basis of a new collaboration between the states and the federal government on education reform and were also used as the basis for new legislation to support education and labor market reform and to drive new programs in the executive agencies.

Table A-1
National Education Goals for the Year 2000

1. All children will start school ready to learn.
2. The high school graduation rate will increase to at least 90 percent.
3. All students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter including English, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography, and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our Nation's modern economy.
4. The nation's teaching force will have access to programs for the continued improvement of their professional skills and the opportunity to acquire the knowledge and skills needed to instruct and prepare all American students for the next century.
5. U.S. students will be the first in the world in mathematics and science achievement.
6. Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.
7. Every school in the United States will be free of drugs, violence, and the unauthorized presence of firearms and alcohol and will offer a disciplined environment conducive to learning.
8. Every school will promote partnerships that will increase parental involvement and participation in promoting the social, emotional, and academic growth of children.

The 1990s: Building the Policy Framework

In the early 1990s, the public policy debate over a 21st-century system of education and workforce preparation shifted from a focus on the supply side of the labor market to issues related to the demand side. With an agreement on the national education goals and a consensus that education needed to be more aligned with work, it became clear that new mechanisms were

needed to bridge the divide between school and work. Educators needed to become more knowledgeable of the skill requirements of work, and students needed more exposure to the application of knowledge and to career opportunities to help them see a connection between what they were learning in school and their future.

In addition, changes in the economy made it necessary for employers and others concerned with the economic performance of the country to take a closer look at the nature of work inside American firms. As the economy had shifted to more reliance on the service sector, it had also begun to become more global. Continued economic growth required more than just adding more workers; employers had to become responsive to market changes and improve their quality and customer service in order to remain viable in the marketplace. U.S. employers were challenged to make internal changes to improve their performance, to include the integration of new technologies and changes to the nature and structure of work that allowed workers to apply a higher level of skill and knowledge in the workplace (*Commission on the Skills of the American Workforce*, 1990).

A new policy debate had emerged that placed the U.S. education system and the new national education goals in the broader political economic context. Some argued that the U.S. education system and the skills it provided matched the level of skill and knowledge required by daily life and work in America (Marshall & Tucker, 1992). Traditional industries were organized based on mass production. In mass production, workers work in isolation, conduct repetitive tasks, are highly supervised, and are afforded little discretion or control over their work (Scully & Marschall, 1996). A high school diploma provided young people with the qualifications employers required for many entry-level jobs in this system. Once employed, workers learned on the job to perform and advance in their careers (Marshall & Tucker, 1992).

In the early 1990s, many had begun to conclude that the traditional “mass production” work system prevalent throughout the U.S. industrial economy had become a significant barrier to competitiveness and employment security for workers (Appelbaum & Batt, 1994; Bluestone & Bluestone, 1992; Carnevale, 1991; Marshall & Tucker, 1992). Economic advocates sought to help employers replace this system with a new model called high performance work systems (HPWS). In HPWS, frontline workers have wide discretion and control over the work processes, which allows for just-in-time quality control and more flexibility in the allocation of resources. As a result, firms can quickly redirect work in support of rapidly changing market trends and customer needs (Marshall & Tucker, 1992).

The characteristic feature of these systems was flexibility. Both production systems and the organization of work had to be flexible so that firms could quickly respond to rapid changes in market demands. New information and computer technologies and leaner staffing patterns would need to become the norm to ensure responsiveness. The demand for flexible workplaces had already begun to translate into new employment patterns. In the early 1990s, it was estimated that one out of three American workers had become part of a contingent workforce, part-timers, temporaries, consultants, and suppliers who commanded varying degrees of compensation, commitment, and security (Carnevale, 1991). So in addition to placing new demands on employers and workers, HPWS had also begun to place new demands upon the public labor market exchange systems.

In the early 1990s, policy debates turned to what was needed to help employers, workers, and communities shift to this new model. Though the model demanded fewer workers, it also required a new kind of worker, one who was more skilled and who was willing and able to continuously learn. The public education system could not be the only source of learning in this

new context. Employers needed to make new investments in the workforce to increase the training provided on the job and to provide higher pay to compensate workers for new skills and new levels of responsibility (Appelbaum & Batt, 1994; Marshall & Tucker, 1992).

One consensus that emerged in the debate was that the new system would require more rigorous educational standards and that these standards needed to be shaped in part by the skill and knowledge demands of the workplace. In addition, as continuous learning and flexibility had become more important, new structures were needed to provide all workers with ongoing education, training, and career transition support. These requirements demanded that employers, unions, and others knowledgeable about workplace skills and knowledge requirements increase their engagement in education reform and in the planning and delivery of education and workforce development programs.

This consensus was made clear in two commissions that issued seminal reports that helped to shape much of the debate, public policy, and federal education and workforce programs and initiatives throughout the 1990s. The National Center on Education and the Economy's Commission on the Skills of the American Workforce issued *America's Choice: High Skills or Low Wages* in 1990, and Secretary of Labor Dole commissioned the Secretary's Commission on Achieving Necessary Skills (SCANS), which issued its report, *What Work Requires of Schools: A SCANS Report for America 2000*, in 1991. Together these reports presented recommendations for a comprehensive framework within which leaders from employers, unions, educational institutions, workforce development programs, and the community could work together to set standards, build new industrial training and assessment schema, and communicate interests and needs to the multiple public systems that were charged with the planning and delivery of high-quality and relevant education to students and workers.

The Commission on the Skills of the American Workforce explored the changing nature of work and the implications for worker skills and employment in the future. The commission's final report, *America's Choice: High Skills or Low Wages* (1990), placed the economic shifts that had occurred in the U.S. economy within a broad global context and concluded that if America was to keep pace with changes in the global economy, it needed to enact systemic change to both the supply and demand side of the labor market. Though education for the frontline workforce needed to change, the commission acknowledged that this change could occur only if employers reorganized work in ways that demanded more skilled workers. The debate could no longer be about whether work or education needed to change first; interventions into both the labor market and education were needed to ensure that the two systems evolved and changed together (Commission on the Skills of the American Workforce, 1990). New structures and mechanisms were needed to link work and learning. Students and workers needed to see that their learning was relevant, and educators needed to understand in fine detail the types of knowledge and the level of work skill demanded of their students.

Through their involvement in education reform, employers could understand how to reorganize work so that workers could apply their knowledge and skill in new ways. New mechanisms were also needed to give incentives to employers to invest in education and training of the workforce and to work with educators and workforce development practitioners to move work systems closer to the HPWS model. The commission laid out a series of policies and frameworks for how employers, educators, and others could collaborate in codifying the knowledge and skills required by HPWS and in creating learning systems and certifications that would guide individual learning and career advancement.

Key to the effectiveness of these recommendations was “a philosophic change in the way we as a nation view human resources policies” (Commission on the Skills of the American Workforce, 1990, p. 90). New public policy was required to move the public vocational education and workforce development systems from the margins of the labor market, “linked primarily to income maintenance systems for the disadvantaged . . . to a more comprehensive system where skills upgrading for the majority of workers becomes a central aim of public policy” (Commission on the Skills of the American Workforce, 1990, p. 90). New policies were needed to align and coordinate the fragmented system of education, training, and workforce development so that local communities could draw upon all the resources available to them to create a new system for the preparation and ongoing training and development of the frontline workforce.

The next year, SCANS issued its report, *What Work Requires of Schools: A SCANS Report for America 2000*. One retort of educators to calls for education reform efforts was that employers and others did not clearly communicate their skill requirement to schools, so educators were limited in their ability to align student learning with skills needed for work. Lacking a communication mechanism, education and business sent confusing signals regarding the expectations of students’ performance, and students quickly learned that school-based learning had little relevance to their future.

SCANS conducted a systematic process involving employers, unions, educators, and labor market experts in a process to identify the fundamental skills and basic competencies all HPWS employers needed. The commission envisioned that educators and workforce development practitioners would use SCANS skills and competencies to bring the curriculum and assessments more in line with the needs of the employers; in other words, the commission

saw the SCANS skills and competencies as the rigorous standards upon which all education and training should be based.

At the time, educators expressed concern over SCANS' work-based approach to education reform because they feared that it would cause education to become too narrow and leave out the range of subjects required to prepare students for a full life experience. But the SCANS commission did not believe that using industrial standards to drive learning in schools would result in education becoming narrow. They argued that if education was aligned to produce the higher skill levels that employers needed, then the curriculum would naturally expose students to academic as well as applied subjects in school. Academic and vocational learning needed to be integrated in ways that enhanced both. The SCANS skills and competency framework would provide a new communication mechanism to help educators integrate the skill requirements of work into the curriculum and assessments in schools.

