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Nevada State Office of Energy

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Status of Energy in Nevada



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Principal Author:

Richard E. Burdette, Jr.
Energy Advisor & Director
Nevada State Office of Energy
Office of the Governor

Contributors:

Nevada State Office of Energy

Dave McNeil
Pete Konesky
Jim Walker

Public Utilities Commission of Nevada

Howard Hirsch
Mark Harris

Consultants

Jeneane Harter
Howard Geller

The opinions expressed herein are those of the principal author unless otherwise specifically noted, and the contributors should not be held accountable for any errors.

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Executive Summary

Nevada statutes require the Director of the Nevada State Office of Energy (NSOE) to file each year a report to the Governor describing the Status of Energy in Nevada (see NRS 701.160). In odd-numbered years, this report must also be filed with the Nevada Legislature. This document has been prepared in compliance with this statute.

The 2003 status report identified the transformation of Nevada's energy sectors from their "at risk" condition in 2001 to their comparatively stable condition at the beginning of 2003. It acknowledged the role of Governor Guinn's Nevada Energy Protection Plan (NEPP), the recommendations of the Governor's Nevada Electric Energy Policy Committee (NEEPC), and the initial activities of the Nevada Renewable Energy and Energy Conservation Task Force (Task Force).

The 2005 status report includes an updated version of the Comprehensive Energy Plan for Nevada (CEPN) that seeks to build upon the NEPP goals, while seeking also to contribute to initiatives by Western States and by President Bush to reduce our nation's dependence on imported energy. The Director of NSOE is responsible for drafting and coordinating the implementation of the CEPN. These activities involve the input and active participation of numerous public and private entities. The network of organizations and entities that have been and are expected to continue to contribute to the development and implementation of the CEPN are identified throughout this report.

Importantly, the 2003 status report established Energy Action Plan goals that remain substantially in effect and valid as we enter calendar year 2005. These goals are shown in Table ES-1, below.

ES-1 Table Nevada State Office of Energy Action Plan Goals

- A reliable, affordable, and sustainable supply of electricity and natural gas,*
- Further diversification of Nevada's electrical supply,*
- The efficient use of energy, and*
- Further diversification and increased reliability of Nevada's transportation fuel supply.*

In the 2005 Status Report Energy Action Plan goals have been expanded to include ten Nevada Energy Actions, which, in turn, have been expanded into specific tasks and subtasks that are planned for completion during the next biennium. These actions are shown in Table ES-2, below.

ES-2 Table
Nevada State Office of Energy
Nevada Energy Actions

1. *Improve Energy Efficiency*
2. *Improve Energy Conservation*
3. *Improve Transportation Fuel Reliability*
4. *Support Development of Renewable Energy in Rural Nevada*
5. *Amend the Renewable Portfolio Standard*
6. *Improve the Financial Condition of the Electric Utilities*
7. *Enhance the Electric Transmission System*
8. *Upgrade Nevada's Energy Assurance Program*
9. *Overhaul and Refocus Federal Energy Programs in Nevada*
10. *Enhance the Organization of Energy Policy Development*

A more detailed discussion of how these action plan goals are being implemented may be found in Chapter 6 and in Appendix II to this report. Appendix II is the proposed revision to the Strategic Action Plan, planned for incorporation into this report on February 28, 2005.

The 2003 Status Report warned that regional and international events might present challenges for Nevada's energy policy. The 2003 challenges are identified in Table ES-3, below.

ES-3 Table
Nevada State Office of Energy
Nevada Energy Challenges - 2003

1. *Terrorism that brings with it potential threats to our energy infrastructure and the need for increased energy security,*
2. *Weakened electric utilities – a legacy of the 2000-2001 western energy crisis – that limits the ability to invest in new facilities and to hedge price and supply risks,*

3. *Periodic severe droughts in the Pacific Northwest, that threaten the adequacy of electricity supply,*
4. *Uncertainty about the long-term price of natural gas, that adds risk to electric generation investment decisions,*
5. *Limited availability of natural gas in eastern Nevada that undermines economic growth in that region,*
6. *World events that drive up the base price of crude oil and increase supply risk, and*
7. *Uncertainty about California fuel standards and the consequences that changes to those standards may have on Nevada transportation fuels.*

All seven of these challenges remain in the coming biennium and beyond, but it is necessary to modify number (4), "uncertainty about the long-term price of natural gas," to acknowledge that volatility may have actually been slightly reduced over the past two years, but the price of petroleum and natural gas began a steep climb during that period. The volatility, or price uncertainty, of these two commodities remains high, but the average prices of both are substantially higher. Because natural gas and petroleum products are used throughout the economy to provide home and process heating, electricity and transportation, the long-term effect will be an increase in the cost of goods and services that rely more heavily on energy for their production and delivery. Naturally, this will affect some more than others, as is pointed out in the next paragraph.

It is also necessary to add three new challenges that have developed during the past two years. These additional challenges are shown in Table ES-4, below.

ES-4 Table
Nevada State Office of Energy
Nevada Energy Challenges - 2005

8. *Natural gas and petroleum prices that have risen to the point where the cost of electricity and transportation fuels brings hardship to Nevada's farmers, ranchers and rural businesses,*
9. *Changes in financial markets have made it very difficult to obtain financing for energy projects, including renewable energy projects, when the electric utility that must buy the energy output is not creditworthy, and*
10. *The widely expected electricity capacity shortage within the next biennium will very possibly place demands on Nevada's scarce water supplies and fragile air sheds to satisfy electricity demand throughout the western states, but particularly in California.*

These challenges are, in part, balanced with several new opportunities that offer new and better solutions to our future energy needs. These opportunities are shown in Table ES-5, below.

ES-5 Table
Nevada State Office of Energy
Nevada Energy Opportunities - 2005

1. *The potential for significant quantities of low to moderately priced electricity from power plants under development and planned in the western interconnection,*
2. *The use of Nevada's ample renewable resources to further the development of bio-fuels, as well as ancillary products and services,*
3. *The development of renewable energy, desert southwest architectural innovations and standards, and hydrogen technologies in partnership with the U. S. Department of Energy and the National Renewable Energy Laboratory in Nevada "Deployment Centers,"*
4. *Improvements in the efficiency and efficacy of monies allocated for low income weatherization and assistance programs, and*
5. *For now, the continuation of relatively low interest rates that favors an even more aggressive approach to performance contracting.*

Finally, the collection of challenges and opportunities, and the lessons of experience require that energy planners keep in mind several strategic interests for the state. These interests are shown in Table ES-6, below.

ES-6 Table
Nevada State Office of Energy
Facing Nevada's Future – Emergent Strategies

- Effectively manage a return to a more traditional electric regulatory structure and allowing that structure to improve the stability of the industry,*
- Applying good management skills to optimize the benefit of federal dollars,*
- Making the most of Nevada's natural strengths,*
- Seeking regional solutions to resource adequacy problems,*
- Managing the consequences of continued growth in Las Vegas, and*
- Helping Nevadans manage the consequences of high energy prices, particularly in the rural parts of the state.*

Report Overview

Balancing energy needs with secure supplies continues to be an important issue, not only in Nevada, but in the rest of the United States as well. This 2005 Nevada Energy Status Report provides information about what has been done over the past two years, in particular, but also provides the Governor's roadmap for how Nevadans should address the issue of balance in the coming biennium and beyond. The end goals have not changed. Nevadans need to ensure ample supplies of energy, at reasonable and affordable prices, to sustain and improve their quality of life as individuals, to provide a robust commercial environment that fuels economic growth and provides jobs. This needs to be accomplished in a way that balances our strong sense of individual and cultural freedom with the use of indigenous energy resources, with our magnificent but fragile environment, and with a proper sense of responsibility to the principles of good government.

This chapter begins by providing a brief background of the national and regional context of Nevada's energy challenges and opportunities, and ends with an outline of the report and how it describes the Governor's roadmap for energy security.

National and Regional Energy Balance Sheets

Nevada exists electrically within eleven states, four Canadian provinces and northern Baja California, Mexico that together are known as the Western Interconnection. This is so because the United States, Canada and northern Mexico are divided into three separate and electrically isolated grids, the Western Interconnection, the Eastern Interconnection and, interestingly, most of Texas. These grids are virtually isolated from one another so that prices in one grid generally do not affect prices in another, nor is it practical for oversupply in one grid to serve the needs of another grid that may have insufficient generation. The Western Interconnection includes all of California, Oregon, Washington, Idaho, Nevada, Arizona, New Mexico, Utah, Wyoming, and Colorado; parts of Montana, Nebraska and Texas; the Canadian provinces of British Columbia and Alberta; and the northern region of Baja California in Mexico.

Nevada exists within a tightly integrated North American natural gas market that includes all 49 states on the continent, all of Canada and parts of Mexico. Supplies are interrelated through a system of international, interstate and intrastate pipelines, and prices are routinely "pegged" to the major collection point in Louisiana called "Henry Hub," or to one of a dozen or so regional hubs. The price of delivered natural gas is typically a commodity

price linked to a hub and a transportation price. There are a number of natural gas production areas in North America, each having its own costs and abilities to deliver gas. Importantly, natural gas demand in Nova Scotia, for example, can affect the price of natural gas in Nevada.

Nevada exists in a loosely integrated and unregulated North American market for petroleum products. The supply of crude oil, the basic feedstock for petroleum products, comes from a number of international companies and countries. Prices for crude oil are generally set by marginal providers that are often state-owned oil companies in countries that belong to the Organization of Petroleum Exporting Countries (OPEC). The U.S. market for petroleum products is generally segmented by proximity to refineries; Nevada, Arizona, and parts of Oregon are largely served by California refineries. Supplies and prices, therefore, tend to be regional in nature because petroleum products are typically delivered to larger population centers, such as Las Vegas and Reno, through pipelines from the refineries.

National Energy Agenda

The short-term national energy agenda will be driven by yet another national energy bill – perhaps a much less generous one – budget battles related to energy programs viewed as marginal, and international oil politics, with a somewhat uncomfortable expanded agenda – the need to import greater quantities of refined products and liquefied natural gas (LNG). It is likely the federal government will also continue to support short-term means to expand domestic oil production in the hope that reliance on fossil fuels can be reduced slowly over many years. It is likely that a national energy bill, if passed, will deal in some way with Federal Energy Regulatory Commission (FERC) initiatives on improving the efficiency of the electric transmission system and instituting some form of federal involvement in electric transmission planning. The Department of Energy (DOE) will probably be forced to deal with very difficult budget priorities that will help or hinder certain renewable and energy efficiency efforts .

In assessing this agenda, Nevada benefits most by federal support of Alaskan natural gas development, energy efficiency and conservation measures and continued support of renewable generation, both in the area of investment or production tax credits and in the area of regulatory reform to allow renewable generation more equitable access to the electric transmission system.

The long-term national agenda will be driven in significant measure by international issues. The most prominent will be the slow, but irreversible, decline in fossil fuels as the energy source of choice. This will become more evident in the types of investment decisions made by energy companies, investments such as in refineries. Big-ticket developments, requiring billions of dollars and decades to recover costs, will decline in the industrialized parts of the world and move to the growing economies of Asia, South America and Africa – largely because investment dollars can be recovered more quickly. The

differential effect on Nevada will probably be small. Nevada has good renewable resources and is in the process of developing them and using them in a coordinated way with fossil fuels. As fossil fuels become more and more expensive, although continued volatility is expected, Nevada is in a good position to shift its fuel sources based on economics.

Another long-term national agenda item will be world pressure on the United States and a few other industrialized countries to act on global warming. To the extent that this pressure results in a reduction in the use of coal for power generation, or at least coal without carbon offsets of some kind, the U.S. will be harmed. More particularly, Nevada will be harmed if the most obvious response to limitations on coal plants is realized – the construction of new nuclear plants.

