



# A Survey of State Clean Energy Fund Support for Biomass

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## **Background & Purpose**

This survey reviews efforts by CESA member clean energy funds to promote the use of biomass as a renewable energy source. For each fund, details are provided regarding biomass eligibility for support, specific programs offering support to biomass projects, and examples of supported biomass projects (if available). For the purposes of this survey, biomass is defined to include bio-product gasification, combustion, co-firing, biofuel production, and the combustion of landfill gas, though not all of the programs reviewed here take so wide a definition. Programs offered by non-CESA member funds fall outside the scope of this survey.

To date, three funds – the California Energy Commission, Wisconsin Focus on Energy, and the New York State Energy Research and Development Authority – have offered programs targeted specifically at the use of biomass as a renewable energy source. We begin by reviewing efforts in these three funds, and then proceed to cover programs in other funds that have provided support to biomass projects when the opportunity has arisen, but otherwise do not *differentially* target biomass relative to other renewable technologies.

## **California Energy Commission (CEC)**

### **Eligibility**

According to the CEC’s “Overall Program Guidebook,” biomass is generally defined as “any organic material not derived from fossil fuels,” and solid-fuel biomass as “a biomass technology that utilizes solid fuel, such as wood, agricultural waste, and other organic material that may be burned to produce electricity.” Additional eligibility criteria apply to specific CEC programs.

### **Support For Biomass Projects**

#### *Agricultural Biomass-to-Energy Program*

The California Energy Commission (CEC) initiated the Agricultural Biomass-to-Energy Program following the enactment of state Senate Bill 704 (SB 704) in September 2003. SB 704

directed the CEC to design and implement a program to help improve California's air quality in agricultural communities by reducing open-field burning of agricultural residues. Through this program, the CEC offered grants of \$10 per ton of biomass to eligible facilities converting biomass to electricity from July 1, 2003 to June 30, 2004. To be eligible for support under this solicitation, facilities were required to increase their purchase of qualified agricultural biomass by at least 10% above their five-year average of qualified purchases. The CEC allocated \$6 million for this one-year program, and provided payments upon demonstration that these requirements had been met. However, the \$6 million was entirely allocated to nine facilities for purchases occurring by February 2004, and purchases made later in the year will not receive support. There are currently no plans for a continuation of this program.

#### *Dairy Power Production Program*

Signed into law on April 11, 2001, Senate Bill 5X created the Dairy Power Production Program and authorized the CEC to expend \$9.64 million (roughly \$8.6 million of which is available for project awards, with the rest covering administrative expenses) to encourage the development of anaerobic digestion and gasification ("biogas") electricity generation projects on California dairies. The CEC in turn signed a contract with the Western United Resource Development Corporation (WURD) to administer the program. WURD is a non-profit entity created to administer the CEC program and is associated with the Western United Dairymen, a trade association of dairy farmers and producers in California. The original goal of the program was to install over five megawatts of dairy biogas systems capable of generating over 30 million kWh annually by September 30, 2002 (the CEC subsequently extended the timeline in recognition of several barriers discussed below). The CEC has estimated that approximately 100 MW of near-term biogas production potential from livestock manure exists in the state, with only 370 kW in place today.

Applicants could initially request two types of financial assistance: a buy-down grant of \$1,250 per kW, or a five-year production incentive of 3.6¢/kWh, both of which were capped at 50% of the capital cost of the anaerobic digester system. In May 2002, however, the CEC raised the buy-down cap from \$1,250/kW to \$2,000/kW, and the production incentive from 3.6¢/kWh to 5.7¢/kWh, in response to biogas system costs that turned out to be higher than anticipated, such that the original incentives would have covered far less than 50% of system costs. Applicants can also receive low-interest loans from the California Renewable Energy Loan Guarantee Program to cover the remaining costs.

As of May 2004, roughly 50 projects had applied to the program, and a total of \$5,792,370 had been set aside to fund 14 projects with a total estimated generating capacity of 3.5 MW. The first of these projects came on line in May 2004. A number of factors have contributed to the delay in bringing funded projects on line. First, low milk prices over the past few years have hit California dairy farmers hard, and reduced the amount of discretionary funds available for investment in biogas projects (which, as mentioned above, turned out to be more expensive than anticipated). Permitting and interconnection processes have also presented major barriers. AB2228, which was signed into law in September 2002, extended net metering to biogas generators, yet implementation of that extension was not resolved until a year later, when the CPUC ruled in favor of California dairy farmers, allowing them to use biogas generation to offset demand aggregated from multiple meters on a farm. More details can be found at

[www.wurdco.com](http://www.wurdco.com) (see in particular the June 2003 program progress report in the “press room” section).

#### *Existing Renewable Facilities Program (ERFP)*

The CEC’s Existing Renewable Facilities Program (formerly called the Existing Renewable Resource Account) was designed to help in-state existing renewable technologies weather the transition to a restructured electricity industry. Since the California electricity crisis of 2000/2001, the program has taken on a new purpose – to keep existing renewable generation on line in a time of great need. This program was originally allocated \$243 million over four years (1998-2001) to be divided between three tiers of renewable energy technologies, two of which involved biomass projects:

- Tier 1 (biomass, waste tire and solar thermal) was allocated \$135 million.
- Tier 2 (wind power) was allocated \$70.2 million
- Tier 3 (geothermal, small hydro, digester gas, landfill gas, and municipal solid waste) was allocated \$37.8 million.