These two commissions, the Commission on the American Workforce and SCANS, set out to close the communication gap in the labor market by offering new frameworks and skills and knowledge typologies for employers and educators to use in working together to build labor market systems for the new economy. SCANS codified baseline skills and competencies. However, the continuous change in the economy required that this basic system be linked to an ongoing system of skill identification and education reform to ensure their continued relevance.

The recognition of the need for a framework to foster ongoing engagement and collaboration between industry and education was a central finding of both commissions. The national education goals, coupled with the growing consensus over the need for a new framework for employers and educators to communicate rigorous standards, led Congress to pass two new laws in 1994, the School-to-Work Opportunity Act and Goals 2000: Educate America

Act. These were complementary pieces of legislation intended to create (1) a structured school-to-work system and (2) a system of national skill standards. It was envisioned that these two new systems would work hand in hand to build a new national, comprehensive workforce development system.

The School-to-Work Opportunity Act provided funds to states to plan new programs that help all students make a productive transition after high school. The legislation responded to the decades-long debate over the need to provide new strategies to respond to the learning and development needs of the non-college-bound youth and to prepare them for roles in the growing middle-level, technical labor market. States were required to coordinate the new school-to-work activities and programs with other federally funded workforce and economic development programs and involve other stakeholders such as employers, unions, and community groups in the planning and operation of programs. The law made a specific reference to the need to develop “career majors,” described as a coherent sequence of courses or a field of study that prepares students for their first jobs and that integrates academic and occupational learning, integrates school-based and work-based learning, and creates linkages between secondary and postsecondary institutions. Thus, it appears that the legislation reflected the then-growing recognition of the need to build a more coordinated system of worker preparation, while also drawing upon the recommendations of several seminal reports in the 1980s to provide more focused and career-related education for the non-college-bound student population.

The Goals 2000: Educate America Act encoded the national educational goals in legislation and laid out a framework for comprehensive education reform that would help states achieve the goals. It established three new panels or boards to help build and promote a nationwide system to set world-class standards for academic attainment and competencies

assessment, to measure student progress, and to bring about change in the preparation of youth and in the training of adults for careers in the growing technical and mid-skilled labor markets.

The National Education Goals Panel was established to build support for the national goals. The National Education Standards Improvement Council was established to examine and certify national and state content standards and assessment systems submitted by states. The National Skills Standard Board (NSSB), which was placed under the auspices of the Secretary of Labor, was established to identify broad occupational clusters and to facilitate the creation of a system of skill standards, assessments, and certification for each cluster.

It was envisioned that the national system of industrial skill standards and certification system would become an organizing mechanism to bring more alignment to the fragmented labor market, which in turn would provide workers with a new source of employment security. Industry stakeholders, educators, and others would come together under the auspices of the NSSB to determine the job and skill requirements for high-performance workplaces. These agreements would be translated into rigorous industrial skill standards that would specify the content of jobs, rigorous academic standards, and skill performance levels (Wills, 1995). These industrial skill standards would provide a language, a common vocabulary, which all stakeholders could use to communicate across the labor market and education systems. The standards would be used to develop new training to help students and workers learn relevant and valuable skills. Finally, a system of competency-based assessments leading to a recognized industrial certificate would be established to help students and workers communicate their skills and expertise to employers. Individual workers would have more flexibility in the labor market because the credentials would enable them to quickly transfer their skills from one workplace to another.

The NSSB established several voluntary industry partnerships in the manufacturing, retail, and hospitality sectors to begin to develop the industry skill standards and certification, and though there were plans for other partnerships in health care, information and communication technology, and other industries, the entire system was never fully developed before the Goals 2000 legislation was allowed to sunset in 1999. However, the manufacturing and the retail partnerships succeeded in building a system of standards, training, and credentials that continue to operate. In addition, though the specific system of national skill standards envisioned by the NSSB never fully materialized, much of what was learned as well as advocated for within the NSSB framework was brought forward into other initiatives and in workforce development practices that continued beyond the NSSB.

For example, the career clusters, which were encoded into the federal system of vocational education through the reauthorization of the federal Vocational Education Act in 2010, Perkins IV, have their roots in the early to mid 1990s. Prior to the formation of the NSSB, the U.S. Department of Education and the U.S. Department of Labor formed pilots projects in 22 industries to bring together the existing industry-based skill standards and to figure out how to connect them along a coherent pathway (Ruffing, 2006). It may be that the career pathways model originated in these pilots because they were intended to organize all preexisting industrial standards and certifications into a coherent pathway and not to develop new occupation standards (Ruffing, 2006)

It was envisioned that these pilots would in part help to lay the groundwork for the formation of the NSSB network of voluntary industry partnerships. However, the industrial framework developed by the NSSB did not cross over to the 22 pilot industries, so it was difficult to align the work of these emerging new systems. Yet, given that the 22 pilots did pull

together existing standards and that state and local educators and workforce development practitioners were being encouraged to use industrial skill standards in their programs, a new federal initiative was launched to help states integrate the work of the 22 pilots into their education reform efforts.

Building Linkages was formed in 1996 as a collaborative initiative between the NSSB, the Office of Vocational and Adult Education (OVAE), and the National School-to-Work Office to help align these emerging systems and to build mechanisms and tools to transfer industrial skill standards into career and technical education systems and programs. Again, the career pathways model emerged as a framework to integrate academic and vocational skills and to organize curriculum and assessment (Ruffing, 2006). The initial effort consisted of three pilot projects, each led by a state. Though these groups succeeded in bringing together K-12 vocational educators and school-to-work counselors, they were less successful in engaging employers, unions, and K-12 and postsecondary educators. Thus, these groups had difficulty in figuring out the explicit role of skill standards in the K-12 curriculum. However, Ruffing (2006) claimed that this tension moved the projects to focus on career pathways as an organizing framework for dealing with the disconnections and disagreements that surfaced in these projects. The initial Building Linkages pilots used the career pathways model as a tool to integrate academic and vocational standards and as the basis for curriculum and assessment (Ruffing, 2006).

In 1997, Building Linkages was transferred to OVAE, where it continued to evolve into the career cluster framework, which 2 years later in 1999 was adopted by the federal Department of Education as the model of classification for state career and technical education (Ruffing, 2006). Ruffing (2006) described the political process that led to this result. It consisted of a

combination of good research and development, strategic engagement of state directors of career and technical education in federal-funded pilot programs, and the development and distribution of practical tools that states could use to organize, coordinate, and connect the growing number of disparate efforts to use industry and occupational standards to reform career and technical education throughout the country.

As of 1999, OVAE used the 16 clusters to fund career and technical education programs (Lewis, 2008). This classification and reporting system had a powerful distributive effect, because the previous two reauthorizations of the Perkins Act created an activist role for the federal government in the reform of vocational or career and technical education.

Perkins was reauthorized in 1990 and again in 1998. Each version of the Act served to integrate the national education reform agenda into local vocational and career and technical education. Perkins II mandated the use of federal funds to improve student achievement. The aim was to bring technical preparation programs into the mainstream in schools and connect them more systematically to academic and postsecondary education (Lewis, 2008; Ruffing, 2006). Perkins III placed more emphasis on academic achievement and established new accountability requirements for the use of federal funds (Ruffing, 2006). States were required to set indicators of performance and negotiate rigorous standards with the Secretary of Education. Failure to meet those measures could result in the loss of federal funding, whereas states that exceeded the requirements would receive an incentive bonus (Lewis, 2008). The introduction of the OVAE career clusters into the states' reporting on the overall performance of the system, coupled with new direct negotiations between the states and the federal government, may have helped to ensure a quick pickup of the emerging career cluster framework.

However, the reforms to career and technical education moved only one part of the agenda for building a 21st-century workforce, which included reforms to both education and the workplace. The reforms that may have resulted from OVAE's and others' work in the Building Linkages Initiative and the career clusters have helped to meet what Bailey and Merritt (1995) called the short-term goal of the industrial skills standards movement, "which focuses on improving the flow of information among schools, students, and employers" (p. 2), as well as part of the longer-term goal, which is to "place skill standards within the context of broad efforts to reform schools and workplaces" (p. 2). Career clusters and the discontinued work of the NSSB to build industrial skill standards and assessments did not include efforts to help employers examine their human resources and workforce development policies. Education reform efforts must be accompanied by employer willingness to use the skill standards to professionalize the role of the frontline workforce, to sponsor ongoing training and development for their employees, and to make hiring and promotion decisions (Bailey & Merritt, 1995).