The other long-term change that will come as a result of increasing relative cost of fossil fuel is the change in attitude toward acting providently in energy matters. It is very difficult to be thrifty with energy – regardless of what may be considered “correct” – when the price of energy is cheap. As production declines and as demand grows, energy will become relatively more expensive and Americans will treat it accordingly.

Regional Energy Agenda

The western governors have set the short-term regional agenda. By calling for 30,000 MW of “clean and diversified” energy, 20 percent improvement in energy efficiency, comprehensive evaluations of electricity and natural gas adequacy, and enhanced regional coordination in transmission planning the governors have made a clear statement of expectations for western states. Actions are already underway to implement these initiatives and meaningful results are expected within the next few years. Similarly, the governors have strongly opposed ceding such important local tools as eminent domain to federal regulators as FERC attempts to rewrite its own statutory authority.

The governors and other state and local regulators have also moved quickly to deal with two other potential problems with regional implications: continuing drought in the Colorado River basin and various threats to the west’s fragile ecological systems. The economic vitality of the west demands not only ample energy, but also ample water and access to valuable renewable resources. Good management of western energy, air, water and wildlife are essential to that economic vitality, most of all in tourism driven economies in Las Vegas, Lake Tahoe and Reno.

Organization of the Nevada Energy Status Report

The Governor and Legislature typically formulate Nevada’s energy policies jointly during legislative sessions. The Governor then is charged with implementing these policies. It is the Comprehensive Energy Plan for Nevada (CEPN) that is the vehicle for implementing those policies. The remainder of this report first describes the three major energy sectors –

electricity, natural gas, and petroleum products; it then outlines how the Governor and the Nevada State Office of Energy will carry out the roadmap provided by the CEPN during the next biennium.

Chapters 2, 3 and 4 describe the status of electricity, natural gas and petroleum products in Nevada today. Each chapter assesses the situation of the companies providing services for the respective types of energy, including production or generation, transportation to Nevada, opportunities for energy efficiency and energy conservation, and then the short-term and long-term adequacy of resources and infrastructure for our state.

The final two chapters look at the organization and responsibilities of the Nevada State Office of Energy, Chapter 5, and then at the specific actions included in the Governor's Comprehensive Energy Plan for Nevada, Chapter 6.

Electricity Assessment

Nevada's electric power systems operate almost entirely within two control areas, the Sierra Pacific Power (Sierra) control area and the Nevada Power control area. Several rural electric cooperatives, municipal utilities and general utility districts operate within or adjacent to these control areas as wholesale customers of Sierra and Nevada Power, as well as other suppliers such as Bonneville Power Administration and the Colorado River Commission of Nevada. Sierra and Nevada Power serve approximately 93% of the demand in Nevada and the collection of cooperatives and governmental entities serve the remaining 7%. The "retail access" authority granted in AB 661 and SB 211 to large customers to provide their own power has already resulted in two large customers applying to provide their own energy so the percentage of the retail demand served by the large utilities may decline somewhat in the future.

Sierra Pacific and Nevada Power are not interconnected electrically with each other. In evaluating the adequacy of electricity in Nevada it is appropriate to focus on the adequacy of supply in the two control areas separately unless or until such interconnection is accomplished.

Sierra Pacific Power Company

Sierra Pacific Power Company (Sierra or SPPC) is a wholly owned subsidiary of Sierra Pacific Resources (SPR), an investor owned corporation with operating subsidiaries engaged in the energy and utility services business. Sierra's electric division serves customers in a 50,000 square mile region of Northern Nevada and Northeastern California.

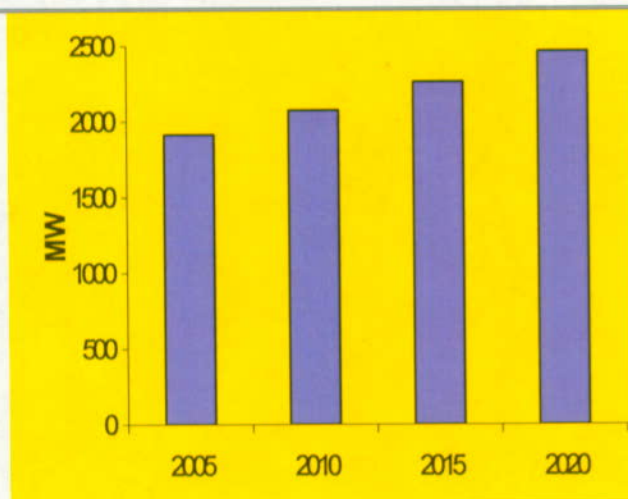
Load Forecast

Sierra forecasts its summer peak demand (including the planning reserve margin) to increase from 1,914 MW in 2005, to 2,073 MW in 2010, or 159 MW for an average annual growth of 31.8 MW and growth rate of 1.6%. Nevada system sales are projected to grow from about 8,800 GWH in 2005 to over 9,300 GWH in 2010, for an average annual growth rate of 1.3%.

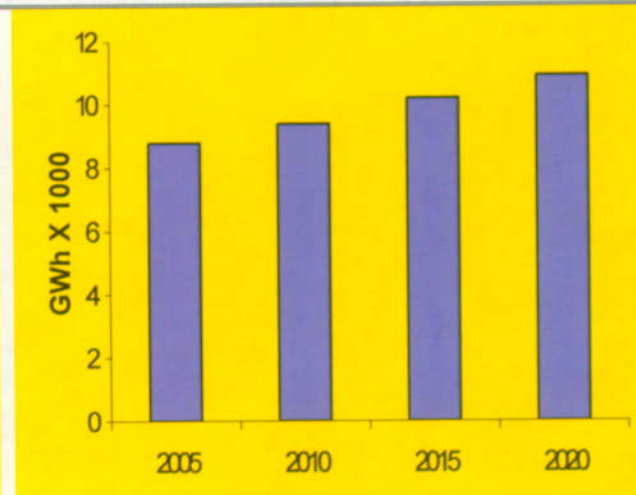
Charts 2-1 and 2-2 provide Sierra's peak demand and annual energy requirements in five-year increments 2005, 2010, 2015 and 2020. These forecasts reflect potential energy savings from conservation and demand side management (DSM) programs. Since these forecasts were prepared, Sierra has continued its "Take Control" Program to encourage

conservation and is preparing to implement a \$3 million DSM program that should reduce peak demand. A description of the Sierra DSM program is provided in Appendix II.

2-1 Chart
Sierra Pacific Power Company
Peak Demand Forecast



2-2 Chart
Sierra Pacific Power Company
Energy Consumption Forecast



The Public Utilities Commission (PUC) staff recently prepared a new forecast that provides demand and sales forecasts for the Nevada service territory of Sierra Pacific Power. The Nevada service territory of Sierra constitutes about 94% of total Sierra electricity sales and the other 6% is made up of sales to its California service territory. The PUC staff's latest peak demand forecast (including a 12% reserve margin) for Sierra estimates demand to reach 1,748 MW in 2005, 1,941 MW in 2010, and the average annual rate of growth from 2003 to 2013 is forecast to be 2.1%. If peak demand continues to grow at about 2.1% from 2010 until 2025, then the staff forecast suggests that demand will grow by an additional 714 MW to a total peak demand of 2,655 MW.

The PUC staff's system sales forecast projects growth from about 9,513 GWH in 2005 to about 10,044 GWH by 2010, with an annual average growth rate in sales from the 2003 to 2013 period of 1.1%. Staff forecasts that Residential customers will increase from 258,310 to 300,116, for an average annual growth rate of 1.5%, over the 10-year period.

The staff's model also demonstrates that consumers are sensitive to price increases and that they did adjust their consumption accordingly in 2001 and 2002. This is particularly interesting because it indicates the feasibility of reducing demand by instituting demand response programs that tie the retail price of energy to the wholesale price of energy at the time of consumption.

Generation Resources

Sierra meets its customers' needs with electricity generated in its own facilities and from electricity it purchases from others, located both within its grid and from suppliers located elsewhere.

Fossil Generation

The fossil generation resources owned by Sierra are listed in Table 2-3, below. Table 2-4 lists the fossil generation resources located within the Sierra system, but not owned by the utility, and Table 2-5 lists the renewable generation resources within the Sierra system, but again, not owned by the utility.

Sierra-owned facilities include the Valmy, Tracy, and Fort Churchill Power Plants, and generation from several smaller power plants throughout its service territory.

2-3 Table
Sierra Pacific Power Company
Fossil Generation Resources

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
Valmy Humboldt	2	Coal Steam	261 Base load	In service	Co-owner with IPC
Tracy Storey	3	Gas/oil Steam	244 Intermed.	In service	
Pinon Pine Storey	1	Gas/oil Combined Cycle	104 Base/Inter	In service	Originally designed as coal gasification
Clark Mtn Storey	2	Gas/oil Comb Turbine	132 Peaking	In service	
Ft Churchill Churchill	2	Gas/oil Steam	226 Intermed.	In service	
Various small Various sites	13	Gas/oil, Diesel Hydro	83 Peaking	In service	

2-4 Table
Sierra Pacific Power Company
In-System Resources – Privately Owned

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
Naniwa Storey	6	Gas/oil Comb Turbine	280 Peaking	In service	Naniwa Energy LLC
Western 102 Storey	14	Gas Reciprocating	118 Base load	Proposed SEP 05	Barrick Mining
Boulder Valley Eureka	2	Coal Steam	203 Base load	Proposed 2007	Newmont Mining
Granite Fox Storey	2	Coal Steam	1450 Base load	Proposed 2009	Sempra; X-mission may not connect
WP Power Sta. White Pine	2	Coal Steam	1200 Base load	Proposed 2010	LS Power X-mission needed

Sierra purchases electricity mostly from other utilities and non-utility generators. Electricity purchased from other utilities usually comes into Sierra's system from Idaho (Midpoint Substation), Utah (Gonder Substation), or California (Hilltop Substation). These imports are discussed under the Transmission System subsection below. Electricity purchased from non-utility generators may come in through these same gateways, but some are already located within the Sierra transmission system. The latter include the Naniwa Energy Facility (gas) in Storey County, as well as several fossil generating facilities under construction or completing permitting activities.

Regarding the Granite Fox project, the intent of the developer is to gain access to the Pacific DC Intertie at a point near Gerlach, NV. At this point it is not clear whether the plant will be interconnected with the Sierra system. If it is not interconnected, it will not have any direct effect on the Nevada utility. Interconnection would most likely involve the construction of a transmission line linking the Sempra plant with Sierra's 345 KV system east of the Tracy Power Station.

2-5 Table
Sierra Pacific Power Company
Renewable Generation Resources – Privately Owned

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
Original Group Various	13	Geothermal	109 **	In service	Qualifying Facility Contracts
Desert Peak 2 Churchill	1	Geothermal	22 **	Proposed	Ormat – capacity has variable limits based on resource
Desert Peak 3 Washoe	1	Geothermal	13 **	Proposed	Ormat – moved to Steamboat area & renamed Galena 2
Galena Washoe	1	Geothermal	20	Proposed	Ormat – new contract
Sulfur Springs Elko	1	Geothermal	25 **	Proposed	Earth Power Res. Pending Financing
Blue Mountain Humboldt	1	Geothermal	30	Proposed	NV Geothermal Power
Salt Wells Churchill	1	Geothermal	10	Proposed	NV Geothermal Specialists
Nevada Wind White Pine	1	Wind	50 **	Proposed	Nevada Wind Pending Financing

** Most renewable facilities, including high load factor geothermal and intermittent wind and solar are listed as “non-dipatchable” rather than as base, intermediate or peaking type generators.