For the 2002-2006 extension of this program (funded with \$135 million total, or \$27 million per year, from SB 1038), the CEC removed waste tire generation from Tier 1, and eliminated Tier 3 altogether, leaving biomass, solar thermal, and wind as the only technologies eligible for program funds.

Under this program, funds are distributed monthly to renewable energy suppliers through a ¢/kWh payment for eligible renewable electricity generation. The amount paid depends on the tier-specific target prices and caps, and on short-run avoided costs of the purchasing utility. With many existing renewable generators in California having signed 5.37¢/kWh extensions of their standard offer contracts during the electricity crisis, payments from the ERFP – particularly to existing wind generators, whose target prices are well below 5.37¢/kWh – have been curtailed in recent years. As a result, Tier 1 facilities (biomass and solar thermal) now receive the lion’s share of support from the ERFP. Roughly 26 biomass projects totaling about 620 MW (or about 31% of all existing renewable capacity registered under the program) currently receive support from the program.

#### *New Renewable Resources Account*

California’s New Renewable Resources Account has also provided support to biomass and other renewable energy projects through three production incentive auctions since 1998. In each of these auctions, project developers submitted bids for five-year production incentives and bids were accepted starting with the lowest bid until funds were exhausted. The three auctions, of \$162 million (1998), \$40 million (2000), and \$40 million (2001) respectively, encumbered funding for a number of biomass projects, per Table 1 (note that some of the projects that reserved funding have since been cancelled, so the “Online” and “Claimed” numbers in Table 1 may never reach the “Funded” and “Reserved” numbers).

**Table 1. Status of Successful Biomass Bidders in California’s New Renewables Auctions**

	# of Projects Funded (Online)	MW of Capacity Funded (Online)	Millions of \$ Reserved (Claimed*)
Biomass	3 (2)	19.1 (11.3)	\$7.7 (\$3.8)
Digester Gas	1 (1)	2.05 (2.05)	\$1.1 (\$1.1)
Landfill Gas	27 (14)	76.55 (36.37)	\$28.1 (\$15.9)
Waste Tire	1 (0)	30 (0)	\$7.2 (\$0.0)

\*“Claimed” means the online projects are *eligible* to collect that amount over 5 years; not that they have already done so.

Moving forward, the New Renewable Resources Account will be used to ease the cost of compliance with the state’s RPS, supporting the “above-market” cost (if any) of long-term contracts for renewable energy signed by the state’s investor-owned utilities.

## Wisconsin Focus on Energy (Focus)

### Eligibility

According to the “Reliability 2000” provisions of 1999 Wisconsin Act 9, Section 196.378, Wisconsin Statutes reads:

*“Biomass” means a resource that derives energy from wood or plant material or residue, biological waste, crops grown for use as a resource or landfill gases. “Biomass” does not include garbage, as defined in s. 289.01 (9), or nonvegetation-based industrial, commercial or household waste, except that “biomass” includes refuse-derived fuel used for a renewable facility that was in service in this state before January 1, 1998... “Biomass cofired facility” means a renewable facility in which biomass and conventional resources are fired together.*

In addition, the term “renewable resource” is further defined to include all electricity produced from biomass, per the definition above. Further, section 16.957 sets aside 4.5% of the system benefits charge fund for proposals to encourage the development or use of "customer applications of renewable resources" which is defined as "...the generation of electricity from renewable resources that takes place on the premises of a customer or member of an electric provider." In other words, the program cannot support a biomass project wholly owned by an independent power producer, with sales dedicated to the utility grid. The program supports non-electric projects with a budget outside of the 4.5% set-aside.

### Support for Biomass Projects

Support for biomass in Wisconsin – another big dairy state – primarily targets anaerobic digestion technologies to produce biogas from cow manure. In 2003, however, Focus started to support process and space heating projects in the business sector. These projects are using primarily wood waste, and are becoming very popular as a way to decrease natural gas costs. Other eligible projects include landfill gas and municipal wastewater treatment plant biogas.

Focus support includes customer education, information sharing, leveraging other incentive programs and strategies, and overcoming market and regulatory barriers towards the installation of distributed power systems such as biogas systems. Focus has funded at least two biogas-related conferences, and has worked – successfully – with Wisconsin utilities to offer higher avoided cost rates and streamlined interconnected requirements for biogas facilities.<sup>1</sup>

Focus also offers a number of grants (with at least 50% cost-sharing required) to biomass projects. These grants fall under the categories of Business and Marketing, Research and Development, Feasibility Studies, and Implementation. Such grants are typically small in size (i.e., \$10,000 – \$15,000), with the exception of R&D and Implementation grants, which range from \$50,000-\$100,000 (i.e., Implementation grants for biomass projects are limited to the lesser of 35% of project costs or \$45,000, except for projects that utilize both heat and power, which are eligible for the lesser of 35% of project costs or \$90,000). For examples of past Focus biomass grants, see <http://www.focusonenergy.com/page.jsp?pageId=725>.