This discussion now turns to reforms occurring in the public workforce development system to explore whether and how employers were engaged in the broader process of economic reform. In 1998, Congress enacted the Workforce Investment Act, which replaced the Job Training Partnership Act of 1978 as the guiding framework for the nation's public workforce development system. The Job Training Partnership Act provided funding for programs and services to meet the employment and training needs of displaced workers and disadvantaged populations (AFL-CIO Working for America Institute, 1998).

The general consensus was that the public workforce development system was largely marginalized and that it needed to more closely align with the political economy of states and firms. This need was most clear in the more advanced areas of the old economy, such as

advanced manufacturing, and the emerging new areas of the economy, like information technology. In the past, these specialized workforce needs were met by either internal job training efforts, such as apprenticeships, or through strategic relationships with universities and specialized training centers.

However, as the economy expanded and the size of the workforce began to shrink, all employers were finding it more difficult to find the qualified workers they needed. At the same time, the worker displacement that had begun in the late 1970s continued in many labor markets, so employers and workers presented conflicting needs for the public systems. On the one hand, employers needed new pipelines to workers with the specific skill sets they required for the available jobs. On the other hand, more workers needed increased access to higher levels of training and reemployment services. The public workforce system needed mechanisms to provide skilled workers to growing industries, while it also continued to support a growing number of workers who were in need of more frequent learning opportunities and continued support for career navigation. Employers pressed the public system for more support for economic and job growth, and workers looked to it for more frequent and improved services in managing their careers.

Against the backdrop of these growing demands, Congress passed the Workforce Investment Act in 1998. The Act, which came into effect in 2000, was designed to foster change in the form and function of the nation's workforce development system. It shifted the focus from the delivery of social services to individuals to economic development of regions and firms. It established a new dual customer focus in the public system, including both employers and job seekers. The strategy to achieve this new dual-focus mission was to create new oversight

through workforce investment boards, which were to be led by and composed largely of representatives from the business community.

The Act devolved control for the workforce development system from the federal government to the states. Governors and local workforce investment boards were granted new latitude in determining programs and services. The Act also required coordination among federal education and training programs at the state and local levels. Both of these aims were largely accomplished by new block grants that combined a number of federal funds into one pot over which governors had more control.

A new principle of universal access was adopted, opening up system services to all members of the community and not just individuals who met certain categories such as displaced workers and disadvantaged populations. This provision was intended to move the system from a “second chance” system to one that could serve everyone.

These changes were controversial, both then and now. The Act came on the heels of major reforms to the nation’s welfare system, which instituted strict guidelines that significantly limited the amount of time an individual could receive public assistance while also instituting “work-first” regulations that pushed disadvantaged workers into the labor market after limited training. The aim was to provide better coordination across these systems and more integration of welfare with public human and economic development policies and programs.

The 1990s resulted in a new policy framework and organizing mechanisms to connect and bring more coherence to the fragmented public education and workforce development systems. The work to institutionalize academic and skill standards in education shifted the focus of the reform discussion from the educational system to the development of mechanisms for linking education and schools into a broader system of economic and workforce development.

Still noticeably absent from the reforms was systematic interventions into the workplace to create new HPWS that would drive the demand for more skilled workers. What also remained lacking was a mechanism to link changes in education and workforce development to the internal career structures and education practices inside the American workplace.

The 2000s: Scaling Up

Certainly, communities and industries were not passively awaiting assistance from the federal government to resolve education and workforce challenges. In fact, a plausible argument could be made that federally sponsored initiatives in the 1980s and 1990s resulted from the learning and advocacy of stakeholders engaged in innovative local efforts to improve schools, respond to worker displacement, capitalize on new opportunities to engage disadvantaged groups in the labor market, and help employers meet their needs for new employees.

In the mid to late 1990s, more communities and industries began to experiment with the creation of multiemployer labor market institutions to improve alignment and coordination between firms sharing similar skill sets and drawing from the same labor market (Bernhardt & Bailey, 1997; International Labour Organization, 2002; Plastrik, Seltezer, & Taylor, 2003). New sector-based and regional labor market partnerships had emerged to tackle a number of workforce and HPWS transition issues: training, setting skill standards, forming hiring halls, joint benchmarking, disseminating best practices, and other activities that firms were unwilling or unable to engage in on their own. These partnerships were created to help companies pool their resources with government agencies and private funders to address gaps in the labor market, improve the internal performance of individual firms, and offer new employment and advancement opportunities to workers.

Many of these initiatives also served as workforce intermediaries, which Giloth (2004) described as “local organizations . . . embedded in low-income communities and in networks of employers, workforce providers, and community organizations.” Giloth continued:

They implement strategies that help employers grow, articulate labor demand, and define occupational specifications, while building a network of service providers and measuring progress. . . . They are fundamentally brokers, integrators, and learners who entrepreneurially enact workforce development rather than simply “meeting the market” or conforming to a publicly mandated set of roles and responsibilities. (pp. 6-7)

Based on this definition, workforce intermediaries can be seen as a model of a dual-customer workforce development system set forth in the Workforce Investment Act of 1998. Workforce intermediaries seek to address the needs of employers and low-income, less-skilled workers and job seekers. They do this by going beyond the job matching services provided by traditional workforce development initiatives to include both supply and demand side interventions into the labor market. On the supply side, workforce intermediaries work to improve training and job matching processes. On the demand side, intermediaries help employers improve human resource systems, build career ladders, improve the quality of jobs, and broker technical assistance and other resources to help employers upgrade the production system and improve competitiveness. Workforce intermediaries engaged in ongoing, community-based efforts that provide an array of flexible services, while advocating for the policy changes needed to build a 21st-century workforce development system (Giloth, 2004).

The workforce intermediary model appeared to have captured the attention of many public policy leaders and administrators, particularly in the philanthropic community and the U.S. Department of Labor in the late 1990s and early 2000s. For example, in 1995 the Annie E. Casey Foundation launched the Jobs Initiative, an 8-year, \$30 million demonstration program in six urban centers to help low-income residents get and sustain good jobs. The aim was to foster

experimentation in the development of broad cross-agency strategies to “change the way employers recruit and supervise workers,” to “result in modifications in the way work is structured and compensated” (Giloith, 2004, p. 132). Rather than just focus on outcomes for individuals, the explicit goal of the effort was “to change the structure, operation, and policies of the urban labor market . . . [in ways] that will help improve the condition for all low-income workers in a city, not just for the program participants” (Giloith, 2004, p. 132). Though many of the cities selected for the initiative were sector partnerships that targeted specific industries for development in a region, regional efforts that were focused on the needs of businesses from across industries were also included.

The same year, the Aspen Institute launched its Workforce Strategies Initiative to support the development and dissemination of the sectoral partnership model to workforce and economic development (Workforce Strategy Initiative, n.d., <http://www.aspenwsi.org/about-history.asp>). The effort began when the Aspen Institute published *Jobs and the Urban Poor: Privately Initiated Sectoral Strategies*, which attempted to articulate the features of an emerging approach to improving how the labor market functioned for low-income people. The Workforce Strategies Initiative has continued to study the model, including efforts to understand the needs and benefits from an employer perspective. The Workforce Strategies Initiative has also established Sector Skills Academies, which bring together an annual cohort of policy makers and practitioners from sector partnerships and the field of workforce development to build sector partnership leaders and advance the state of the model (Workforce Strategy Initiative, n.d.).

A central feature of these initiatives was to increase the quality and use of data in planning and managing workforce development initiatives. If these efforts were to improve the career advancement, wage progression, and conditions of low-waged work, then more baseline

and impact data were needed than what was typically available to workforce programs. The Annie E. Casey Jobs Initiative program facilitated the development of a common measurement system and then invested in building capacity within each local program to systematically collect, track, and utilize the data to improve the performance of the partnership. Included in this system was participant-level data, secondary data such as unemployment insurance, which could be used to supplement participant data in tracking participants' wage progression and job retention, and a mechanism to follow up in each site and across the sites to track the retention and career progression of individuals and to assess whether and how the participants' lives were changed by enrolling in the initiative (Abt Associates Inc. & Metis Associates, 2005, <http://www.aecf.org/upload/publicationfiles/fes3622h957.pdf>).