Of the approximately 1,790 MW of generation capacity in northern Nevada, Sierra owns or has under contract 1,159 MW to serve its native load. Idaho Power is a joint partner in the Valmy facility, owning 50% or 261 MW. As a result, Sierra has access to an additional 261 MW when Idaho customers do not need its share of Valmy. Sierra supplements the 1,159 MW with internal renewable generation discussed below under long-term contracts.

Renewable Generation

Currently, Sierra does not own any renewable generation. It has chosen to serve its load and meet its Renewable Portfolio Standard (RPS) statutory requirement by entering into long-term contracts with renewable developers. There are currently 14 geothermal generating facilities in northern Nevada; 13 of these, amounting to 109

MW are under contract to Sierra, the other two, amounting to 90 MW, are not. Some 60 MW of this geothermal power is under contract to Southern California Edison (SCE); the remaining 30 MW is available for purchase when not needed by SCE.

In 2003 Sierra and Nevada Power together entered into seven long-term renewable energy contracts. These contracts included two facilities with Ormat, one facility with Earth Power Resources, one facility with Advanced Thermal Systems, one facility with Cielo Wind, one facility with Ely Wind – renamed Nevada Wind, and one facility with Solargenix. Of these facilities, only the Solargenix plant and the renewable energy credits Sierra expected to receive, was needed to meet Sierra's RPS obligation through 2006. The 13 existing geothermal contracts were allowed to be counted toward the non-solar portion of the standard.

It was learned later in the year that Nevada Wind and Solargenix were having significant difficulty financing their facilities because their financial advisors warned that the poor financial condition of Sierra Pacific Resources, including both Sierra and Nevada Power, would devalue the power purchase agreement between the companies and the utilities in the eyes of potential lenders.

For this and a number of other reasons, only two of the seven original renewable facilities are under construction. A third renewable facility based on a new long-term contract signed in the late 2004 is also under construction. Ormat is building all three of these facilities and all three are geothermal generators. The three plants are Desert Peak No. 2 (nominally, 22 MW, in Churchill County), Galena No. 2 (13 MW, in Washoe County, originally Desert Peak 3 in Churchill County), and a new facility, Galena (20 MW, in Washoe County).

Of the remaining five contracts, two have been formally terminated, the Advanced Thermal System geothermal plant and the Cielo Wind plant. Two contractors, Solargenix and Nevada Wind, expect to complete permits, obtain financing, and begin construction within calendar year 2005. A proposed contract modification for the Earth Power Resources project is currently before the PUC.

The team of individuals completing renewable contract negotiations for both Sierra and Nevada Power continue to work with potential contractors, many of whom submitted bids under the utility companies' renewable request for proposal in the summer of 2003. Unsolicited contracts are also being considered.

The balance of Sierra's electrical needs (the difference between 1,914 MW of demand and the 1,260 MW of owned and contracted power) is met through a combination of long-term, short-term, and uncommitted purchases, as outlined above. Sierra, as the control area operator, is charged with making real-time decisions about how much of its own generation should run, how much electricity should be purchased from generators internal to

2-6 Table
Sierra Pacific Power Company
Loads & Resources Table

	Rating	2005	2010	2015	2020
Forecasted System Peak		1715	1869	2049	2232
Reserve Margin		199	204	212	222
Required Resources		1914	2073	2261	2454
	(MW)				
Owned Resources (Table 2-3)	1050	1050	1050	1050	1050
Valmy	261				
Tracy	244				
Pinon Pine	104				
Clark Mountain	132				
Fort Churchill	226				
Various Small Generators	83				
Internal Resources (Table 2-4)	note 1	306	306	306	306
Naniwa	280				
Western 102	118				
Boulder Valley	203				
Granite Fox	1450				
White Pine County	1200				
Renewable Resources (Table 2-5)	note 1	135	241	288	298
Original Geothermal Units	109				
Desert Peak 2	22				
Desert Peak 3 (Galena 2)	13				
Galena	20				
Sulfur Springs	25				
Blue Mountain	30				
Salt Wells	10				
Nevada Wind	50				
New Units - Unspecified	Variable				
External Contracts		75	0	0	0
Planned Purchases		348	476	483	477
Total Purchases		864	1023	1077	1081
Available Resources		1914	2073	2127	2131
Transmission Capacity	1000	1000	1000	1000	1000
Transmission Commitments		241	247	262	258
Net Import Capability (Native Load)		759	753	738	742

Note 1: Sierra contracts include partial capacity in some of the facilities listed; the addition of new units is also anticipated over the 15 years covered by the table.

the system and how much should be imported. Imports are discussed below. A copy of Sierra's Loads and Resources Table from its Resource Plan filing with the PUC is included in Table 2-6.

Transmission System

Table 2-7 refers to transmission capacity, commitments and availability. The transmission "capacity" refers to the total amount of electricity import capacity that Sierra's control area can rely on at all times (i.e., that can deliver firm imported power). The "commitments" of Sierra import capability refers to transmission capacity that is under long-term contract to wholesale energy customers, such as the municipal and cooperative utilities. The "available" import capacity is the amount of import capability reserved for Sierra's native load customers. Thus from a reliability perspective, the available capacity is a very important number and it represents the maximum amount of out-of-state purchases that Sierra can import into its system to serve its native load requirements.

The Sierra transmission system is composed of four major interties that connect it to neighboring utilities (see system map on the following page). These interconnections allow for transfer of energy among the west coast utilities. The specifics of each of its interties are listed below:

2-7 Table
Sierra Pacific Power Company
Transmission Interties & Design Capacities

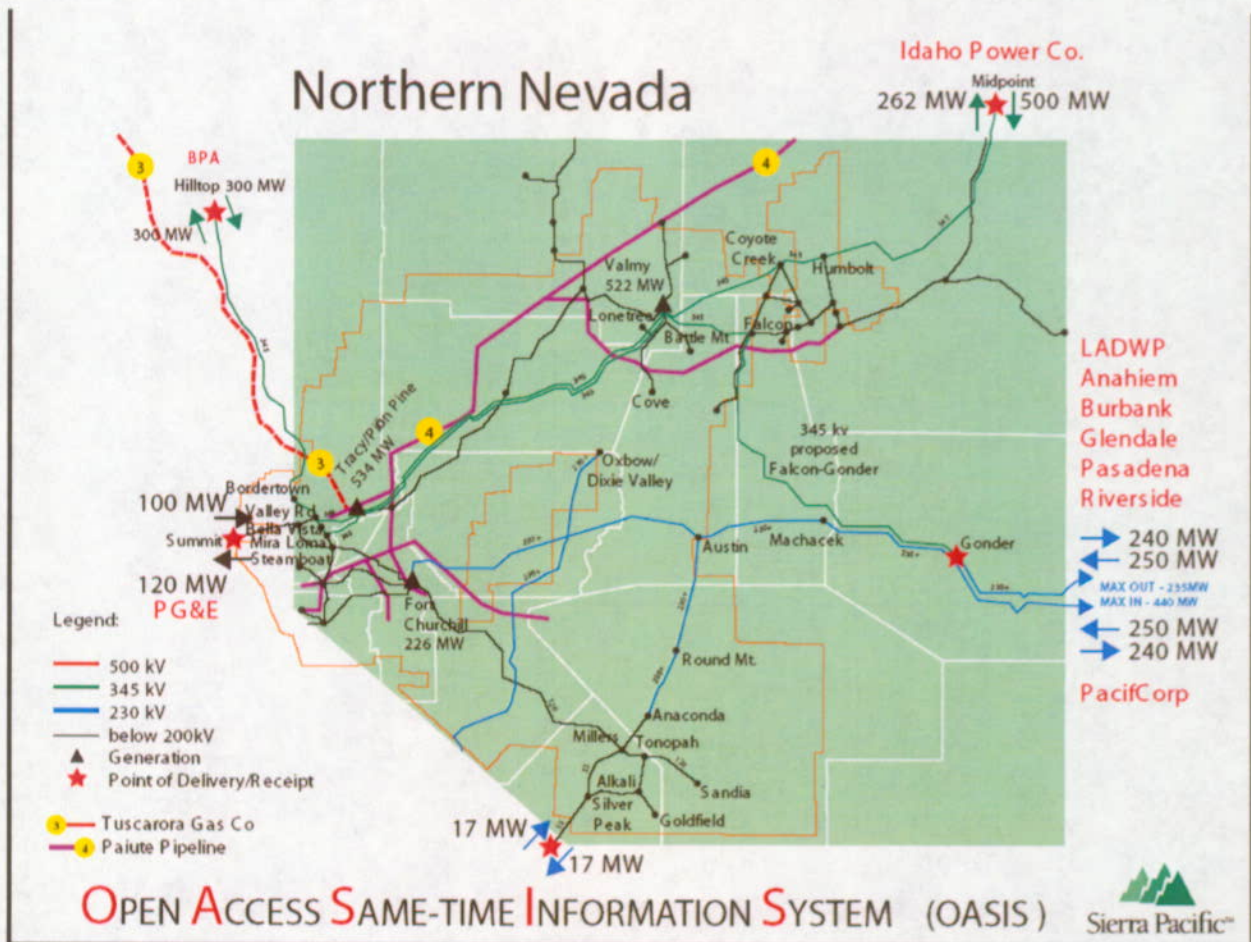
Intertie	Control Area	Rating (kV)	Cap in/out (MW)	Notes
Humboldt Line	Idaho Power	345	500/262	
Summit Line	CAISO PG&E	120 & 60	100/120	
Alturas Line	COB/ BPA System	230	300/300	BPA has 110 MW cap into SPP System
Utah Intertie	Gonder to PacifiCorp/Pavant and to LADWP et.al. /Intermountain PP	230	370/235	

Sierra to Idaho (the Humboldt line) – The Valmy to Midpoint 345 kV line connects the Sierra system to Idaho Power Company. This is Sierra's largest intertie with a capability of transferring 500 MW from Idaho to Sierra and 262 MW from Sierra to

Idaho. Sierra and Idaho Power jointly own the line. Sierra owns the transmission capacity from Idaho to Sierra. Idaho Power owns the transmission capacity from Sierra to Idaho, expressly to move their ½ ownership of the Valmy power plant to Idaho.

Sierra to Alturas (the Alturas line) – The North Valley Road to Hilltop 345 kV line connects Sierra to the energy-trading hub at the California – Oregon Border (COB) via a Bonneville Power Administration (BPA) 230 kV line from Alturas to COB. The Alturas Intertie is capable of transferring 300 MW from COB to Sierra or from Sierra to COB. The intertie is wholly owned by Sierra. BPA has rights to 110 MW of the capacity from COB to Sierra to serve their contracts with Wells Rural Electric.

2-8 Figure
Sierra Pacific Power Company
Sierra Pacific Power Company Transmission System



Sierra to Utah (the Utah Intertie) – The Utah Intertie is composed of two 230 kV lines. One extends from the Gonder Substation (located near Ely, Nevada) to

PacifiCorp's Pavant Substation. The other extends from Gonder to the Intermountain Power Project Substation (owned by the Los Angeles Department of Water and Power and others). These lines, in combination, are capable of transferring 240 MW east to west and 80 MW west to east.

Sierra to California (the Summit line) – The Summit Intertie is composed of two 120 kV lines and one 60 kV line extending from Sierra over Donner Summit to the Pacific Gas and Electric (PG&E) system operated by the California Independent System Operator (ISO). These lines are capable of transferring ~100 MW to and from California.