Focus' outreach efforts are beginning to bear fruit. The program assisted 11 farm biogas projects obtain USDA funding in 2003 and assisted many others to apply for USDA funding in 2004. To date, Focus has had contracts with nine biogas projects. Two recent installations are expansions of existing digesters and another under construction is a German vertical reactor design. The program is also monitoring a GHD, Inc mixed plug flow design, in cooperation with the AgStar program. GHD, Inc.(Green Bay, WI) is enjoying a large sales increase for free stall dairy systems which use a scrape and flush manure collection system. Furthermore, although Focus is not directly involved, Environmental Power Corporation, owner of Microgy Cogeneration Systems, has announced several agreements with Wisconsin farms, utilities, and electric cooperatives to install numerous digester systems. As of May 2004, construction was underway on at least two such systems, which will sell power to Dairyland Power Cooperative.

## **New York State Energy Research and Development Authority (NYSERDA)**

### **Eligibility**

While statewide definitions of renewable energy and biomass were not available, according to Program Opportunity Notice 737, eligible biomass technologies include “biopower systems or components, biofuels, biochemicals, and other bioproducts.”

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<sup>1</sup> For example, Wisconsin Power & Light (a subsidiary of Alliant Energy) offers an experimental tariff that pays digester systems of lower than 800 kW in capacity on-peak and off-peak prices of 8¢/kWh and 4.9¢/kWh, respectively. Total capacity under this tariff is limited to 10 MW, and the tariff is slated to expire at the end of 2004. To reduce barriers to interconnection, Focus engaged in re-writing the interconnection rules, now codified as a new chapter of administrative rule, Public Service Commission chapter 119.

## **Support for Biomass Projects**

With the advent of restructuring in New York, Niagara Mohawk withdrew some of its financial support from a short rotation willow cropping project undertaken by the Salix Consortium. NYSERDA stepped in with nearly \$900,000 to fill this gap, and has been a supporter of the project ever since. The Salix Consortium was formed to enhance New York State's ability to produce biomass, and in particular fast-growing willow trees, on a large scale. The Consortium hopes to provide a solid scientific base of information that will support the commercialization of willow biomass crops as a renewable cellulose feedstock for bioproducts and bioenergy. One specific goal of the Consortium is to bring 800 acres of willow into production for eventual co-firing with coal; about 500 acres are currently in production. The project has experienced some delays due to the sale of the coal plant at which the willow would be co-fired.

On-site biomass systems that make productive use of both heat and power generation are also eligible for up to \$500,000 through NYSERDA's ongoing "Combined Heat and Power and Renewable Generation Technical Assistance" program (for latest program opportunity notice, see <http://www.nyserdera.org/795pon.html>).

In addition to efforts targeted at power generation, NYSERDA has also supported the use of biomass to fuel the transportation industry, funding efforts targeted at ethanol and biodiesel production in New York. For example, in May 2000, the New York Corn Growers Association released a NYSERDA-funded report titled "The Commercialization of Corn to Ethanol in New York State" (see <http://www.nyserdera.org/corn-ethanolreport.pdf>). The study found that fuel-grade ethanol production in New York is economically feasible and should be pursued further.

In late 2002, NYSERDA released Program Opportunity Notice 736: "Biodiesel: Development of Specific Opportunities." Through this solicitation, NYSERDA offered \$250,000 in total incentives for projects related to the development and commercialization of biodiesel manufacturing plants. At around the same time, NYSERDA released RFP 734, "Statewide Feasibility Study for a Potential New York State Biodiesel Industry." The final report, which was released on May 5, 2004, considers current and forecast supply and demand for biodiesel in the state, as well as a market and infrastructure analysis and cost implications of various public policy options.

Table 2 provides a high-level summary of NYSERDA's support for energy-related biomass activities within the three main categories of willow cropping, biodiesel, and landfill gas. In addition to those projects listed, NYSERDA has also committed over \$1.4 million to at least 10 other projects involving biochemicals.

**Table 2. Summary of NYSERDA Support for Energy-Related Biomass Projects**

	<b>Contractor</b>	<b>Objective</b>	<b>NYSERDA Funding</b>
<b>Willow Cropping</b>	SUNY	Prepare for commercial introduction of biomass plantations	\$1,426,115
	Forecon, Inc.	Identify markets for willow crops	\$50,000
	SUNY	Design better harvester head to increase efficiency of willow harvest	\$40,000
	Mesa Reduction Engineering and Processing	Develop and construct scalable model of Collision Mill, a biomass pulverizer	\$39,767
	Alfred University-NYSCC	Study to determine feasibility of gasification of willow and agricultural residue into a medium-grade fuel gas	\$49,975
	SUNY	Establish a willow crop development center to facilitate breeding of superior varieties	\$50,000
	SUNY	Transfer superior willow varieties to NY nurseries	\$40,000
<b>Total Willow Funding</b>			<b>\$1,695,857</b>
<b>Biodiesel</b>	United Environmental and Energy LLC	Develop more cost-effective and energy efficient biodiesel production from waste cooking oils	\$39,335
	LEGG LLC	Statewide feasibility study for potential New York state biodiesel industry	\$110,719
	AL-AG LLC	Help commercialize biodiesel manufacturing at an unused, existing manufacturing facility	\$100,000
	Biodiesel Technologies	Commercialize a proprietary continuous-flow process for producing biodiesel	\$48,700
	Northeast Biofuels LLC	Development of biodiesel production from proposed dry mill ethanol plant	\$0.00
	Guptill Farms	Develop a collection process for yellow grease and refine it into biodiesel on farms	\$161,768
	East Coast Olive Oil, Inc.	Study available inputs to determine feasibility of vegetable oil refinery in NYS	\$40,000
	C.J. Schneider Engineering Co.	Help commercialize biodiesel manufacturing in New York state	\$100,000
<b>Total Biodiesel Funding</b>			<b>\$600,522</b>
<b>Landfill Gas</b>	Town of Colonie	Design, construct, operate a 3 MW LFG plant	\$500,000
	Delaware County	Design, construct, operate a 1 MW LFG plant	\$500,000
	Madison County	Design, construct, operate a 1.2 MW LFG plant	\$500,000
	<b>Total Landfill Gas Funding</b>		