In 1998, the Progressive Policy Institute issued a report advocating that the U.S. Department of Labor invest \$40 to \$60 million annually to support regional skill alliances, which it described as industry-led "independent, staffed collaborations among firms in an industry, and including educational institutions such as community colleges, formed to identify common areas of skills shortages and develop effective training solutions" (Atkinson, 1998, <http://www.ppionline.org/ndol/print.cfm?contentid=1379>). A collaborative approach to collective problems was necessary in the emerging economy because most small to midsized firms lacked the capacity to support sustained workforce development efforts; thus, when confronted with a shortage of skilled workers, they typically hired away the skilled workers trained by other companies. This poaching strategy was detrimental to workers and the regional economy because it was a disincentive for employers to invest in worker training. Moreover, more incumbent as well as displaced workers were in need of ongoing training, and this increased need challenged the public workforce development system to respond with timely and

relevant industry-focused programs. The Progressive Policy Institute and others at the time advocated for a federally funded strategy to motivate and help industries to provide leadership in communities in development of ongoing training solutions to the growing skill needs of workers and firms in a region (Atkinson, 1998).

In 2000, The U.S. Department of Labor responded to the growing interest in sector training initiatives with competitive grants to fund regional skill partnership demonstration projects. The department awarded \$10 million to 11 states and the District of Columbia to develop regional partnerships to respond to employers' identified skill shortages. The activities included the development of a comprehensive skill shortage action plan; a community audit to document employment needs, the availability of workers with the skills to meet the needs, and available training resources; and training strategies and programs to respond to at least one of the identified skill shortage areas (U.S. Department of Labor, 2000). One expressed aim was to build new models of an industry-led workforce development infrastructure to support the implementation of the Workforce Investment Act legislation ("Regional Skills Partnerships," 2000). The inclusion of funds for the community audit reinforced the Jobs Initiative's data-based approach to improving workforce development policy and program planning.

The George W. Bush administration extended the federal government's support of the sectoral partnership workforce development model with the High Growth Training Initiative in 2003. The initiative included a series of actions and programs to engage business, education, and the workforce investment system to develop solutions to the workforce challenges in targeted, high-growth industries. Early on in its development, the initiative formed national employer groups within leading sectors of the economy to identify needs and worked with community colleges to draw upon existing resources to design training programs. In addition, \$285 million

was invested in 150 projects to develop education and training solutions to specific workplace challenges.

In 2005 the initiative expanded to include the President's Community-Based Job Training Grants and Workforce Innovation in Regional Economic Development (WIRED), both designed to make stronger connections among the multiple stakeholders in regional labor markets. The Community-Based Job Training Grants provided \$250 million to community colleges to build new capacity to respond to employer skill needs. Grants were awarded to help community colleges build stronger ties to employers, expand and specialize faculty, improve facilities, and buy state-of-the-art equipment.

WIRED was designed to make workforce development a more effective contributor to the economic development of regional economies (U.S. Department of Labor, 2007). WIRED was predicated on two assumptions (Almandsmith et al., 2009). One was that effective workforce development could result in job growth if there was more interaction and integration between the institutions that drive economic development and workforce development in a region. The second was that the economy and labor market had regionalized, which made it difficult for government-run economic and workforce development institutions, which were organized by narrow political jurisdictions, to meet their needs. The goal of WIRED was to expand the employment and advancement opportunities for workers by helping to increase the number of jobs; the aim was to help communities focus on developing an effective workforce development component of an integrated regional economic development strategy (U.S. Department of Labor, 2007).

There were three generations of grants in this program. For Generation 1 in 2006, 13 regions received \$15 million in demonstration funds and extensive technical assistance from the

U.S. Department of Labor to foster systemic change in the relationships and interactions among the education, workforce development, and economic development systems in the region.

Envisioned was a broad range of partners, including many of the federal agencies involved in regional economic development, including Agriculture, Transportation, Commerce, Education, Energy, Defense, and the National Science Foundation. One desired outcome was the development of “regional structures that effectively linked previously separate assets, mobilizing the shared resources needed to realize those opportunities, and ultimately contributing to sustainable economic prosperity in the region” (Almandsmith et al., 2009, p. ii). Regional activities included the formation of a broad-based regional leadership team, assessment of region-wide assets and strengths and weaknesses (community audit), and the development of a comprehensive implementation plan for the region to support regional economic goals and strategies (U.S. Department of Labor, 2007). The next two generations of WIRED, Generation 2 in 2006 and Generation 3 in 2007, spread the model to 26 other regions.

As with the Jobs Initiative, WIRED included a national system of data collection and evaluation, and sites were expected to implement it and report their data. The measures tracked performance and change on education and training, capacity building, and economic indicators.

In a 2009 evaluation of WIRED Generation I, Almandsmith et al. (2009) found that new collaborations emerged in the 13 regions to set goals and pool resources, yielding concrete results for the region as well as for the individual participating agencies and partners. Regions reported the emergence of new workforce and economic development strategies, including new credentialing and certification programs, new training for underserved populations, and the creation of new business incubators and new cluster initiatives. Many efforts focused on

workforce pipeline issues to ensure that youth were being prepared with the foundational knowledge and skill for growing occupations in the region.

It was becoming clear that a new model for workforce development had emerged that was regionally focused and integrated into the political economy of growing industries and firms. At least two approaches could be delineated: the sector initiative, which aimed to engage employers with public agencies to develop sector-specific workforce development strategies, and the workforce intermediary approach, which brought together a range of industry, community, and government partners to develop and implement new education and career pathways to connect low-wage workers to good jobs. Both models assumed a dual customer, employers and workers, but each model emphasized the needs of one over the other (Baran et al., 2010).

Ironically, just as many national policy makers and analysts were focused on policies and strategies to foster the development of more sector and regional workforce development partnerships, policy advocates and practitioners organized to influence national policy and advocate for a continued role for unions and community partners to include community-based service providers in the emerging workforce development system. The concern was that a system driven by the needs of business might not include the policies and investments needed to ensure that workers and communities also benefited from workforce development efforts. Advocate groups like Good Jobs First advocated that the local board establish quality job standards to regulate the use of public employment and training funds and ensure that investments were being made in good jobs and in industries that offered ongoing developmental opportunities to workers. Another example is the National Skills Coalition, which organized in 2007 as the Workforce Alliance. Community-based workforce development leaders and practitioners organized the coalition to ensure their voice and their knowledge—gained from

many years of experience working to help low-wage workers break out of a cycle of poverty—were included in the emerging federal policy and program development framework. Their slogan, *Every Worker, Every Industry, A Strong Economy*, could be seen as a retort to the High Growth Initiative’s focus on particular industries and communities (National Skills Coalition, 2010). The coalition quickly identified an agenda of aligning the emerging workforce development system around supporting the growth and development of mid-skilled jobs. They argued that labor market data showed that much of the current and anticipated job growth was in the mid-skilled segment of the labor market, yet many low-skilled individuals still lacked access to the support they needed to succeed in postsecondary career and technical education. They set out a policy agenda to encourage more investment in the creation of new and innovative educational pathways for mid-skilled careers (Holzer & Lerman, 2007).

Another example of an effort to organize to bring the emerging sector-based and workforce intermediary model to scale was the National Fund for Workforce Solutions, which developed in 2007. The fund addressed the growing contradiction between an economic environment that places a premium on skills and education and a policy environment that inadequately supports the acquisition of these assets by a large portion of the population (Baran et al., 2010). The fund brought together and coordinated funding and knowledge of the private, philanthropic, and public sectors to make grants, help develop new collaborations and sector partnerships, and help local partnerships and programs identify and leverage funding from a number of sources to support programs. The fund also developed standards that guide local programs in the development of programs that help move the unemployed and the underemployed into sustainable career paths. In addition, the fund conducted research and evaluation and disseminated lessons learned throughout the network. By 2009 the fund was

operating in 22 regions and had leveraged more than \$100 million in public and private funds to support regional initiatives (Baran et al., 2010).