The Sierra transmission system is shown in Figure 2-8. It consists of the four major interties described above and two long lines, a 345 KV line extending from the Idaho border in northeastern Nevada to the Reno area in the west, and a 230 KV line extending from the Utah border in the east and the Tracy Power Station just east of Reno in the west. These two lines were interconnected in 2004 with a 345 KV line from the Gonder Substation near Ely, NV on the 230 KV line to the Falcon Substation near Carlin, NV on the 345 KV line. The Falcon-Gonder line brought additional import capacity to the system, as well as increased reliability to industrial customers served from the 345 KV line.

Energy Efficiency/Conservation Opportunities

In completing an integrated resource plan, Nevada utilities are required to treat energy efficiency and energy conservation as if they were potential generation resources. This is a reasonable approach because it treats avoided consumption as if it had been actual consumption supplied by an internal generator. Also, there are generally two types of consumption to be avoided: energy consumption and peak capacity consumption. The two are broken out and treated differently because the costs associated with energy and capacity are different and they are billed differently to larger customers.

The Sierra Pacific system has a relatively high load factor, meaning that the difference between peak energy demanded (peak capacity) and the least energy demanded is fairly small. The Sierra Pacific system has a load factor of about 65 percent, meaning that the minimum energy demanded is roughly two thirds of the peak energy demanded. This is important because it follows, then, that it will be relatively difficult to reduce the peak capacity. Accordingly, Sierra's energy efficiency and conservation programs are aimed at reducing energy consumption overall and not necessarily during peak times.

In the future this relationship between peak demand and minimum demand is expected to change because two of the mining companies, Barrick and Newmont, have either begun construction (Barrick) or expect soon to begin construction of new power plants. This is relevant because the mines are generally Sierra's highest load factor customers and when they supply their own power, the load factor for the remainder of the system will decrease. This will have the effect of improving the payoff for efforts to reduce peak demand in the future.

Total System Capacity

Total system capacity for imports into the Sierra transmission system and control area is not simply the sum of the individual capacities on the four lines identified above. Transmission systems need to be operated in such a way that they are able to function assuming the worst single malfunction on the system. A malfunction, such as a break in the Humboldt Line between Midpoint in Idaho and the Valmy Power Station, causes electric "fault" currents to flow in many different parts of Sierra's and adjacent systems. During normal operations, the transmission system must be operated in such a way that the fault currents resulting from the single worst event would not cause damage in the integrated transmission systems.

As a practical matter, Sierra maintains a series of nomographs that visually display the load limits for control area operators. When the system is balanced for maximum imports, it is possible to bring in 1,000 MW of power or more. If the system is not properly balanced; for example, if a relatively large amount of power is brought in on the Summit Line, the total system capacity can be less than half of the maximum import power. Where the imports come from and how the transmission system is loaded are key determinants of available system capacity. The outside temperature also affects total system capacity; higher temperatures reduce the amount of power that can be transported.

Imports

The Sierra transmission system is capable of 1,000 MW of (simultaneous) import. As noted above, this number is governed by the ability of the system to survive the loss of its single largest element.

Exports

In addition to the limitations each interconnecting line has, there is a total system limit of approximately 500 MW of exports from Sierra's control area. Additionally, because of the load pocket (see the next subsection, below), there are resource-limited times when exports are not possible due to the need for those resources within the control area. Currently, Sierra does not export a great deal of power to wholesale customers outside their own control area.

In the future, however, it may be desirable to change this condition. Two events could have this effect. The first is the interconnection of the two Nevada control areas, Sierra's and Nevada Power's. It is likely that such an interconnection would allow the two utilities to supply power to each other and minimum limitations on exports might become important. Also, it is likely that renewable development on Sierra's system, particularly wind and geothermal generators, would make exporting more attractive.

Special System Constraints

Sierra Pacific's control area covers the majority of the populated areas of Northern Nevada (approximately 50,000 square miles). The control area peak load is approximately 1,800 MW. Sierra's transmission system is capable of importing approximately 1,000 MW (180 MW of this import capacity is allocated to Bonneville Power Administration, Mt Wheeler, Truckee Donner Public Utility District, and the City of Fallon) of supply from other neighboring utilities across our four major interties. This amounts to approximately 40 % of our peak load and reserve requirement. The balance (~60%) of the supply must be generated inside of the control area.

This condition, where a geographical portion of a utility's control area must have internal generation resources available to ensure reliable service due to transmission import limitations, is called a "load pocket." The Sierra load pocket is quite large to begin with, but because of the potentially wide variations in import capacity, it can become even larger depending on how the system is loaded.

Planned Additions and Retirements

Generation

Sierra Pacific has proposed no new generation during in its three-year action plan. It is studying the material condition of its existing plants and non-utility entities are proposing about 315 MW of new fossil generation and more than 100 MW of renewable generation.

Long-term planning indicates the need for additional base load generation, spurring a study on the feasibility of adding capacity at Valmy Power Station. Additional base load and intermediate load requirements are also behind a proposal to add a combined cycle gas plant, or repowering facilities, at the Tracy Power Station.

Transmission & Distribution

Sierra Pacific has proposed to significantly upgrade its transmission facilities serving southwest Reno and the Virginia City regions. Demand for new and upgraded distribution facilities is among the highest in the west; last year Sierra added more than 11,000 new meters (a common measure of distribution growth).

Resource Adequacy

Near-Term

It appears that Sierra has sufficient resources to meet its peak load in 2003. This being said, Sierra could have inadequate resources if: (1) regional energy supply dips below acceptable regional reserve margins owing to an external event such as a low hydro year in the northwest; and (2) Sierra's contracting strategy does not protect

its supply against such a possibility. That is, if there is a low hydro year in the northwest and Sierra does not have firm contracts to ensure delivery under these circumstances then an inadequacy may occur. Similarly, out through the summer of 2006 there should be sufficient resources unless unforeseen events arise that reduce the supply in the regional market and Sierra does not contract to protect its customers against such shortages.

Long-Term

The completion of the Falcon Gonder project, the construction of the renewable energy facilities needed to comply with the RPS, and the possibility of other projects in northern Nevada should ensure an adequate electricity supply. Projects being considered by some large industrial customers are among these possible future facilities. Also, some commercial and industrial customers are considering combined heat and power (CHP – also called “co-generation”) facilities that would be in the range of 10 to 15 MW. These projects enhance reliability in three ways: they bring new supply resources to northern Nevada, they increase the geographical diversity of power generation, and they would reduce Sierra’s total load and, thereby, reduce its need to build new generation.

Interstate transmission projects and transmission projects that could interconnect northern and southern Nevada could also improve reliability in Nevada. The Western Governors Association and the Federal Energy Regulatory Commission are both working to encourage new interstate transmission capability in the western states. In particular, there are transmission bottlenecks outside of the Sierra system that at times limit the use of its system. The major bottlenecks and opportunities include:

- Congestion along the Humboldt Line from Midpoint to SPP. The opening of the Falcon-Gonder line has been helpful, in terms of reliability, but available capacity still limits the amount of power than would otherwise be transferred on this line.
- Idaho Power Company’s system has several constrained paths that can affect Sierra’s use of the Idaho Intertie at Midpoint. Path “C” between Utah and Idaho, the Idaho – NW path, and the West of Bridger Path, are all limited certain times of the year and can limit transactions on Sierra’s system. These limitations are being addressed, in part, by regional efforts to address transmission congestion. The Rocky Mountain Area Transmission Study (RMATS) group has studied these Idaho limitations and proposals have been offered to help relieve the existing bottlenecks.
- Congestion between the Pacific Northwest and the California Oregon Border (COB).
- The electric system in Southern Oregon is limited in its deliveries to COB when generation on the lower Columbia River is low. This can affect the availability of resources that would otherwise be available for use on Sierra’s Alturas Intertie.

- The State of California has determined that it will require significant amounts of base load generation by the end of this decade or shortly thereafter. Because it is unlikely that base load generators will be constructed in the state, major transmission upgrades are envisioned. Some of the proposed projects will affect Nevada.
- The Province of Alberta is in the process of accelerating its recovery of crude oil from tar sands. Plans include the building of CHP units that provide the heat for oil recovery, but produce large amounts of "waste" electricity. Providing markets for this power will trigger major transmission line development. Some of the proposed projects will affect Nevada.

Specific projects addressing these constraints will involve working with utilities in other states. This topic is addressed further in chapters 5 and 6.

Two transmission projects are included in Sierra's resource plan; these projects were included in the "Planned Additions and Retirements" subsection, above. Among the other intrastate projects that are currently being discussed by Sierra is a north-south Intertie from Robinson Summit near the Gonder Substation to the Crystal or Harry Allen Substation near Las Vegas. The completion of this or a similar link between the two systems is quite important. Not only does such a line provide needed operational flexibility for the utilities, but it also provides a way to get renewable generation, largely located in the northern part of the state, to the largest market in the southern part of the state. Lastly, it is likely that a north-south intertie will be very valuable if Nevada is to capitalize on major interstate transmission upgrades mentioned in the preceding paragraph. In evaluating these transmission projects it will be important to weigh the benefit to Nevada ratepayers relative to the increased transmission costs that could fall upon Nevadans.

Therefore, at the present there is no reason to believe supply side and transmission resources will be inadequate in northern Nevada; indeed, it appears that northern Nevada will have several opportunities to improve its access to relatively inexpensive imports. Demand side resources, however, are also quite important. The issue is not reliability, but rather, economics. The very significant increases in natural gas prices and, therefore, electricity prices, will reduce the state's overall financial capacity, leading to an important reduction in the state's economic vitality. Failure to approach demand side efforts aggressively would be an error. Sierra has proposed and the PUC has accepted a 60 percent increase in DSM expenditures.

The adequacy of Sierra's resource plan depends in significant part on the utility's ability to implement its action plan. The financial condition of Sierra and other utilities in the west has reduced access to capital markets and made energy procurement a riskier process. In response to this new reality, the utilities implemented new risk management policies. Further, non-utility, customer CHP, and renewable generator developments have relieved some financial pressure on the utilities to enter capital markets, though the developers themselves have run into difficulty. Importantly, this also has a negative impact on the utilities' balance sheets. To the extent that the utility has a long-term contract to purchase the output from these new developments,

it must show the committed revenue streams as debt, which further reduces the already low equity fraction.

This brings us back to the central place held by the resource planning process in Nevada. The question of how best to meet the resource needs of northern Nevada is an open question, and the proper venue for addressing and resolving that question is in resource planning proceedings before the PUC. The combination of fossil generation, renewable energy generation, distributed generation (including CHP), intrastate transmission, interstate transmission, conservation and demand side resources that best meet the public interest of Nevadans is technically complex and the PUC is staffed with the technical experts required to fairly adjudicate these issues. This topic is discussed more in Chapter 6.

Nevada Power Company

Nevada Power Company (NPC) is a wholly owned subsidiary of Sierra Pacific Resources (SPR), an investor owned corporation with operating subsidiaries engaged in energy and utility services business. NPC's electric division serves a population of approximately 1.5 million people in portions of Clark and Nye Counties in southern Nevada. NPC's service territory continues to be one of the fastest growing areas in the nation. Energy usage ranks among the highest in the nation due primarily to the area's dependence on cooling during hot summer months. NPC meets less than half of its customer energy needs through self-owned resources and the remainder through purchases from non-utility or out-of-state resources. The enormous growth in population and the commensurate growth in the number of electricity customers in Nevada Power's service territory have fueled substantial growth in demand over the last decade and the growth is expected to continue, though perhaps at a slower rate in the coming decade.

Load Forecast

Nevada Power's forecast for summer peak demand (including a 12 percent reserve margin and assuming normal temperatures) is anticipated to increase from 5,806 MW in 2005, to 7,511 MW in 2020, or 1,605 MW for an average annual growth rate of 1.8%. System sales are projected to grow from slightly over 19,200 GWH in 2005 to over 25,300 GWH in 2020, for an average annual growth rate of 1.9%.