Finally, through its *Innovations in Agriculture* program, NYSERDA has solicited and funded proposals that focus on optimizing the operation of farm waste management systems to allow future implementers to increase production of biogas and improve energy efficiency in composting and other farm waste management systems. NYSERDA currently has a total of \$1,000,000 available under the most recent *Innovations in Agriculture* Program Opportunity Notice (PON 856) and plans to award multiple contracts of up to \$200,000 per project or \$75,000 for feasibility studies. For more information, see <http://www.nyserda.org/856pon.html> or <http://www.manuremanagement.cornell.edu/>.

## **Connecticut Clean Energy Fund (CCEF)**

### **Eligibility**

Section 16-245n of the General Statutes of Connecticut (as updated in July 2003 by Public Act 03-135 of the Connecticut Substitute Senate Bill Number 733) creates the state's "Renewable Energy Investment Fund" and defines renewable energy as "solar energy, wind, ocean thermal energy, wave or tidal energy, fuel cells, landfill gas, hydrogen production and hydrogen conversion technologies, and low emission advanced biomass conversion technologies and other energy resources and emerging technologies which have significant potential for commercialization and which do not involve the combustion of coal, petroleum or petroleum products, municipal solid waste or nuclear fission."

### **Support for Biomass Projects**

Though not offering standardized incentives specifically targeted at biomass projects, CCEF has placed a good deal of emphasis on this energy source. In July 2000, CCEF provided support for the development of a report entitled "Biomass Strategies for Connecticut." This report examined potential biomass resources within the state, technology options for biomass conversion to energy, and potential strategies for further developing the biomass market in Connecticut. In addition, biomass projects (including biomass gasification, co-firing, and landfill methane) are eligible for CCEF's standard range of debt/equity investments and grants. To date, CCEF has made at least three such investments in biogas projects, totaling over \$1 million:

- In 2000, CCEF invested \$500,000 as a convertible note in a consortium that proposed to build a 72 MW next-generation hybrid power plant combining biomass gasification and fuel cell technology. If the project comes to fruition, the note, which is written against the assets of the project development company, will convert to equity at a pre-determined level.
- *Connecticut Renewable Energy* will re-develop a brownfield site with a biomass gasification plant capable of producing 4.1 million decatherms of renewable methane gas per year (sufficient to fuel a 60 MW gas-fired generator). The gasifier will be fueled by land clearing brush, wood chips, and other clean biomass materials harvested from around the state. The renewable methane gas may be sold to electricity generators, or to local distribution companies.
- *Renova Engineering, P.C.* will develop a sawmill biomass gasification project that deploys small air-blown downdraft gasifiers capable of producing low BTU gas to generate 100-300 kW of electricity at small-to-midsize sawmills. Sawmill waste residue comprised of wood chips and sawdust will fuel the gasifier.



## **Illinois Clean Energy Community Foundation (ILCECF)**

### **Eligibility**

The ILCECF offers support to renewable biomass projects per the State of Illinois' definition of the term, which includes dedicated crops grown for energy production and organic waste biomass, regardless of project size and without sustainable source requirements. However, the term "renewable energy resources" in Illinois does not include energy from the incineration, burning or heating of waste wood, tires, garbage, general household, institutional and commercial waste, industrial lunchroom or office waste, landscape waste, or construction or demolition debris, nor does it generally include landfill gas combustion.

### **Support for Biomass Projects**

Projects involving biomass (as well as wind or solar energy) as a fuel source are eligible for renewable energy grants offered by ILCECF. Only non-profit (501c3) organizations, as well as state and local government entities, may apply for these grants. Examples of grants can be found at <http://www.illinoiscleanenergy.org/grantees/grants.htm>, and include:

- **City of Champaign (Champaign, IL):** \$18,300 in support of a demonstration project to renew a closed landfill with the planting of biomass energy crops
- **Pike County Economic Development Corporation (Pittsfield, IL):** \$35,000 to study the feasibility of designing the Western Illinois Ethanol Project to be highly energy efficient and use biomass power
- **Blackhawk Hills Resource Conservation and Development Council (Rock Falls, IL):** \$7,000 in support of a regional agricultural biomass energy workshop and related follow-up activities
- **Gas Technology Institute (Des Plaines, IL):** \$150,000 in support of the Metropolitan Bio-Power Deployment Project
- **Illinois State Geological Survey (Champaign, IL):** \$44,276 towards production and combustion testing of biomass-coal fuels

## **Massachusetts Technology Collaborative (MTC)**

### **Eligibility**

According to Chapter 164 of the Acts of 1997, "An Act Relative to Restructuring the Electric Utility Industry in the Commonwealth, Regulating the Provision of Electricity and Other Services, and Promoting Enhanced Consumer Protections Therein,"

*A renewable energy generating source is one which generates electricity using any of the following: ... (v) landfill gas; (vi) waste-to-energy which is a component of conventional municipal solid waste plant technology in commercial use; and (viii) low-emission, advanced biomass power conversion technologies,*