Meanwhile, the career pathways model that emerged from one of the early 22 skill standards pilots and then was extended by the Building Linkages project began to take hold in education policy and planning circles. The backdrop to these efforts was the passage of No Child Left Behind (NCLB) in 2001, which increased the accountability of local schools and districts in challenging new standards for student achievement in math and reading. The new law raised the bar for the quality of all education, and technical preparation programs were challenged to develop curricula, align high school graduation requirements, and ensure student achievement of the rigorous standards (Hull, 2004).

The early 2000s saw several influential publications and reports by national groups of educators, as well as activities concerned with improving career and technical education; these offered planning frameworks for bringing the career pathways model of education and workforce planning to scale. In 2002, the Workforce Strategy Center published *Building a Career Pathways System: Promising Practices in Community College-Centered Workforce Development* (Alssid et al., 2002). In the same year, the League for Innovation in the Community College launched the College and Career Transitions Initiative, which brought together community colleges and their employer and secondary education partners to design and implement career pathways models that would align secondary and postsecondary education and integrate academic and technical learning to prepare students for work in growing sectors of the economy. In 2004, the Center for Occupational Research published *Career Pathways: The Next Generation of Tech-Prep* (Hull, 2004), and in 2007 the center changed the name of its National Tech-Prep Network to National Career Pathways Network, signaling that the model had moved from a

planning framework to a model or type of education for preparing individuals for work—a model that many thought should be brought to scale across the nation’s system of career and technical education.

The career pathways model organized the curriculum and the students’ educational experience around the clusters of knowledge and skills needed for careers. High schools would treat careers as areas of interest and use them to contextualize the students’ learning of challenging academic subjects such as math and science. In the later years of high school and into postsecondary education, career clusters would define the foundational skills and knowledge students would need for work in occupational areas within the clusters. The career pathway, in this context, “is the sequence of courses leading to employment in an occupational field and/or further education” (Hull, 2004, p. 3).

Advocates argued that the career pathways model should become the new model or template for organizing the educational experiences of students in career and technical education programs. The reauthorization of Perkins in 2006 (Perkins IV) required secondary and postsecondary recipients of federal funds to offer at least one program of study, which must include the following:

coherent and rigorous content aligned with challenging academic standards and with relevant career and technical content. This content must be delivered in a coordinated, non-duplicative progression of courses that align secondary with postsecondary education and leads to an industry-recognized credential or certificate or an associates or baccalaureate degree. (Lewis, 2008, p. 165)

Hull (2005) observed that the 1990 reauthorization of Perkins (Perkins II) set aside funds for innovative partnerships between secondary and postsecondary education, which led to hundreds of secondary and postsecondary articulation agreements. These agreements helped to realize Parnell’s (1985) vision for a 2+2 tech-prep model. The model emerged to become the

characteristic model of career and technical education. Students participated in a coordinated course of study by traversing between high school and postsecondary education. High school graduation rates improved for tech-prep students, and more students went on to earn a postsecondary credential. Tech prep emerged as a change agent in the education reform movement (Hull, 2004).

Perkins IV, which was reauthorized in 2006, invested in and in fact mandated the use of the career pathways model as a tool in the continuing effort to reform career and technical education and align it more closely with the needs of the 21st-century knowledge economy. Time will tell whether the career pathways model will emerge as *the* model of career and technical education in the future.

The American Recovery and Reinvestment Act of 2009 included \$100 billion for education; slightly less than half was designated to improving the quality of and access to education. An additional \$82.2 billion went to supporting low-income workers, the unemployed, and retirees, and approximately \$4 billion was designated for workforce development–related initiatives (Recovery.gov, 2010). In perhaps a symbol of the growing influence of both the sector-based model for workforce development and the career pathways model for career and technical education, ETA’s training programs funded by the Recovery and Reinvestment Act, including the State Energy Sector Partnership and Training Grants, the Energy Training Partnership Grants, and the Health Care and the High Growth Industries Grants, were designed to build new regionally focused, sector-based partnerships to create new jobs and coordinate among community and government education and training resources to build effective training based on the career pathways model.

Showing faith in the model, in October 2010, President Obama launched the Skills for America Initiative, a program to create job training partnerships in all 50 states. The aim was to improve relationships between industry and community colleges and to “build a nation-wide network to maximize workforce development strategies, job training programs, and job placement.” In his remarks about the new initiative, President Obama stated:

We want to put community colleges and employers together to create programs that match curricula in the classroom to the needs of the boardroom. Skills for America’s Future would help connect more employers, schools, and other job training providers. . . . The goal is to ensure there are strong partnerships between growing industries and community college and training programs in every state in the country. (White House Office of the Press Secretary, 2010)

As the first decade of the 21st century came to a close, the nation faced a deep economic crisis, which has moved the attention from long-term efforts to reform education and workforce development to the short-term need to get the economy back up and running (Baran et al., 2010). Many partnerships report difficulties in keeping employers engaged in the ongoing planning that is required to ensure programs are relevant and connected to the labor market (Baran et al., 2010). In addition, the recession greatly impacted individual retirement accounts, forcing many skilled workers to remain in the labor market and taking pressure off of the public system to deliver on employers’ skill needs. Attention in the public system has moved from investing in skill upgrades to helping unemployed and underemployed workers find jobs. Yet, as the economy improves, a new labor market may emerge that is leaner and even more reliant on the skills of frontline workers. The new work order may be one in which the bar has been raised for the skills and knowledge that are required to sustain productive workplaces and high-paying, rewarding careers (Baran et al., 2010; Carnevale, Smith, & Strohl, 2010; Holzer & Lerman, 2007).

Appendix B:

Advisory Board Members

Thomas Kriger, Ph.D., Provost and VP for Academics, The National Labor College

Barbara Kaufmann, Director, Division of Workforce Services, Montgomery County Workforce

Investment Board

Daniel Marschall, Ph.D., Legislative and Policy Specialist for Workforce Issues, AFL-CIO

Jeffrey Rickert, National Policy Director, Green for All

Appendix C:

Energy Training Partnerships Meeting Study Criteria

Criteria

1. The partnership is a U.S. Department of Labor Energy Training Partnership grant recipient (funded by the American Recovery and Reinvestment Act of 2009).
2. The partnership limits its services to stakeholders in one state.
3. The partnership is located in a state that is implementing a career pathways credentials model that aligns high school, adult education bridge programs, and postsecondary education curriculum with industry needs through a series of articulated degrees and stackable credentials.
4. The partnership is incorporating the career pathways model into the design of the program.
5. Employer, union, and educational partners are actively involved in program development.
6. Accessibility: The partnership operator is open to outside research of its program and process; is willing to provide necessary information, documentation, and assistance in outreach to two employers, one education provider, and one workforce development stakeholder to participate in the study interview; and is willing and able to do so within the timeframe of the study.
7. Program diversity: The two selected programs are in different industries and involve a different mix of partners, occupations, and program participants. In addition, the programs differ in terms of their prior experience with models of career development, their relationship with the education community, the engagement of employers, and /or their experience in obtaining external funding.
8. U.S. Department of Labor Employment and Training Administration (ETA) feedback and input: i.e., the ETA is interested in learning more about the partnership.

Table A-2
Eleven Energy Training Partnerships Meeting Study Criteria

Name/state	Industry	Participants	Partners	Description
Blue Green Alliance, MN Shifting Gears	Manufacturing	D/W, Wo, Minorities, Vets, Steelworkers	ICD, Solar Energy Assoc., individual companies, chamber of commerce, MN state colleges and U., individual schools	Train manufacturing workers for jobs in clean energy economy; MN 16 career clusters, 81 career pathways, new articulation agreements
Central VT Community Action Council, Inc., VT	Manufacturing, construction, recycling, waste reduction	Unemployed, under-employed, vets, HS dropouts, Wo. individuals with disabilities	VT Tech College, Office of Econ. Opportunity, Vt. Works for WO., coalition for runaway and homeless youth, organized labor, industry	Home energy efficiency/ weatherization certificate—and industry credentials supplemented with case management and job placement—expand existing apprenticeship programs/state aims to transform CTE focus on occupational skills to broader and higher level