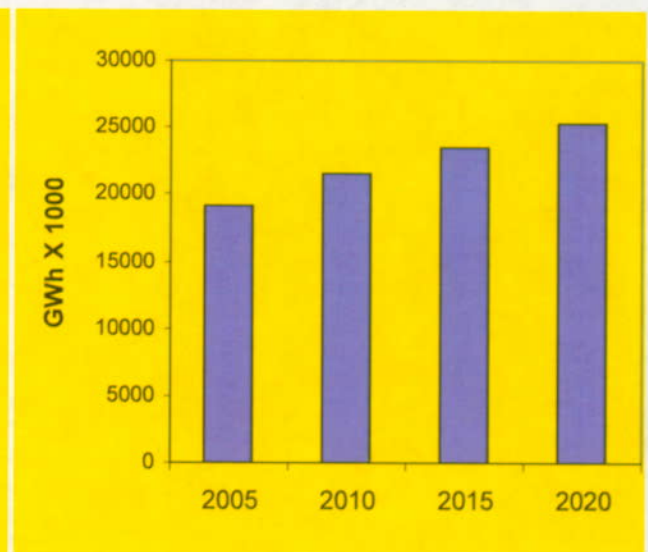
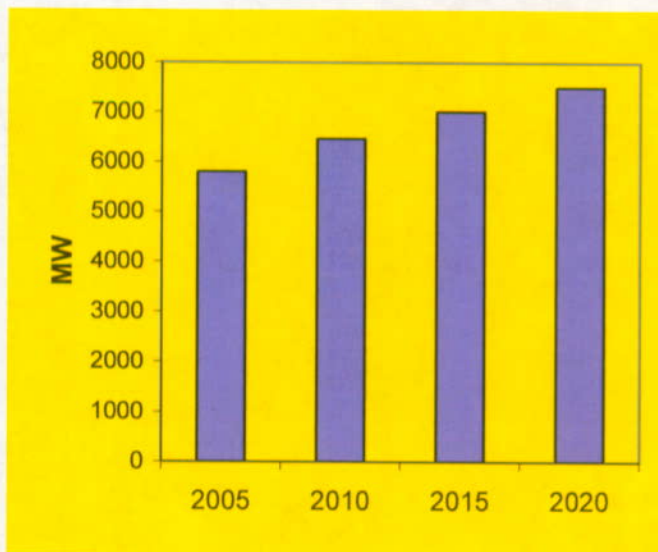
Charts 2-9 and 2-10 provide the NPC peak demand and annual energy requirements in five-year increments 2005, 2010, 2015 and 2020. Like Sierra Pacific, Nevada Power recently had a demand side management program approved by the PUCN (see Appendix III). The effects of the Take Control program, energy conservation programs supported by NSOE and others, and the \$12 million in DSM programs are not reflected in the load or sales forecasts.

The PUC staff filed a new forecast in December 2004 that provides demand and sales forecasts for Nevada Power. The PUC staff's latest peak demand forecast (including a 12% reserve margin and normal temperatures) for NPC estimates demand to reach 5,371 MW in 2005, 6,304 MW in 2010, and 6,813 MW in 2013. The average annual rate of growth from 2003 to 2013 is forecast to be 3.6%. If peak demand continues to grow at this rate from 2010 until 2025 then the staff forecast suggest that demand will grow by more than 4,300 MW to a total peak demand of 10,637 MW. It should be noted, however, the NPC forecast showed relatively high growth rates during the first five years and then fell down to less than 2% by 2020. A decreasing growth rate in the later years would also lower staff's forecasted demand in 2025.

The PUC staff's system sales forecast projects growth from about 20,513 GWH in 2005 to about 23,190 GWH by 2010, with an annual average growth rate in sales from the 2003 to 2013 period of 2.6%. This forecast is based on normal temperatures.

2-9 Chart
Nevada Power Company
Peak Demand Forecast

2-10 Chart
Nevada Power Company
Energy Consumption Forecast



Interestingly, the PUC staff's forecast noted a leveling off of demand in the 2000-2001 time frame and attributed the decline in growth rate principally to two factors: the decline in population growth, and the increase in energy prices. The staff model demonstrates that consumers are sensitive to price increases and that they do adjust their consumption. This indicates the feasibility of reducing demand by instituting demand response programs that tie the retail price of energy to the wholesale price of energy at the time of consumption. Furthermore, the fact that the peak load is growing at 3.6% while the energy sales are only growing at 2.6% means that the peak will become increasingly sharp in the absence of programs to shave the peak. Demand response programs that can

counteract the growing peak load by conveying market signals during high wholesale cost hours would be highly desirable.

Generation Resources

Fossil Generation

The fossil generation resources owned by NPC are listed in Table 2-11 on the next page. Table 2-12 lists the fossil generation resources located within the Sierra system but not owned by the utility, and Table 2-13 lists the renewable generation resources within the Sierra system but, again, not owned by the utility.

2-11 Table
Nevada Power Company
Fossil Generation Resources

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
Mohave Clark	2	Coal Steam	196 Base load	In service	SCE Co-owner Emission problem
Navajo Arizona	3	Coal Steam	255 Base load	In service	SRP Co-owner and operator
Reid Gardner Clark	4	Coal Steam	580 Base/Peak	In service	
Clark Clark	10	Gas Steam Combined Cycle	688 B/I/P	In service	
Sunrise Clark	2	Gas Comb. Turbine	149 Peaking	In-service	Lease – tolling
Sunpeak Clark	1	Gas Comb. Turbine	222 Peaking	In service	Lease – tolling
Harry Allen Clark	1	Gas Comb. Turbine	72 Peaking	In service	
Chuck Lenzie Clark	2	Gas Combined Cycle	1200 Base/Inter.	Proposed 2006	Former Duke Plant
Harry Allen 4 Clark	1	Gas Comb. Turbine	80 Peaking	Proposed 2006	
Harry Allen Clark	1	Gas Combined Cycle	520 Base/Inter.	Proposed 2007	

NPC-owned facilities include the Mojave, Navajo, Reid Gardner Power Plant, Clark, Sunrise, Sun Peak and Harry Allen Power Plants. All of these plants are in Clark County with the exception of Navajo Generation Station, which is located in north central Arizona. NPC also receives an allocation of power from Hoover Dam, through the Colorado River Commission, which is a Nevada state agency. Finally, NPC purchases the remainder of its power needs with a mixture of long-term contracts and short-term purchases in the wholesale market. In all, a little more than 3,000 MW of power in southern Nevada are committed to NPC.

NPC purchases electricity mostly from other utilities and non-utility generators. Electricity purchased from other utilities usually comes into NPC's system at Harry Allen Substation from Utah (Red Butte Substation), at Crystal Substation from Arizona (normal entry pathway for power from Navajo Generating Station), or at the complex of NPC substations south of Las Vegas generally referred to as "Mead" from California and Arizona (various substations). These imports are discussed under the Transmission System subsection below.

Electricity purchased from non-utility generators may come in through these same gateways, but some are already located within the NPC transmission system. The latter include Reliant's Eldorado Plant, Black Hills' Las Vegas Cogen II, the Reliant Big Horn Plant, Mirant's Apex Station, and Pinnacle West Energy's and Southern Nevada Water Authority's Silver Hawk Plant, all located in Clark County. There are also several fossil generating facilities under construction or conducting permitting activities. These potential sources include NPC's Chuck Lenzie, Harry Allen 4, and the Harry Allen expansion power plants, as well as non-utility generators planned at Diamond Power's Ivanpah, Vidler Water's Toquop, and Semptra's Copper Mountain Power Stations.

The Mohave Generation Station and the Navajo Generation Station were built by NPC in cooperation with other entities, with NPC's portion constituting 451 MW, or 17%. NPC's Hoover Dam allocation is 235 MW or 9%, although all 235 MW are not always available. In addition, NPC maintains long-term cogeneration qualifying facilities contracts totaling 305 MW, or 11%. NPC's remaining electrical needs are met through a combination of long-term, short-term, and uncommitted, out-of-state and merchant power purchases.

**2-12 Table
Nevada Power Company
In-System Resources – Privately Owned**

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
CHP Facilities Clark	4	Gas Cogeneration	305 **	In service	Qualifying Facilities
Hoover Dam Clark		Hydro	235 **	In service	Contract with CRC
Eldorado Clark	1	Gas Combined Cycle	400 Intermed.	In service	Reliant
LV Cogen 2 Clark	1	Gas Cogeneration	230 Base load	In service	Black Hills Under contract
Big Horn Clark	1	Gas Combined Cycle	500 Base/Inter.	In service	Reliant Under contract
Apex Clark	1	Gas Combined Cycle	500 Base/Inter.	In service	Mirant Under contract
Silver Hawk Clark	1	Gas Combined-Cycle	500 Base/Inter.	In service	Pinnacle West & SNWA
Ivanpah EC Clark/Nye	1	Gas Combined Cycle	500 Base/Inter.	Proposed	Diamond Power
Toquop EC Clark	2	Gas Combined Cycle	1100 Base/Inter.	Proposed	Vidler Water
Copper Mtn Clark	1	Gas Combined Cycle	480 Base/Inter.	Proposed	Sempra/Reliant

** Qualifying facilities are typically listed as "non-dipatchable" rather than as base, intermediate or peaking type generators; also, power from Hoover is allocated to CRC, and then passed to NPC. Importantly, the capacity is not always available and must be scheduled, based on the operating limitations of the dam.

The amount of transmission required to meet load depends on the amount of in-state merchant generation contracted to the utility. The chart shows the minimum amount of transmission needed (in that it assumes all in-state merchant generation is contracted to NPC) and the maximum amount of transmission needed (assumes no in-state merchant purchases).

The amended NPC resource plan calls for the company to complete the 1200 MW Lenzie Plant in 2006, build a new 520 MW combined cycle gas-fired plant in 2007

and a coal-fired plant in 2011. As a result, the fraction of load supplied by NPC generation is projected to move up sharply from less than 45% today, to well in excess of 55% in 2013.

Renewable Generation

Currently, NPC does not own any renewable generation. It has chosen to serve its load and meet its Renewable Portfolio Standard (RPS) statutory requirement by entering into long-term contracts either directly with renewable developers, or with Sierra Pacific to obtain renewable energy credits. Currently, the only operating renewable facilities are solar photovoltaic (PV) installations. NPC is moving strongly to increase the number of installations. It has concluded contracts with Your Vitamins, Inc. and with PowerLight Corporation to obtain renewable energy credits (RECs) from their respective commercial installations, and a large number of residential, commercial and public sector PV installations, together amounting to nearly 1 MW.

NPC also has a contract with Solargenix Energy, which calls for the delivery of energy from a 50 MW concentrating solar facility to be built in the Eldorado Valley. Construction is expected to begin in early 2005. While the unit is listed in Table 2-13 as non-dispatchable, part of the original Solargenix proposal would include storage and some level of dispatchability during peak days.

2-13 Table
Nevada Power Company
Renewable Generation Resources – Privately Owned

Plant Name County	# of Units	Type	SPPC Cap (MW)	Operating Status	Notes
Boulder City Clark	1	Solar Concentrating	50 Non-disp	Proposed 2006	Solargenix Under Contract
Roof-top Clark	1	Solar Photovoltaic	Non-disp	In service	Vitamins, Inc. REC Contract
Roof-top Clark	1	Solar Photovoltaic	Non-disp	Proposed	PowerLight REC Contract
Var. Roof-top Clark	>200	Solar Photovoltaic	~ 1 Non-disp	Proposed	AB 431 & 429

The balance of NPC's electrical needs (the difference between 5,806 MW of demand and the 3,541 MW of owned and contracted power) is met through a combination of long-term, short-term, and uncommitted purchases, as outlined above.