*such as gasification using such biomass fuels as wood, agricultural, or food wastes, energy crops, biogas, biodiesel, or organic refuse-derived fuel; provided, however, that after December 31, 1998, the calculation of a percentage of kilowatt-hours sales to end-use customers in the commonwealth from new renewable generating sources shall exclude clause[s] (vi). The division may also consider any previously operational biomass facility retrofitted with advanced conversion technologies as a renewable energy generating source.*

### **Support for Biomass Projects**

MTC does not *specifically and differentially* target biomass through any of its programs, but biomass is eligible for incentives through virtually all of MTC's non-resource-specific programs. Specifically, biomass projects qualify for incentives under MTC's Green Buildings and Green Schools Initiatives; Pre-Development Financing Initiative; Emerging Technology Demonstration Initiative; Commercial, Industrial, and Institutional Initiative; Massachusetts Green Power Partnership Program; and Industry Support Program. Biomass projects may also submit unsolicited proposals.

In addition to a dozen or so small grants aimed primarily at studying the feasibility of incorporating biomass technology into green buildings or schools, MTC is supporting the following biomass projects within specific initiatives:

**Pre-Development Financing Initiative:** This Solicitation targets organizations that are interested in developing grid-connected electric generating facilities. MTC has awarded several unsecured loans and one grant to biomass projects under Round 2 of this solicitation. Round 2 is still accepting applications for funding.

- **Commonwealth New Bedford Energy, LLC:** \$150,000 loan to partially finance pre-development activities for a 3.3 MW landfill gas project at the Crapo Hill Landfill in Dartmouth, MA.
- **EcoPower, LLC:** \$150,000 loan to partially finance pre-development activities for a 20 MW biomass-to-energy project at the New Bedford Business Park in Dartmouth, Massachusetts. The project will be fired with wood fuel primarily comprised of construction and demolition ("C&D") material that is produced by processing facilities in the region.
- **City of Pittsfield:** \$47,000 grant to partially finance feasibility study activities to evaluate upgrading the existing anaerobic digestion process located at the City's Wastewater Treatment Plant and adding electricity generators for co-generation.

**Emerging Technology Demonstration Initiative:** This Solicitation targets organizations that are interested in demonstrating an Emerging Technology for use in electric power generation. MTC has awarded two grants to biomass projects under this solicitation. Round 2 of this program is tentatively scheduled for release in 2005.

- **Renewable Oil International:** \$500,000 grant to scale up, construct and demonstrate a 15-dry-tons-per-day ROI Advanced Fast Pyrolysis Biorefinery Plant at Berkshire Hardwoods, Inc., a sawmill located in Chesterfield, MA.

- Biomass Energy Resource Center: \$500,000 grant to demonstrate biomass gasification at the Heyes Forest Products site in Orange, MA. The project will use an Ankur Scientific Gasifier to produce “gas” from woody biomass that will run an internal combustion engine with generation capacity of 150 kW.

**Commercial, Industrial, and Institutional Initiative:** This Solicitation targets commercial, industrial, and institutional facilities that are connected to the local electric distribution system and consume more than 50% of the proposed new renewable energy on-site. Both feasibility study grants and design and construction grants are available under this Solicitation. Six competitive rounds are scheduled for release over the next three years. The first round (May 04) is supporting the following projects:

- Feasibility study grants to assess using biodiesel to produce combined heat and power for an industrial operation (\$13,000) and a new condominium complex (\$25,000)

**Massachusetts Green Power Partnership:** This Solicitation offers to purchase tradable renewable credits (TRCs) and to provide other TRC market price risk hedging products to developers of eligible renewable energy generation projects and to companies that purchase energy, capability and/or TRCs from eligible facilities. Round 2 of this initiative is scheduled for release in late 2004. Awards under Round 1 of this initiative included:

- Public Service Company of New Hampshire: \$2.72 million in the form of TRC price support to the Northern Wood Power project at the Schiller generating facility in Portsmouth, NH, where the Public Service Company of New Hampshire will convert an existing 50 MW coal-fired unit to a low-emission, advanced biomass unit fueled by wood chips and other clean wood materials.
- Commonwealth New Bedford Energy, LLC: Nearly \$3 million in the form of TRC price support to the Greater New Bedford Landfill Gas Utilization Project, a 3.3 MW landfill gas project at the Crapo Hill Landfill in Dartmouth, MA.

**Industry Support Program:** The Trust’s Industry Support Program will make direct investments to catalyze new product commercialization, will work to build networks and provide services that will better enable companies to access capital and other vital resources, and will strive to lower barriers to success for entrepreneurs in the state. Two initiatives under this program have provided financing for biomass enterprises:

- Through a TRC purchase and security agreement (the “Ameresco Agreement”), MTC is supporting the Ameresco-Chicopee Project, a 5.7 MW landfill gas-to-electricity project in Chicopee, MA that went on line in early 2004 (the “Project”). Under the terms of the Ameresco Agreement, MTC receives a substantial portion of the TRCs expected to be generated by the Project over a period of years. MTC intends to make these TRCs available to green electricity suppliers that offer consumers the opportunity to recognize their green electricity payments as charitable contributions through MTC’s “Clean Energy Choice” program. Until such time as all Ameresco TRCs are under contract, qualifying green electricity suppliers who meet certain program requirements will be provided an option to purchase up to 25% of the TRCs available to the Trust quarterly from the Project for a period of three years. MTC’s obligation under the option is strictly subject to the Trust obtaining actual delivery of TRCs from the Project.