Name/state	Industry	Participants	Partners	Description
				knowledge and skill within a career pathway—national career pathway model with 12 clusters and 37 pathways, articulation agreements
Community Housing Partners Corporation, VA	Energy efficient building, construction and retrofitting and energy efficient assessment	Unemployed and dislocated workers	CREATES: Labors, New WA Corridor Tech Council, 3 WIBs and 3 CC	Upgrade existing regional training programs and develop/implement new curricula to support mastery of energy-efficient practices and to pass requirements for 5 certifications and degrees associated with the VA CC pathways system; VA is developing pathways programs for IT and manufacturing
CWA National Education Fund, OH	Sustainable manufacturing	Dislocated workers and vets	IUE-CWA, MSSC, AFL-CIO WAI, WIB, Apollo, Green Career Central	MSSC, certified production tech certification training for career prep in emerging energy related, energy storage, and clean manufacturing; State of OH statewide stakeholder planning team to develop POS; state developing 16 career field tech standards to integrate tech/academic content through assoc. degree level that incorporates stackable credentials and industry certifications
Labor's Community Action, CO	Energy-efficiency building construction and retrofitting, renewable electric power, assessment	Dislocated workers, incumbent workers, newly trained workers	CC of Denver, Denver office of economic development, Denver JT Electrical Apprenticeship Training Center, National Electrical Contractors Assoc.	Training and certification for incumbent, newly trained, and unemployed in emerging positions through 3 methods: certificate upgrades, apprenticeship training, and preapprenticeship; Co is building upon and adopting National Career Clusters initiative, with 16 national clusters in 6 industries
Montana Electrical Jt. Apprenticeship and Training Council, MT	Energy efficient building construction and renewable energy power	Unemployed workers	IBEW, Ironworkers, Laborers, UA Plumbers, Operating Engineers, Bricklayers, PPL MT, State WIB,	Upgrade current craftworkers and preentry training for new workers in craft skills; green competency model training and certification; state building Big Sky Pathways which offers foundational skills K-21 and specialty training at post-

Name/state	Industry	Participants	Partners	Description
			MT Dpt. of Labor, Office of Higher Ed	secondary; career cluster framework: 6 fields, 16 clusters, 81 pathways with curriculum crosswalk
NW Energy Efficiency Council, WA	Energy efficiency, building construction and retrofit and assessment	Older youth, dislocated workers, incumbent workers, vets, Wo., individuals with disabilities	Private company, Energy Council, WFD councils, several CC and voc tech centers, WIBs, labor organizations, one-stops	Sound energy efficiency devt. project through regional partnership of employers, labor, education, one-stops. Training and placement in energy-efficient assessment occupations. Update curriculum based on industry guidance. State of WA examining career pathways models and incorporating industry credentials
OH Electrical LM Cooperative Committee	Energy efficient building, construction, and retrofit in combination with renewable electric power sector	Incumbent and dislocated workers including vets	Community colleges, Jt. apprenticeship training programs, regional WIB, OH electrical contractors and IBEW, Helmets to Hardhats	OH Green Renewable Opp for Workers (GROW) = 19 existing training centers provide green skills training to dislocated and incumbent workers; focus is on registered apprenticeship model to transition workers into a new industry
Oregon Manufacturing Extension Partnership, OR and WA	Renewal electric power and biofuels	Unemployed and dislocated workers, employed workers in renewable industries	Sheet metal workers, IAM, NW Oregon Labor Council, Energy Trust of OR, 4 WIBs, 6 community colleges, eco dev partners	Build a skilled workforce to support companies that generate power and help local manufacturers retool their workforce. Provide industry training, analyze existing skills and requirements, retool workers. Train workers in occupational and technical skills. OR 18 regional consortia bt secondary and postsecondary to dev 6 pathways in 26 clusters, and 111 focus areas – deeper alignment of secondary and post, career pathways roadmap based on national career cluster – aligned with industry skill levels and credentials

Name/state	Industry	Participants	Partners	Description
SER Metro Detroit, Jobs for Progress, Inc., MI	Building, construction and retrofit, solar, weatherization, and electrical	Wo., minorities, and vets	Detroit WFD dept., SE MI community alliance, Green Energy Stakeholder Advisory, Detroit for environmental justice, IBEW, Detroit electrical apprenticeship program, national electrical contractors, labors training and apprenticeship inst.	Coordinate several partnerships to combine academics with skills training, ojt, employment or apprenticeship opportunities and support services. Create a pipeline of skilled workers for alternative energy. MI adopting the states career clusters model incorporating secondary, postsecond education with industry credentials, and articulation agreements
UAW-Labor Employment Training Corporation, MO	Energy efficiency and clean energy	Vets, ex-offenders, individuals with disabilities, and WO	CC, MO dpt. of ecodev, MO dpt. of natural resources, St. Louis eco dev, WIB, General Motors, auto dealers	Develop and deliver customized training in 4 career pathways in energy efficiency and clean energy occupations (listed in proposal). Develop a Green Portal Program to support individual career planning and assessment and job search. MO building a curriculum framework around 4+2+2 articulation model – knowledge and skill validated by industry

Appendix D:

Research Protocol

Employers

1. Please tell me about your company's involvement in the green industry sector.
 - What motivated your company to move into this sector?
 - What steps did you take to move into this sector?
 - What change(s) have you made in order to move into this sector?
 - What challenge(s) did you face in moving into this sector?

2. I have several questions about the green jobs in your company.
 - What are the green jobs' titles?
 - What are the wages and benefits for these jobs?
 - What skills do people need to perform these jobs?
 - Do any of these jobs require degrees or formal credentials?
 - Are these new jobs or existing jobs with new responsibilities?
 - If these are existing jobs, do your employees require additional skills or knowledge to perform these jobs?
 - If new skills are required, how are your employees developing these skills?
 - If these are new jobs, how have you filled these positions?
 - What career advancement opportunities exist for employees in these jobs?
 - How do individuals progress up the career ladder?

3. If one of your employees went to (name of school/education partner) and earned a (specific 'green' certificate offered by education partner), would you have a higher-level job for them here?

4. How has the ETP helped you address the challenges or achieve the goals you described earlier when talking about your move to the green industry sector?

5. Please tell me about your early experiences with the ETP.
 - What was going on at the time that motivated you to become involved in the partnership? (What task were you working on, what challenges did you face, what opportunity did you perceive at the time?)
 - What initial commitments did you make to the partnership?
 - What were your expectations or goals?
 - Have your commitments and expectations changed?

6. Please tell me about your work with the ETP today.
 - What role do you play?
 - Has your role changed over time? If so, in what way? Why?

- What programs or services does the ETP provide to your company?
7. What interaction have you had with the educators involved in the ETP? Can you please tell me about that experience? Has the ETP enhanced your relationship with the educators in the region?
 8. Do you have workforce/economic development needs that currently are not being met by the ETP? What are you doing to meet those needs?
 9. What, if any, change(s) has your company made in order to participate in and/or benefit from your participation in the ETP?
 10. What challenges you have faced in participating in the ETP? What have you done, or what are you now doing to overcome these challenges?
 11. Think about the participants in the ETP programs.
 - Why do you think they were motivated to participate in the program?
 - How do you think they would evaluate the training and support services they have received from the partnership?
 - What do you think they would say that they had accomplished by their participation in the ETP programs and services?
 12. Finally, I am going to share a list of benefits that many policy analysts say can be achieved by green jobs and green job training initiatives like the ETP that involve employers, educators, workforce development, and economic development agencies to develop new training and certification in green skills. These efforts are sometimes called green jobs pathways. Please let me know what you think about each of the following statements.
 1. Green jobs pathways help individuals to move in and out of school and work to advance to better-paying jobs and higher levels of education over time.
 2. Green jobs pathways ensure students and workers are trained in the skills that employers need.
 3. More workers with green skills and higher levels of education will help employers grow their business and provide more jobs.
 4. Competitors in an industry will collaborate to develop common skill standards to guide the development of training and certifications to prepare students and workers to fill growing jobs in a region.
 5. Green jobs are good jobs because they provide meaningful work and family-supporting wages and benefits.
 6. Green jobs are suitable for people who face barriers to employment because there are low barriers to entry.
 7. People who face barriers to employment are interested in green jobs.
 8. Entry-level green jobs are linked to a career ladder to a higher-paying job.
 9. Employers in green businesses are willing to hire workers with barriers to employment for green jobs.