2-14 Table
Nevada Power Company
Loads & Resources Table

	Rating	2005	2010	2015	2020
Forecasted System Peak		5184	5773	6256	6706
Reserve Margin		622	693	751	805
Required Resources		5806	6466	7007	7511
	MW				
Owned Resources (Table 2-11)	2162	2176	3071	4542	5520
Mohave	196				
Navajo	255				
Reid Gardner	580				
Clark	688				
Sunrise	149				
Sunpeak	222				
Harry Allen 1	72				
Harry Allen 4	50				
Harry Allen - Expanded	520				
Chuck Lenzie	1200				
Other New Generation	0				
DSM Programs	9				
Internal Resources (Table 2-12)	Note 1	865	540	540	540
Qualifying Facilities	305				
Hoover	235				
Eldorado	400				
LV Cogen II	230				
Big Horn	500				
Apex	500				
Silver Hawk	500				
Ivanpah	500				
Toquop	1100				
Copper Mountain	480				
Renewable Resources (Table 2-13)		Intermittent Resources not included			
Boulder City	50				
Solar Roof Installations	1				
External Contracts		500	0	0	0
Planned Purchases		2265	2855	1925	1451
Total Purchases		3630	3395	2465	1991
Available Resources		5806	6466	7007	7511
Transmission Capacity		3794	4124	4124	4124
Transmission Commitments		0	0	0	0
Net Import Capability (Native Load)		3794	4124	4124	4124
Required Imports		0	0	0	0

Note 1: NPC contracts include partial capacity in some of the facilities listed; the addition of new units is also anticipated over the 15 years covered by the table.

NPC, as the control area operator, is charged with making real-time decisions about how much of its own generation should run, how much electricity should be purchased from generators internal to the system and how much should be imported. Imports are discussed below. A copy of NPC's Loads and Resources Table from its Resource Plan filing with the PUC is included in Table 2-14.

Transmission System

The NPC transmission system is composed of three major interties that connect it to neighboring utilities. These interconnections generally allow for transfer of energy among many utilities in the western interconnection. The specifics of each of our interties are listed below:

2-15 Table
Nevada Power Company
Transmission Interties & Design Capacities

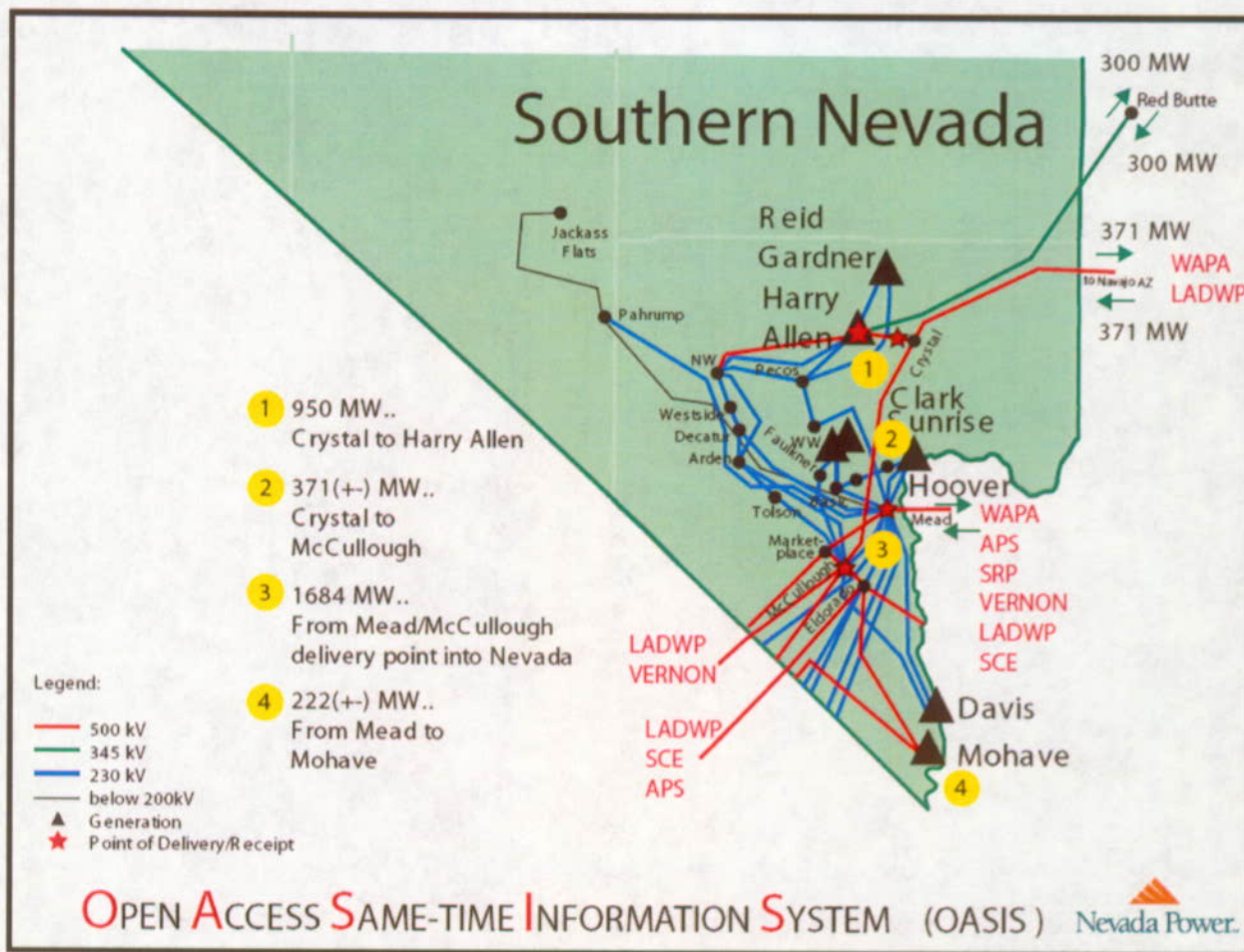
Intertie	Control Area	Rating (kV)	Cap in/out (MW)	Notes
NPC to Eldorado Valley	Mead/ McCollough Eldorado/Mkt Place	230	2400/1800	
NPC to Navajo	Crystal to Navajo	500 & 230	950/950	
NPC to Utah	Harry Allen to PacifiCorp	345	300/300	

NPC to Eldorado Valley – this interconnection is composed of ten 230 kV lines extending from the Las Vegas Valley to the following series of substations all located in the Eldorado Valley: Mead, McCullough, Eldorado, and Marketplace. These lines are capable of 2400 MW of import to and 1800 MW of export from the NPC system. NPC's shares of Mohave and Hoover use these lines. This Intertie is by far the largest in the NPC system.

NPC to Navajo, McCullough (via the Crystal Tap) – The Crystal Tap allows for the transfer of 950 MW from the Navajo 500 kV system into or out of the NPC system. The Crystal Tap is composed of a pair of 500/230 kV step down transformers and a pair of 230 kV phase regulating transformers.

NPC to Utah – The Red Butte to Harry Allen line is a 345 kV line running from the Las Vegas Valley to PacifiCorp's southern Utah system. This line is rated for 300 MW of transfer in both directions.

2-1 Figure
Nevada Power Company
Transmission System



Energy Efficiency/Conservation Opportunities

In completing an integrated resource plan, Nevada utilities are required to treat energy efficiency and energy conservation as if they were potential generation resources. This is a reasonable approach because it treats avoided consumption as if it had been actual consumption supplied by an internal generator. Also, there are generally two types of consumption to be avoided: energy consumption and peak capacity consumption. The two are broken out and treated differently because the costs associated with energy and capacity are different and they are billed differently to larger customers.

The Nevada Power system has a low load factor, one of the lowest in the nation, meaning that the difference between peak energy demanded (peak capacity) and the least energy demanded is quite large. The NPC system has a load factor of less than 45 percent, meaning that the minimum energy demanded is well less than half of the peak energy demanded. This is important because it follows, then, that it will be important to reduce the

peak-load demand. Accordingly, NPC's energy efficiency and conservation programs are and should be aimed at reducing both overall energy consumption and peak demand.

In the future this relationship between peak demand and minimum demand without positive intervention is expected to degrade. First, as noted earlier, declining load factor has been the trend. Also, this will occur because NPC's largest and most flexible customer in terms of ability to shed load at peak times – Southern Nevada Water Authority – has shifted much of its load to the Colorado River Commission, as permitted by SB 211 (2001 Legislature). While NPC has moved strongly to increase the fraction of energy supplied from its own generation, those efforts are not relevant to the system load factor. Aggressive load management is needed to change system load factor. The payoff for success in this endeavor is quite high; for every reduction of 80 MW in peak demand, NPC and its ratepayers will avoid the cost of a combustion turbine power plant – roughly \$40 to \$50 million of capital cost.

Total System Capacity

Imports

The Nevada Power Company Transmission system is capable of importing approximately 3,800 MW of supply. As noted in the Sierra discussion, this number is governed by the system ability to survive the loss of its single largest element, although Nevada Power's system is not nearly as sensitive to import path as was Sierra's.

Exports

The NPC system is currently capable of exporting more than 2,000 MW. However this number is limited when generation resources are committed to serve control area load.

Special System Constraints

Roughly 65 % of the energy required on peak in the NPC system can be imported. The other 35% must be generated internally. This condition, where a geographical portion of a utility's control area must have internal generation resources available to ensure reliable service due to transmission import limitations, is called a "load pocket." The NPC load pocket, as a function of total load served, is much smaller than the Sierra load pocket.

Planned Additions and Retirements

Generation

It is very likely that the Mohave Generating Station in Laughlin will need to shutdown in December of this year. While NPC owns a 196 MW share of the facility, Southern California Edison operates it. The reason for the shutdown is the failure of the facility to meet environmental emission limitations related to opacity. Mohave has also been

at the forefront of controversy regarding the effect its emissions may have on visibility at the Grand Canyon.

NPC is in the process of constructing the 1,200 MW Chuck Lenzie Generating Station, a partially completed, two-unit, combined cycle, natural gas power plant purchased from Duke Energy. Both units should come on line during 2006.

NPC is also in the process of constructing the 80 MW Harry Allen 4 Power Plant, a peaking unit expected to come on line in 2006

NPC has an additional 520 MW combined cycle, natural gas power plant scheduled for completion in 2007, also on the Harry Allen site. This plant was included in the resource plan before the purchase of the partially completed Duke plant.

Finally, NPC has a 1200 MW coal plant scheduled to come on-line in the 2011 time frame. This reflects the company's determination that it will need base load power at that time, but details on siting and construction are not finalized at this time. Early planning placed the facility in White Pine County; if that continues to be the plan, it will be necessary to construct a transmission line from the plant to the NPC control area. This is an expensive proposition, but as noted both the Sierra and the NPC transmission discussions it has significant benefit for Nevada ratepayers in the north and south.

Transmission & Distribution

The Centennial Project is a 500 kV system interconnected at Crystal, Mead, and Northwest Substations. The project also included a transmission line from the Big Horn Power Plant to the Stateline Generation site. As planned, it will provide 3000 MW of transmission service from the Harry Allen and Crystal Substations to the Eldorado Valley. Delays in the construction of a number of the power plants that purchased capacity on the new transmission facilities have delayed the completion of the Centennial Project. The Big Horn line was completed in 2002 and the line between Northwest and Crystal Substations was completed early in 2003, but the remainder of the project is scheduled for completion in 2007.