- Through an investment of \$50,000, MTC is supporting the early-stage product development efforts of Agrivida, Inc., a Cambridge, MA-based bioengineering firm. Agrivida is developing an engineered seed designed for ethanol production. The technology it incorporates is a biological “switch” that enables producers to activate a desired enzyme on demand to break down the biomass into basic sugars for ethanol processing. The company is a start-up founded by a team of 5 researchers from the Massachusetts Institute of Technology and local entrepreneurs. Agrivida’s near-term market is ethanol production which can be combined with combustion of ethanol-related biomass waste to produce renewable energy. Agrivida is also pursuing a long-term opportunity recognized by the U.S. Department of Energy and other scientific councils: the photobiological production of hydrogen. Agrivida is one of 8 firms in 2004 that have been awarded investment capital on a competitive basis through the Trust’s Sustainable Energy Economic Development (SEED) initiative.

## **Xcel Energy Renewable Development Fund (XERDF)**

### **Eligibility**

According to the Minnesota Statutes of 2003, Chapter 116C.779, “Funding for renewable development,” and Chapter 216B.2422, “Resource planning; renewable energy,” biomass energy sources are included in the state’s definition of renewable resources, worded specifically as “trees or other vegetation; or landfill gas.”

### **Support for Biomass Projects**

The XERDF has offered support to biomass projects through two related programs.

Under a 2001 solicitation, XERDF offered grants toward “Category A” projects – i.e., new or refurbished existing projects utilizing commercial technology and resulting in an increase in renewable energy generation. Preference was given to biomass projects. Biomass was further defined in this RFP as “dedicated energy crops and trees; agricultural food and feed crops; agricultural crop wastes and residues; wood wastes and residues; aquatic plant and animal waste gasification.” Direct combustion of animal waste or municipal solid waste was ineligible. Funded biomass projects include:

- **Greden Dairy and Crop Farm:** \$80,000 towards use of cow manure to produce methane, which would then produce up to 100 kW of electricity and usable heat. Some of the excess energy could be used on-site for a soybean processing facility, which would produce a soybean oil fuel that would replace diesel fuel
- **Minnesota Corn Processors:** \$400,000 to capture and combust methane currently being wasted in an engine that could produce up to 580 kW of electricity
- **AnAerobics Inc.:** \$1.3 million in support of a first-of-its-kind technology to convert solid and liquid waste from the corn and pea canning process at the Seneca Foods plant in Montgomery to produce methane and up to 1,700 kW of electricity

XERDF also offered incentives for biomass projects through a related RFP for Category B (Experimental Technology) and Category C (R&D) projects. Category B projects involved technologies somewhere between the research and commercialization stages, such as pilot demonstration projects. Category C projects involved more basic research and development activities. Funded biomass projects include:

- **Sebesta Blomberg & Associates, Inc.:** Study of the feasibility of producing electricity from spent distiller grains used in the production of ethanol
- **Energy Performance Systems, Inc.:** Exploration of the possibility of burning whole trees and waste wood to generate electricity
- **University of North Dakota:** 1) Study of burning biomass materials with coal, 2) Study of ways to reduce emissions from that process, and 3) Research into biomass gasification
- **National Renewable Energy Laboratory:** Research of a new way of removing contaminants from the end product of biomass gasification processes

In late 2003, XERDF released its second RFP from renewables projects. This 2003 solicitation was very similar to the 2001 solicitation, with an emphasis on biomass projects. Proposals are now in and winning bidders are expected to be announced in 2004.

## **New Jersey Clean Energy Program (NJCEP)**

### **Eligibility**

According to Public Law 1999, Chapter 23, "Class I renewable energy" includes electric energy produced from, in addition to other sources, "methane gas from landfills or a biomass facility, provided that the biomass is cultivated and harvested in a sustainable manner."

The NJCEP provides a number of further, more thorough definitions of biomass on its website ([www.njcep.com](http://www.njcep.com)) and within its solicitations. NJCEP's "Evaluation Criteria for Sustainable Biomass Projects" provides examples of eligible and ineligible facilities based on three guiding principles for all sustainable biomass projects:

1. Fuel sustainability
2. Closed-loop operational process
3. Proper emissions levels

Some of NJCEP's individual solicitations offer considerably more extensive definitions for the term biomass and requirements for project eligibility.

### **Support for Biomass Projects**

The NJCEP has historically offered support to large (>1 MW) biomass and other renewable projects that supply power to the grid through its Grid Supply and Market Development Programs. In 2001, NJCEP approved \$11.3 million worth of five-year production incentives, as well as up-front grants (not-to-exceed 10% of the total incentive requested) to defray development costs, to developers of eligible renewable and clean energy technologies. The

major criteria were to maximize the amount of installed capacity and energy for the available funding. Secondary criteria included resource diversity and maximizing environmental benefits. In 2002, awards were made to a 4 MW landfill gas project (2.93¢/kWh over 5 years, for a total of \$3.9 million), as well as three wind projects, a fuel cell project, and a photovoltaics project. None of the projects are yet on line.