Educators

1. Please tell me about how your school came to be involved in the green jobs sector.
 - What motivated your school to develop programs in this sector?
 - What steps did your school take to develop these programs?
 - What changes did you need to make to develop and offer these programs?
 - What challenges did your school face in developing these programs?
2. I have questions about the green jobs programs and services offered by your school.
 - What specific green jobs-related degrees or credentials do you offer?
 - How many students are currently enrolled in these programs?
 - What are the pipelines into these programs: high school, developmental education, employers, other?
 - Are the students coming from these pipelines prepared to succeed in the green jobs programs? If not, what steps are you taking to ensure your current students succeed? What steps are you taking to ensure future students are prepared?
 - How does your program help your students transition into work or advance education after they complete the program?
 - What are the biggest challenges your school faced in developing these programs?
3. How has the ETP helped you to address the challenges or achieve the goals you described earlier when you talked about how you developed your new green jobs programs and services?
4. Please tell me about your early experiences with the ETP.
 - What was going on at the time that motivated you/your school to become involved in the partnership? (What task were you working on, what challenges did you face, what opportunity did you perceive at the time?)
 - What initial commitments did you make to the partnership?
 - What were your expectations or goals?
 - Have your commitments and expectations changed?
5. Please tell me about your work with the ETP today.
 - What role do you play?
 - Has your role changed over time? If so, in what way? Why?
 - What programs or services have you helped the partnership to offer/provide?
 - What are you doing to help meet those needs?
6. What interaction have you had with the employers involved in the partnership? Can you please tell me about those experiences? Has the partnership enhanced your relationships with employers in the region?
7. If the ETP did not exist, what alternative approaches do you think your school would have taken to achieve the goals you now achieve through your participation in the partnership?
8. What, if any, changes has your school made in order to work with the ETP to provide green jobs programs and services in the region?

9. What challenges have you faced in participating in the ETP and/or providing services to green companies in the region? What have you done, or what are you now doing to overcome these challenges?
10. Think about the participants in the programs and services sponsored by the ETP and share your thoughts about their experiences.
 - What do you think motivates them to participate?
 - What do you think they would say about the training or support services they have received?
 - What do you think they would say that they have accomplished?
 - What has been their experience after leaving the program?
11. Are you knowledgeable of the green jobs career pathways education and credentialing system that is being developed in your region/state? If so, can you share your thoughts and opinions about it?
12. Finally, I am going to share a list of benefits that many policy analysts say can be achieved by initiatives like the ETP that involve employers, educators, workforce development, and economic development agencies in the development of new education and certification programs for green jobs. These efforts are sometimes called green jobs pathways. Please let me know what you think about each of the following statements.
 1. Green jobs pathways help individuals to move in and out of school and work to advance to better-paying jobs and higher levels of education over time.
 2. Green jobs pathways ensure students and working learners are trained in the skills that employers need.
 3. More workers with green skills and higher levels of education will help employers grow their business and provide more jobs in this region.
 4. Competitors in an industry will collaborate to develop common skill standards to guide the development of training and certifications to prepare students and workers to fill growing jobs in a region.
 5. Green jobs are good jobs because they provide meaningful work and family-supporting wages and benefits.
 6. Green jobs are suitable for people who face barriers to employment because there are low barriers to entry.
 7. People who face barriers to employment are interested in green jobs.
 8. Entry-level green jobs are linked to a career ladder to a higher-paying job.
 9. Employers in green businesses are willing to hire workers with barriers to employment for green jobs.
 10. Green jobs pathways help educators at all levels align and articulate curriculum so that students are prepared to succeed at the next higher level of education.
 11. Green jobs pathways help schools integrate and coordinate between career and technical education and academic education.
 12. Green jobs pathways allow educators to modularize the curriculum and provide certificates that help them advance in the workplace while they continue in a program of study that leads to a degree.

Workforce Development Representatives

1. Please tell me about how your workforce investment board came to be involved in the green industries in the region.
2. How does your workforce investment board support the green industry sector in the region?
3. Please tell me about your early experiences with the ETP.
 - What was going on at the time that motivated you to support the partnership? (What task were you working on, what challenges did you face, what opportunity did you perceive at the time?)
 - What initial commitments did you make to the partnership?
 - What were your expectations or goals?
 - Have your commitments and expectations changed? If yes, in what ways? Why?
4. Please tell me about your work with the ETP today.
 - What role do you play?
 - Has your role changed over time? If so, in what way? Why?
 - What interaction do you have with partners?
5. How has the ETP helped you address the challenges and/or achieve the goals you described earlier when you talked about how and why your workforce development board came to support the green industry sector in the region?
6. Have you had the opportunity to observe the interaction of employers and educators involved in the partnership? If so, can you please share your observations with me? How has the ETP changed the relationship between employers and educators in the region?
7. Think about the participants in the programs and services sponsored by the ETP and share your thoughts about their experiences.
 - What do you think motivated them to participate?
 - What do you think they would say about the training or support services offered by the partnership?
 - What do you think they would say that they have accomplished in the partnership's programs and services?
8. If the ETP did not exist, what alternative approaches do you think your workforce development board may have taken to achieve the goals you seek to achieve through your participation in the partnership?
9. Are you knowledgeable of the green jobs career pathways education and credentialing system that is being developed in your region/state? If so, can you share your thoughts and opinions about it?

10. Finally, I am going to share a list of benefits that policy analysts say green jobs pathways achieved for the workforce development system. Please let me know what you think about each of these assumed benefits.
 1. Green jobs pathways help individuals move in and out of school and work to advance to better-paying jobs and higher levels of education over time.
 2. Green jobs pathways ensure students and working learners are trained in the skills that employers need.
 3. More workers with green skills and higher levels of education will help employers grow their business and provide more jobs in this region.
 4. Competitors in an industry will collaborate to develop common skill standards to guide the development of training and certifications to prepare students and workers to fill growing jobs in a region.
 5. Green jobs are good jobs because they provide meaningful work and family-supporting wages and benefits.
 6. Green jobs are suitable for people who face barriers to employment because there are low barriers to entry.
 7. People who face barriers to employment are interested in green jobs.
 8. Entry-level green jobs are linked to a career ladder to a higher-paying job.
 9. Employers in green businesses are willing to hire workers with barriers to employment for green jobs.
 10. Green jobs pathways help to align the public workforce and economic development system to make it more responsive to industries and employers in a region.
 11. Green jobs pathways can improve the labor market information systems and the data tracking and evaluation of publicly funded workforce development programs.

Appendix E:

Green Jobs Grantees

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
Blue-Green Alliance, MN	Manufacturing: renewable, solar, clean energy economy	D/W, wo minorities, vets, incumbent workers UI USWA	\$5 mil	Certified green manf training based on existing curricula and employer input	Certificate of skills	
Broward County Minority Builders Coalition, FL	Solar photovoltaic and weatherization		\$3.21 mil	Solar thermal systems designer and installer; solar P/V system installer (entry level); weatherization tech/installer; LEED green associate		
California State LM Cooperation Committee for IBEW and NECAA, CA	Construction and building maintenance		\$5 mil			Integrate energy efficiency and demand response programs mandated by CA state policy, increase installation of advanced lighting controls
Central VT Community Action Council, Inc, VT	Manufacturing, construction, recycling, waste reduction	Under-employed, unemployed, vets, women, disabled, HS dropouts	\$4.49 mil	Home energy efficiency/ weatherization certificate, customized employer training		
Community Housing Partners Corporation, VA	Energy efficient building construction and retrofit; energy efficiency assessments	Unemployed and dislocated workers	\$3.86 mil	Regional career pathways system: Upgrade existing training and dev and implement new curric in energy efficient practices and related careers	5 certificates and degrees	Deliverables include new and modified curric for portions of VCC pathways system
Communications Workers of America, National Ed Fund, OH	Sustainable manufacturing	Dislocated workers	\$3.96 mil	MSSC production tech training	MSSC Production Certificate	Contribute to analysis for development of new MSSC green manufacturing standards and assessment, train area trainers in MSSC curriculum