The rate at which NPC is required to build out its distribution system to accommodate population growth is quite unprecedented. Demand for new and upgraded distribution facilities is the highest in the west (on a percentage basis); last year NPC set more than 40,000 new meters (a common measure of distribution growth). This places an exceptional demand on the utility's capital resources, and typically causes the utility to be behind the curve in recovering its true costs in rates.

Resource Adequacy

Near-Term

The resources that Nevada Power has that are potentially available to meet its load in 2005 include the 2,700 MW of generation dedicated to native load, the 3,794 MW of import capability, and 1780 MW from the Black Hills, Apex, Big Horn and Silver Hawk facilities. Nevada Power's peak load, if higher than normal temperatures prevail, is projected to reach 6440 MW (including a 12% reserve capacity) in 2005. Thus the transmission and merchant generation exceeds the uncommitted capacity by a safe margin. However, as with Sierra, available capacity does not necessarily mean secured energy. Reserve margins in the southwest could become tight during peak summer periods if several unfavorable regional events occur. Perhaps the most severe of these circumstances is continuing or deepening drought in the upper Colorado River basin so that power from the Glen Canyon Dam is threatened or curtailed, although this is not a likely situation during the next two or three years. In such circumstances it is possible that Hoover Dam would also be threatened.

Long-Term

The completion of the first two phases of the Centennial project, the construction of the solar project currently under contract, and the on-going construction of the Chuck Lenzie, Harry Allen 4, Harry Allen combined cycle, Ivanpah, Copper Mountain and Toquop power plants should ensure an adequate supply of resources located within the Nevada Power control area.

With the completion of the third phase of the Centennial Project, a large number of opportunities become available to Nevada Power. First, NPC will have the most important elements in place to complete a line from the Gonder area to the southern system. This, of course, links the two systems, bringing increased operational flexibility and cost effectiveness, access to Nevada renewable generation located mostly in the north, and periodic access to low cost power from the Pacific Northwest.

For many years it has been apparent that transmission system upgrades throughout the western interconnection offer the potential for significant savings to ratepayers. This was the basis for the federal push to set up regional transmission organizations (RTOs). For the most part, new RTO efforts have remained dormant, as states and FERC have tried to establish effective working relationships on issues such as market monitoring, resource adequacy, and transmission siting. At the end of 2004, a number of interstate transmission initiatives have been described, if not unveiled. The completion of the last phase of Centennial will allow, but not guarantee, Nevada a place at the table as these new projects go through their planning and development cycles. Two of these initiatives have the potential of being particularly beneficial.

In addition, interstate transmission projects that address bottlenecks outside of the NPC system could help increase reliability. The major bottlenecks affecting Nevada Power customers include:

- Congestion from Palo Verde to Mead. This is important because Palo Verde is a major trading hub in the western interconnection and improved access to Palo Verde would likely bring reduced power costs to Nevada.
- Insufficient transmission capacity from Utah to NPC's system. This is also important because it is likely that there will be major power flows from areas with coal resources, like Utah and Wyoming, into the California market. By ensuring capacity upgrades to these regions, Nevada will preserve its ability to select the most cost effective options for base load power.

These specific points of congestion are worth noting as we consider how new transmission might benefit Nevada. As discussions proceed at the Western Governors Association and its energy organization, the Western Interstate Energy Board, about transmission options it will be important to keep these congestion points in mind. It is also likely that much will depend on exactly what the Congress decides to do about an energy bill during the current session.

Resource adequacy will be further protected by conservation and demand side management policies. The \$12 million allocated by Nevada Power to DSM and conservation programs is an important step. As these programs take hold and as the State, Clark County and Henderson conservation efforts further expand, NPC ratepayers should be able to expect a sharp decrease in the rate at which peak demand grows.

As with Sierra, this brings us back to the central place held by the resource planning process in Nevada. The question of how best to meet the resource needs of southern Nevada is an open question and the proper venue for addressing and resolving that question is in resource planning proceedings before the PUC. The combination of fossil generation, renewable energy generation, distributed generation, intrastate transmission, interstate transmission, conservation and demand side resources that best meet the public interest of Nevadans is technically complex and the PUC is staffed with the technical experts required to fairly adjudicate these issues. This topic is discussed more in Chapter 6.

Regional Considerations

Regional Organizations

NSOE and the PUC, along with colleagues from the Consumer Advocate's office and the electric utilities are called upon to engage their counterparts in other western states on

electricity and natural gas issues. Much of the interaction among the states is directly in response to a greater willingness of the Western Governors Association to assert the interests of the western states in response to federal intentions to compromise those interests by proposing to exercise greater direct authority in western markets. In responding to the governors' directions, a fairly large number of organizations have emerged to perform analyses, communicate with Congressional Delegations, and basically formulate a cogent position for the western states. These organizations are identified in the following paragraphs.

Western Governors Association (WGA)

The WGA is a forum established by the governors to explore and act jointly on issues of mutual interest or concern. Recent WGA activities include environmental issues (for example, joint action on the status of listing the sage grouse as an endangered species) and several energy issues. Energy issues are generally addressed by the WGA directly or through the Western Interstate Energy Board. The WGA has chosen to deal with the Clean and Diversified Energy resolution directly (this is the resolution that calls for the building of 30,000 MW of "clean and diversified energy" and the 20 percent improvement of energy efficiency by 2020).

Western Interstate Energy Board (WIEB)

The WIEB is a non-profit organization established to implement some of the energy initiatives of the WGA. Issues that fall within the purview of WIEB include activities related to (1) the Western Interstate Nuclear Compact, (2) the WGA protocol on transmission siting in the west, (3) a series of activities related to operational transmission issues and regional transmission organizations, and (4) actions taken to unify resource adequacy assessments, a role that has been delegated to CREPC.

Committee on Regional Energy Policy Coordination (CREPC)

CREPC functions in concert with WIEB and is active in carrying out several WGA initiatives. These include a very substantial effort to determine electric resource adequacy for the west. In connection with its work on electric adequacy, it soon became apparent that in order to determine electric resource adequacy, it was necessary to determine natural gas resource adequacy. These parallel efforts are underway with considerable assistance and participation by the California Energy Commission. CREPC is also active in coordination with FERC on market monitoring and, through a subgroup called SSG-WI, efforts to coordinate transmission planning among the western states and the nascent RTOs.

Seams Steering Group – Western Interconnection (SSG-WI)

When it seemed likely that it would not be possible to create a single regional transmission organization in the western interconnection, CREPC members created

SSG-WI to coordinate operational issues at the boundary of the RTOs that appeared to be forming or had already been formed. These RTOs include (1) the California Independent System Operator in California (CAISO), (2) GridWest, which formed from RTO West in the Pacific Northwestern states – but including Nevada, (3) WestConnect in the desert southwestern states – but potentially including Nevada Power, and (4) a group of Rocky Mountain states that did not have a widely accepted name or acronym. In the absence of a national energy bill it is likely that federal RTO policies will be unclear, and that RTO development (other than at the CAISO) has gone about as far as it can. This leaves SSG-WI effectively without a mission.

Western Electricity Coordinating Council (WECC)

The WECC is an association of control area operators in the western interconnect. Its members generally perform highly technical analyses related to the design and operation of the interconnected electric system in the west. In recent years, the association has opened its membership to regulators and state policy makers, but the essential function of the organization – establishing and enforcing voluntary reliability standards among utilities and electric service providers – remains much the same. WECC also makes widely quoted forecasts of resource adequacy, but has been criticized for not insisting on uniform criteria from its member utilities.

Reserve Margins

The Western Electric Coordinating Council (WECC) approved a resource adequacy forecast at its October 2004 meeting. The demand forecasts and supply resources included in the analysis are based upon data through 2003. The WECC modeling effort uses data for all of the western interconnection that includes all of the far western, southwestern and intermountain states. Links to the WECC report and to other regional adequacy reports is provided in Appendix IV. It is important to note that the failed 2004 National Energy Bill called for incorporating the WECC function into the federal regulatory structure and requiring that current voluntary reliability standards be made mandatory with the potential for fines when standards are violated.

The WECC breaks the western states into 4 sub-regions and breaks the sub-regions into 24 zones. The strength of the WECC model is that it provides a summary of projected loads and resources for the entire western interconnection using the most recent data available. While the WECC model does consider transfer capabilities between zones, its weakness is that it is not designed to perform any sophisticated analysis of transfer limitations involving simultaneous flows or loop flows in the 4 sub-regions. Therefore, while the model is useful for gaining a general understanding of Nevada's regional resource adequacy outlook, it cannot be relied upon as the "final answer." Modeling efforts by Sierra Pacific and Nevada Power, supply plans filed by the utility with the PUC, and the critique of those models and the supply plans in proceedings before the PUC must be relied upon for getting a more realistic look at Nevada's resource adequacy. The electric utilities and the

PUC both purchased access to the Henwood model so that both the utility and its regulator would have access to a west-wide dynamic model that would help optimize resource planning decisions.

Electric Service Providers

Nevada's rural areas and small cities are served by three types of electric service providers: rural electric cooperatives, municipal utilities and general improvement districts. Rural electric cooperatives are chartered under federal laws associated with the Rural Utility Service, the successor agency to the more widely known Rural Electrification Administration. Municipalities and improvement districts are chartered under state law, NRS 710, Utilities Owned by Local Governments, and NRS 318, General Improvement Districts, respectively. All of these providers are self-regulated and either owned by their members/customers or are accountable to them at the ballot box.

Retail Electric Service Providers

Rural Electric Cooperatives

Harney Electric

Headquartered in Burns, OR, Harney serves customers in north-central Nevada. Its highest peak load was 57 MW and it supplies approximately 183,000 MWh annually.

Mount Wheeler Power

Headquartered in Ely NV, Mount Wheeler serves 6,657 northeastern Nevada customers in Elko, White Pine, Eureka, and Nye Counties, as well as three Utah counties. Its highest peak load was 34 MW and it supplies approximately 188,000 MWh annually.

Penoyer Valley Electric Cooperative

Headquartered in Rachel, NV, Penoyer Valley serves customers in southeastern Nevada. Its highest peak load was less than 1 MW and it supplies approximately 1,000 MWh annually.

Plumas-Sierra Rural Electric Cooperative

Headquartered in Portola CA, Plumas-Sierra serves customers in California and Washoe County, Nevada. Its highest peak load was 25 MW and it supplies approximately 147,000 MWh annually.

Raft River Rural Electric Cooperative

Headquartered in Portland, OR, Raft River serves customers in Idaho, Utah and extreme northeastern Nevada. Its highest peak load was 75 MW and it supplies approximately 278,000 MWh annually.

Surprise Valley Electric

Headquartered in Alturas CA, Surprise Valley serves customers in California and northwestern Nevada. Its highest peak load was 33 MW and it supplies approximately 122,000 MWh annually.

Valley Electric Association, Inc.

Headquartered in Pahrump, NV, Valley Electric serves 15,495 customers in southern Nevada, west of Las Vegas, in Nye, Esmeralda, Clark and Mineral Counties. Its highest peak load was 89 MW and it supplies more than 402,000 MWh annually.

Wells Rural Electric

Headquartered in Well, NV, Wells Rural Electric serves 5,529 customers in northeastern Nevada, in Elko County. Its highest peak load was 89 MW and it supplies more than 643,000 MWh annually.

Municipal Utilities*Boulder City*

Boulder City Utilities serves the citizens of Boulder City, southern Clark County. Its highest peak load was 51 MW and it supplies more than 163,000 MWh annually.

Caliente

Caliente Utilities serves the citizens of Caliente, south-central Lincoln County. Its highest peak load was 3 MW and it supplies slightly less than 10,000 MWh annually.