More recently, NJCEP has launched the Renewable Energy Advanced Power Program, which aims to speed the development of utility-scale renewable energy power plants across the state. REAPP offers grants of up to 20% of the total construction and other qualifying costs, as well as guaranteed long-term financing for the additional costs of construction, to qualifying large (> 1 MW) renewable energy projects. NJCEP set aside \$50 million for this program, and began accepting proposals on October 1, 2003. The solicitation will remain open as long as funding is available.

Finally, NJCEP also offers incentives to on-site biomass projects, along with other on-site renewable energy projects, through its Customer On-Site Renewable Energy (CORE) Program. Through this program, residential and commercial customers and public entities can receive rebates and grants to defray installation, equipment and interconnection costs associated with installing new biomass systems. Small biomass systems up to 10 kW in capacity are eligible for a \$5 per Watt subsidy, capped at 60% of installed costs. Large biomass systems receive \$3/W for the first 10 kW, \$2/W for incremental capacity between 10kW and 100kW, \$1.50/W for incremental capacity between 100 kW and 500kW, and \$0.15/Watt for all capacity over 500kW (capped at 30% of eligible costs). According to NJCEP's web site (see [www.njcep.com/html/2\\_stats.html](http://www.njcep.com/html/2_stats.html) or [www.njcep.com/html/sys\\_inst\\_rebate.html](http://www.njcep.com/html/sys_inst_rebate.html)) there have been a handful of biomass systems installed under this program so far, all of them greater than 10 kW (and two of them quite large for a customer-sited program). Three examples include:

- **Rex Lumber Company:** NJCEP provided a rebate for roughly one third of the cost to purchase and install a biomass system for combusting wood waste from the lumber company. The CHP biomass system heats the wood-drying kilns and the facility, and excess steam powers a 150 kW generator. For more information, see [http://www.njcep.com/media/casestudy07\\_rex\\_lumber.pdf](http://www.njcep.com/media/casestudy07_rex_lumber.pdf).
- **Aluminum Shapes/Pennsauken Landfill:** A third party will provide the Aluminum Shapes factory with electricity using a gas collection system from the adjoining Pennsauken Landfill. Two collection systems that are capable of generating a combined 5.7 MW of electricity will receive \$1.195 million each, or \$2.39 million total.
- **Essex and Union Joint Meeting wastewater treatment facility:** \$2 million was approved for this unconventional biomass project that will generate 2.94 MW through the use of methane gas generated by a prototype sewage sludge digestion process.

## **Ohio Energy Loan Fund (OELF)**

### **Eligibility**

No Information Available

### **Support for Biomass Projects**

The OELF's Renewable Energy Financial Assistance Program offers support to biomass projects as well as other renewable energy projects. OELF offers interest rate reductions of up to 50% on loans used for the installation of renewable energy technologies through a linked deposit approach. Contributions from the Office of Energy Efficiency, administrator of the OELF, are limited to \$25,000 for residential and \$500,000 for commercial projects. To date, no biomass projects have been financed through the OELF.

In 2003, however, the OELF received legislative approval to offer a limited amount of grants as well, through the Energy Loan Fund Grant Program. The first action of the new grant program was to issue a 2004 Distributed Energy Resources RFP. This RFP sought to fund projects that will increase the use of distributed energy resources within the state of Ohio. Projects could range in size from 1 kW to 25 MW and could include residential, commercial, or industrial applications. Landfill or biomass methane projects were eligible; project owners must provide a minimum equal cost share, and must cover at least 10% of total project cost in cash equity. Recipients were eligible for maximum awards up to a \$150,000 grant and a \$1,000,000 linked deposit or \$500,000 direct loan. Two biomass projects have been awarded \$150,000 grants under this RFP: a landfill gas project, and a 500 kW CHP project fueled by low-Btu methane gas recovered in a bioreactor using plant waste products.

## **Energy Trust of Oregon (ETO)**

### **Eligibility**

According to Oregon Senate Bill 1149, the term "renewable energy resources" includes reference to the following:

- (a) Electricity generation facilities fueled by wind, waste, solar or geothermal power or by low-emission nontoxic biomass based on solid organic fuels from wood, forest and field residues;
- (b) Dedicated energy crops available on a renewable basis; and,
- (c) Landfill gas and digester gas.

### **Support for Biomass Projects**

The ETO offers support for biomass projects through its Open Solicitations program. ETO launched the Open Solicitations program in May 2002 to allow renewable energy projects ineligible for any of its targeted incentives to apply for financial support. In fiscal year 2003, 10% of ETO's Renewable Energy program budget, approximately \$925,000, was reserved for

open solicitation incentives. To date, three renewables projects have been funded under this program and are now operating and three more have been approved but are not yet installed, including at least one biogas project at Threemile Canyon Farms in Boardman, Oregon. This farm is home to more than 20,000 dairy cows, whose manure will be used to produce methane to generate electricity. This project, which is scheduled to come on line in 2004, will deliver 3.85 average megawatts per year for 15 years at a cost to the Energy Trust of \$1.5 million. According to its web site, ETO plans to launch a targeted biomass program in 2005.

## **Metropolitan Edison Sustainable Energy Fund (MESEF)**

### **Eligibility**

No information available.

### **Support for Biomass Projects**

Projects that generate electricity from biomass sources are, along with other renewable energy projects, eligible to apply for grants and investments from MESEF. MESEF prefers to support new projects through investment (e.g., debt or equity positions), and typically limits its investments to \$500,000 per project. Biomass projects supported to date include:

- **The Regional Economic Development District:** A \$25,000 grant to study the feasibility of developing an ethanol plant in South Central Pennsylvania that uses grain processing for renewable energy.
- **United Corrstack:** A \$15,000 grant for a feasibility study to determine if the Reading, PA plant's energy system can economically be converted to a biomass energy system. Also a \$40,000 Loan for Phase Two of the Biomass Energy Conversion Project.