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
ECIA Business Growth, INC, IW, MN, WI	Renewable wind energy, energy efficient assessment, energy efficiency construction	Unemployed, dislocated workers, high school grads, vets, disconnected youth, women and minorities	\$2.06 mil		A.A.S. degrees in Wind Turbine Repair Tech; RESNET Certificate; Green Residential Builder Cert., Green Commercial Builder Cert.	Dev 3 separate career ladders to connect workers to jobs in renewable electric power, energy efficient assessment, and energy efficient building
H-CAP, Inc	Energy efficiency building and retrofit industries, energy efficiency assessment	Immigrants, minorities	\$4.64 mil	Green-enhanced skills training for environmental service workers in HC, collect existing curricula and cert programs at the college and industry level for green environment service positions; train participants in regions how to use environmental tracking tool	22 new nationally recognized certificates	Collect existing curricula and cert programs at college and industry levels for green environmental services, develop 3 new curricula; 22 nationally recognized certificates; 12 webinars on topics related to role of environmental service workers in green HC, cross-industry green jobs, green cpw for entry level workers; track the reduction in energy, pollution, waste, and water usage as a result of new cleaning methods
Heritage Health Foundation, PA	Deconstruction, building resource recovery, energy management, weatherization, urban eco-restoration	Under-employed, unemployed, vets, women, minorities		Plug and train format, respond to employer demand, current energy related training, meaningful job opportunities to apply training	Offer numerous green-job related certificates	
ICD, Inc., IN, OH, NY, PA	Renewable: wind energy, solar, geothermal	Dislocated steelworkers	\$4.66 mil	Training will vary by region (4 regions) according to industry needs; trained as wind farm techs, maintenance workers, solar panel installers or geothermal installers; this training will also prepare workers for fields in energy	Degrees and certificates that align with employer, industry, or state-defined standards	

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
				generation, i.e., construction, HVAC, home retrofitting		
International Transportation Learning Center, OH, NY, NJ, UT	Transportation	Minorities	\$5 mil	Prepare workers for careers in public transportation (an energy efficient industry). Expand industry training activity and capacity in a sustainable way; nationwide transit training system that includes standards, apprenticeships and certifications		Support of an emerging national transit training system that includes standards, apprenticeships and certifications to assist in designing or enhancing programs; Local planning: identify local training gaps, validate local training against national training standards, support career ladder advancement, provide training based on these analysis, continue to build national system of apprenticeship
International Training Institute of the Sheet Metal and Air Conditioning Industry, MI, OH, MO, IL, CA, NM, TX	Energy efficiency building construction and retrofitting	Unemployed and under-employed, veterans, minority and women	\$4.99 mil	Series of customized training courses that address the skills gap in the targeted workforce. Training will include three areas of instruction: advanced building information modeling; HVAC testing, adjusting, and balancing, and phenolic installation		
Labor's Community Action, Inc, CO	Energy-efficiency building construction and retrofitting, renewal electric power, energy efficiency assessment	Dislocated workers, incumbent workers, newly trained workers	\$3.6 mil	Access to training and certification for positions in electrical, electrical power-line installation and repair, wind and energy auditing, and solar photovoltaic installation certificate upgrades, registered	Industry recognized certificates	

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
				apprenticeship training, pre-apprenticeship training, basic skills development.		
Memphis Bioworks Foundation	Energy efficiency building construction and retrofitting; Bio-based processing: bio-agriculture and green manufacturing; Energy efficient assessment	Dislocated workers	\$2.93 mil	Leverage existing curricula and expertise coupled with input from employer partners to produce new or modified training programs for solar installation, agriculture production for biomass crops, sustainable design and construction. Entrepreneurship training for farmers broadening farming operations to include on-site biomass processing and management. Customized training in solar installation techniques; Mid-South Community College		New or modified training programs for solar installation, agriculture production for biomass crops, sustainable design and construction
Mn. Electric Joint Apprentices and Training Council	Energy efficient building construction and renewable electrical power	Unemployed workers	\$5 mil	Skills upgrades required to remain in or enter targeted industries: electricians, electrical line workers, carpenters, millwrights, laborers, weatherization technicians, ironworkers (welders),	Green competency training plans, green competency training certificate that corresponds to training as preapprenticeship, apprentice, and journeyman workers	

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
				HVAC technicians, power plant technicians, plumber/ pipefitters, heavy equipment operators		
National Ironworkers and Employers Apprenticeship Training and Journeyman Upgrade Fund	Wind energy	Dislocated workers		Skills upgrade for the renewable wind energy sector and place ironworkers on wind turbine erection projects; technical training provided by education institutions specializing in training in wind turbine erection	Portable training certificates; certificate of completion from an industry partner	
Northwest Energy Efficiency Council, WA	Energy efficiency building construction and retrofit; energy efficiency assessment	Older youth, dislocated workers, incumbent workers, veterans, women, individuals with disabilities	\$3.87 mil	Training and job placement assistance in energy efficiency assessment occupations	Industry recognized certificates in residential energy auditing, building operator, and OSHA safety	Update curriculum based on industry guidance, expand training capacities, utilize a Green Jobs navigator to share industry trends and opportunities
Ohio Electrical Labor Management Cooperative Committee, OH	Energy-efficiency building construction and retrofitting, renewal electric power	Incumbent workers, dislocated workers, veterans	4.82 mil	Green skills training; registered apprenticeship model	Nationally recognized certificates from National Joint Apprenticeship Training Committee, college credit through U system of OH	Develop an operational manual to provide a step-by-step implementation model of the scope of work encompassed by the project
Oregon Manufacturing Extension Partnership, OR, WA	Renewable electric power and biofuels	Unemployed and dislocated workers, incumbent workers at local renewable energy industries	\$5 mil	Industry-identified training; Retool existing workforce to meet changing needs of companies around renewable energy; occupational	Degree or certificate	Build a skilled workforce to support companies that generate power and assist local manufacturers in retooling their workforce; Increase the capacity of local training providers to: provide industry-identified training;

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
				and technical skills training for in demand occupations		analyze the technical workforce skills and production requirements of potential suppliers in target industries; retool existing workers to meet the changing needs of their companies around renewable energy
SER Metro-Detroit, Jobs for Progress, MN	Building construction and retrofit; solar, weatherization, and electrical	Women, minorities, veterans	\$4.29 mil	Academics and green occupational skills training; OJT	CCCD convergent technology energy efficiency training certificate; certificate of completion for 391 hours of instruction and OJB	Coordinate several partners to create pipeline of skilled workers for alternative energy opportunities
The Providence Plan, RI	Energy-efficiency building construction and retrofit; wind-generation electric power	Ex-offenders, minorities, dislocated workers	\$3.72 mil	Pre-apprenticeship, green apprenticeship, and journey-level skills upgrade in green technologies; employers will align training with emerging sector needs and implement procedures in which green-certified craftsmen are given priority on energy-related jobs	Certified pre-apprenticeship	Deliver pre-apprenticeship training, partner with union apprenticeship programs to integrate green training modules into existing curricula, upgrade skills of journey-level tradesmen in green technologies so that industry can respond to green construction and renewable projects
Thomas Shortman Training Scholarship and Safety Fund, NY	Green building operations and maintenance	Incumbent workers and minorities	\$2.8 mil	Weatherization skills: air sealing and installation associated; Optimal management of complex heating, cooling, water supply, and lighting systems of typical large apartment buildings; installation and retrofits of advanced energy		CUNY train 30 commercial building operation engineers in order to lay foundation for a future expansion of green O&M in the city's commercial buildings, and train 170 building analysts to benchmark the energy performance of large buildings

Partnership	Industry	Population	Amount	Training	Credentials	Capacity building
				technologies; train 2000 superintendents on how to make large apartment buildings more energy efficient through better operations and management		
UAW-Labor Employment and Training Center (UAW- LETC), MO	Energy efficiency and clean energy	Vets, ex- offenders, individuals with disabilities, women, incumbent and dislocated auto workers	\$3.2 mil	Training in 4 career pathways: hybrid/electric auto tech; electric auto/truck battery tech; electric motors/devices tech; commercial energy tech		Develop customized training curricula in the four designated career pathways
Utility Workers Union of America, AFL- CIO (Green Skills=Green Jobs), NJ, MA, CA	Energy efficiency and clean energy (utilities: gas, water, electrical utility)	Women, minorities, older youth, incumbent workers	\$4.99 mil	Safety, technical and green skills training: pre- apprenticeship training, apprenticeship training programs	Work-related and recognized industry credentials for the gas, water, and electrical utility industries	Develop and register pre-apprenticeship and apprenticeship programs for the utility industry in CA, MA, and NY so that it can be deployed across the country to create a pipeline of skilled workers prepared for utility careers
Austin Electric Joint Apprenticeship Training Committee (C- NEST: Comprehensive National Electrician Solar Training Initiative), AZ, OK, KS, NM, TX	Renewable electric power	Unemployed, incumbent workers	\$4.84 mil	Solar-specific and smart-grid electrical competencies		Create comprehensive- national electrician solar training (C- NEST) initiative - combine utility-scale solar installation training to meet the immediate employment needs of Austin and San Antonio, with general solar training intended to support capacity- building in the project's 5-state region