## **Penelec Sustainable Energy Fund (PSEF)**

### **Eligibility**

No Information Available.

### **Support for Biomass Projects**

Biomass projects, along with other renewable energy projects, are eligible for support from the PSEF. PSEF provides support through both venture capital and business lending and grant-making. Grants are typically provided for feasibility studies and are limited to \$25,000 per project. Investment support is available in the form of commercial loans, subordinated debt, and royalty and equity financing.



PSEF recently provided \$50,000 in loan/royalty financing to NativeEnergy for the development of a tradable renewable certificates marketing and sales program targeted at the development of farm-based biogas systems in Pennsylvania (dubbed “Remoovable Energy”).

## **Sustainable Development Fund (SDF)**

### **Eligibility**

SDF’s by-laws define renewable energy to include “sustainable biomass” (see [http://www.trfund.com/sdf/SDF\\_bylaws.pdf](http://www.trfund.com/sdf/SDF_bylaws.pdf)).

### **Support for Biomass Projects**

Biomass projects are eligible for support under several of SDF’s programs, including the ESCO Financing Program, the Pennsylvania Advanced Industrial Technology (PA-AIT) Fund, and SDF’s Sustainable Energy Grants Programs. To date, however, no biomass projects have been funded.

## **Sustainable Energy Fund of Central Eastern Pennsylvania (SEFCEPA)**

### **Eligibility**

According to the Annual Plan of the Sustainable Energy Fund of Central Eastern Pennsylvania (SEFCEPA), the following types of biomass applications fall under the category of “Preferred Renewable Energy Projects”:

- Renewable Biomass includes switchgrass, willow/poplar, wood waste, anaerobic digestion (plant matter, sewage treatment plants, and pig, fowl, cow, or horse waste), algae, biofuels/ethanol (liquid)
- Landfill Gas
- Micro Turbines
- Distributed Generation

### **Support for Biomass Projects**

SEFCEPA offers grants, loans and equity or near equity investments in a range of renewable energy technologies, including biomass. Grants are typically \$25,000 or less, and are often aimed at education programs and feasibility studies. SEFCEPA will also strategically offer low-interest loans, subordinated debt, royalty financing, and equity investments averaging \$150,000 to \$200,000. Examples of funded biomass projects include:

- **Pine Hurst Acres:** A \$140,000 loan to support a hog farm bio-digester methane-to-electric generation project.

- **Zimmerman Farm:** A \$100,000 loan and a \$300,000 revolving line of credit to support a cattle farm bio-digester methane-to-electric generation project.
- **Oregon Dairy Farm:** A \$30,000 loan to support a dairy farm bio-digester methane-to-electric generation project.

## **West Penn Power Sustainable Energy Fund (WPPSEF)**

### **Eligibility**

The WPPSEF website defines bioenergy technologies:

*Bioenergy technologies use renewable biomass resources to produce an array of energy related products including electricity, liquid, solid, and gaseous fuels, heat, chemicals, and other materials.*

Biomass is further defined as:

*Any plant derived organic matter available on a renewable basis, including dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials.*

### **Support for Biomass Projects**

Biomass projects are eligible for any of WPPSEF's standard investment and grant incentive offerings, in competition with other types of renewable energy projects. WPPSEF investment and grant support is awarded on a project-by-project basis, and project developers are encouraged to propose incentive amounts and structures.

Examples of funded biomass projects include:

- **Agricultural Commodities, Inc.:** Funding to stimulate the production capability for soybean-derived bio-diesel fuel from 4,000 gallons/week to 9,000 gallons/week.
- **Light-My-Fire, LLC:** Funding for the development of a biomass furnace manufacturing operation for 100,000 Btu furnaces engineered to utilize shelled corn and recycled biomass pellets.

## **Rhode Island Renewable Energy Fund**

### **Eligibility**

According to August 1996 Restructuring Legislation:

*Renewable energy resources shall mean power generation technologies that produce electricity from wind energy, small scale (less than 100 megawatts)*

*hydropower plants that do not require the construction of new dams, solar energy, and sustainably managed biomass.*

*39-22-3. Definitions. -- (a) Renewable resources. "Renewable resources" means resources that are capable of being reproduced, replenished, or restored and shall include biomass, wood, water, solid waste, solar, and wind but shall exclude nuclear fuel sources, coal, and oil.*

Biomass used in supported projects must be sustainable, such as methane or digester gas in internal combustion engines, micro-turbines, or fuel cells. Other biomass can be considered sustainable on a case-by-case basis.

### **Support for Biomass Projects**

Through the 2002 "Purchase and Sale of Renewable Electricity to Large Electricity Customers" RFP, RIREF invited both large green power purchasers and sellers to propose incentives toward new projects. Among other technologies, biomass projects were eligible for support under this RFP.

Biomass projects were also eligible for incentives through RIREF's "2002 Renewable Generation Supply" RFP. This solicitation required applicants to propose a production incentive for a specified amount per kWh produced over a specified term and up to a total cap. The incentive was not to exceed 3¢/kWh and the term was not to exceed five years.

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