Fallon

Fallon Utilities serves the citizens of Fallon in western Churchill County. Its highest peak load was 15 MW and it supplies slightly more than 65,000 MWh annually.

Pioche

Pioche Utilities serves the citizens of Pioche in east-central Lincoln County. Its highest peak load was 2 MW and it supplies approximately 7,500 MWh annually.

General Improvement Districts*Alamo Power District # 3*

Headquartered in Alamo, NV, Alamo Power District # 3 serves customers in Lincoln County. Its highest peak load was 3 MW and it supplies approximately 11,000 MWh annually.

Lincoln County Power District # 1

Headquartered in Caselton, NV, Lincoln County Power District # 1 serves 824 customers in Lincoln County. Its highest peak load was 16 MW and it supplies more than 72,000 MWh annually.

Overton Power District # 5

Headquartered in Mesquite, NV, Overton Power District # 5 serves 9,343 customers in eastern Clark County. Its highest peak load was 74 MW and it supplies more than 366,000 MWh annually.

Wholesale Electric Service Provider**Colorado River Commission (CRC)**

The Colorado River Commission is a Nevada state agency. It is registered with FERC as a scheduling coordinator and is responsible for accepting and distributing power from Hoover Dam, as well as providing power for the Southern Nevada Water Authority and its associated water utilities, Nevada Power Company and a specific list of industrial customers located near Hoover Dam.

Chapter

3**Natural Gas Assessment**

Natural gas is moved from production areas in central-southwestern states, Rocky Mountain states and western Canada, via interstate pipelines to three types of customers: “sales” customers (residential, commercial and sometimes industrial), “transportation” customers (generally commercial and industrial customers), and power generation customers. Sales customers receive gas from a Local Distribution Company (LDC) and typically pay a bundled price for the gas service they use. Transportation customers buy their gas commodity and gas transportation separately. They are usually large customers who may take gas from the LDC or directly from an interstate or intrastate transmission pipeline. Electric utilities and merchant power plants are the only major power generation customers, although some combined heat and power (CHP) installations or self-generating customers also need to take gas at the higher pressures needed for electric generation.

Natural Gas Fundamentals

Natural gas was known as the “perfect fuel” some 25 years ago because it was reasonably available and transportable, and it was virtually non-polluting in the eyes of 1980 regulators and consumers. It was so perfect, in fact, that it was assumed to be in short supply and considered too valuable to be used to generate electricity. It was used as a heating fuel and as a feedstock in industrial processes. In such a world, the principal short-term variable was the weather; so, if suppliers could simply have enough storage to get through two or three weeks of unseasonably cold weather, natural gas prices would remain reasonably stable. As things turned out, this was generally the case. There were a few spikes, but after the mid-1980s natural gas prices typically hovered around \$2.00 per mmBTU (million BTUs) and the spikes that did occur were relatively small and short-lived; that is, until about 1999 to 2000. During the 1990s abundant gas supplies and environmental benefits had all but removed the tacit proscription on natural gas powered electric generating stations. The concept of savings derived from electric deregulation also had become very popular in the middle of the previous decade.

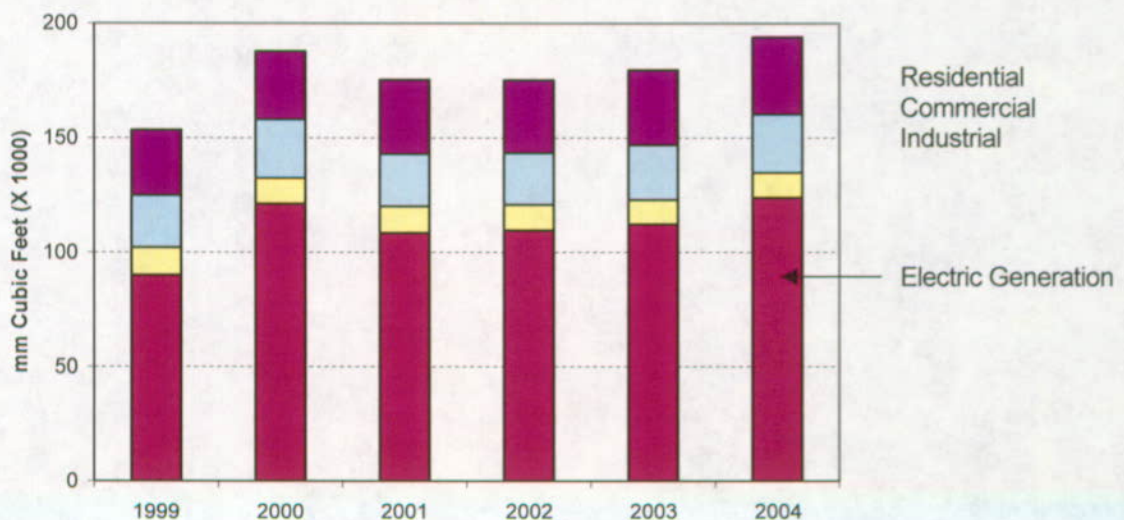
Electric deregulation brought significant uncertainty to the relatively stable natural gas markets. It did this in two ways. First, the potential for substantial profits in electric markets caused a building boom in natural gas powered generators – the least expensive and fastest way to acquire electric capacity. In order to finance such plants, builders needed to assure investors that they had sufficient quantities of natural gas to power the plants being built. To do this, builders needed options on natural gas supplies to match the operating cycles of their new plants. This, in turn, ushered in a new and unprecedented level of speculation in natural gas futures, making it harder and more expensive to obtain forward gas contracts to

fill all of the other uses for natural gas and for the existing natural gas powered electric generators. Second, natural gas electric power plants are relatively expensive to operate but easy to startup and shutdown. As a result, natural gas plants are often “on the margin”; that is, they are the plants that have the least predictable operating cycle. Therefore, the amount of fuel – natural gas – they need to operate is the most uncertain, which again introduces uncertainty and an opportunity for arbitrage.

Today, the natural gas companies in Nevada, Southwest Gas Corporation (Southwest) and Sierra Pacific Power Company (Sierra, once known as WestPac), have adequate supplies of natural gas. Reno and much of the I-80 corridor in the north and Clark County in the south have sufficient access to natural gas commodity, as well as capacity for some additional growth in demand. Generally, those areas that are un-served with natural gas, such as Mesquite and Pahrump, would benefit substantially if it could be made available to them. Other areas, such as Elko, see future economic development tied to increased access to natural gas.

While natural gas utilities are no longer required to file integrated resource plans, they do file Gas Supply Plans. These documents provide both an historical look at purchases in the previous regulatory year and a forecast for the coming year and beyond. Table 3-1 shows natural gas consumption during the past six years for both of Southwest’s systems and for Sierra. Importantly, nearly all of the variability occurs in natural gas used for electric generation. For example, comparing 1999 to 2003, the last year for which we have complete data, 88 percent of the increase in gas consumption came from electric power plants. It is also significant that the amount used for electricity generation is not necessarily predictable. Note, for example, that during the year 2000 – the year of the western energy

3-1 Table
Total Natural Gas Consumption for Nevada
Natural Gas Demand History



Source: EIA

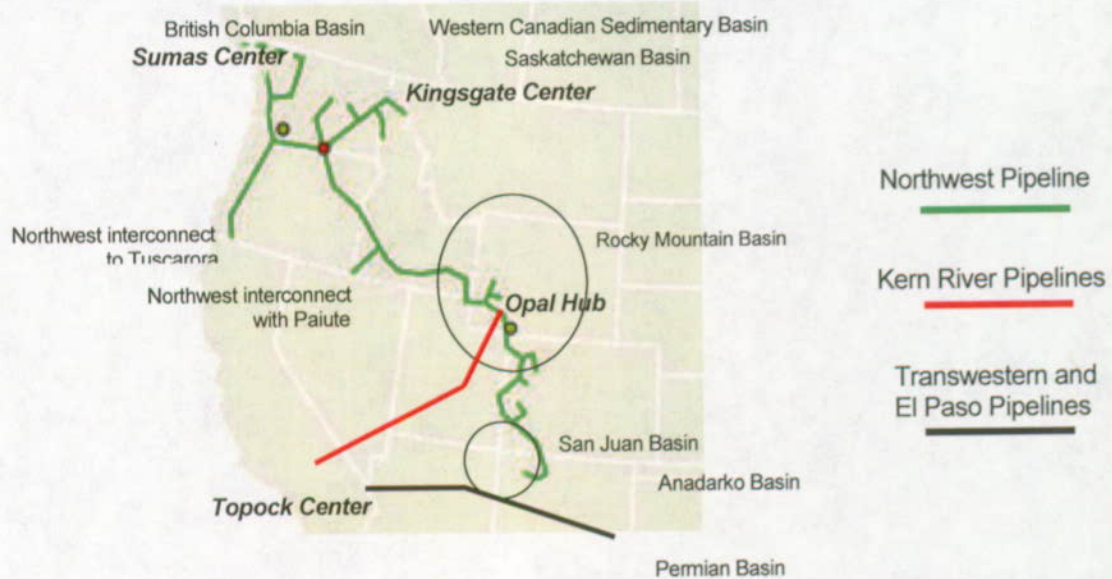
crisis – more natural gas was used than any previous or subsequent year, with the possible exception of 2004. As of the date of this report, it looks like more gas will be used in 2004, but there are also more than 2000 MW of new gas generators compared with year 2000.

An LDC typically purchases gas on one month or multiple month contracts. These contracts specify a daily volume of gas, but may have certain options available to the purchaser or the supplier. Gas may also be purchased such that a minimum and maximum take is specified, so-called “swing contracts.” This allows the LDC some flexibility when the weather or other conditions cause the forecast to be off for the day. Gas may also be purchased on the spot market for a day or for multiple days. LDCs have purchasing strategies that ensure a base amount of gas is purchased to cover loads that are constant and swing contracts to cover normal variations in weather driven gas demand. They also use the spot market to buy or sell commodity on days when it is economically advantageous to do so. Unlike electricity, natural gas deliveries can be somewhat flexible, and may be slowed down by “packing” transmission and distribution pipes, or speeded up by drawing down commodity in pipelines. The amount of gas requested in a contract is called a “nomination.”

The purchase and delivery of natural gas involves arrangement for both the commodity, natural gas in a specific number of million BTUs (mmBTU), dekatherms (ten therms), or million standard cubic feet (mmscf) over a given time period; and the transportation of that gas from the point of purchase generally to the utility’s “city gate.” The city gate is the point where an LDC’s system connects to an interstate or intrastate pipeline. Also, the three units of gas volume (and therefore, energy) measurement are very close to the same quantity of gas and are sometimes used interchangeably.

Southwest’s and Sierra’s supply for northern Nevada typically come from four basins: the Rocky Mountain, British Columbia, Western Canadian Sedimentary, and Saskatchewan Basins. These basins and their nominal basin delivery points; Opal, Sumas, and Kingsgate (Alberta and Saskatchewan), respectively; are shown in Figure 3-2. Southwest’s supplies for southern Nevada typically come from the Wyoming Thrust Belt and Green River (Rocky Mountain), San Juan, Anadarko, and Permian Basins. In general the production of natural gas from Canadian and northern US basins is increasing or steady, while production from the basins located primarily in New Mexico, Oklahoma, and Texas is declining.

3-2 Figure
Interstate Pipeline and Basin Supplies to
Paiute and Tuscarora Pipelines



Southwest Gas Corporation

Southwest serves both the northern and southern parts of Nevada and, similar to the physical situation with electricity, the two systems are not interconnected within the state. In the northern Nevada service territory, Southwest serves the following counties: Carson City, Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Nye, Pershing, Storey and Washoe. In the southern part of the state, Southwest serves Clark County.

Natural Gas Supply and Transmission

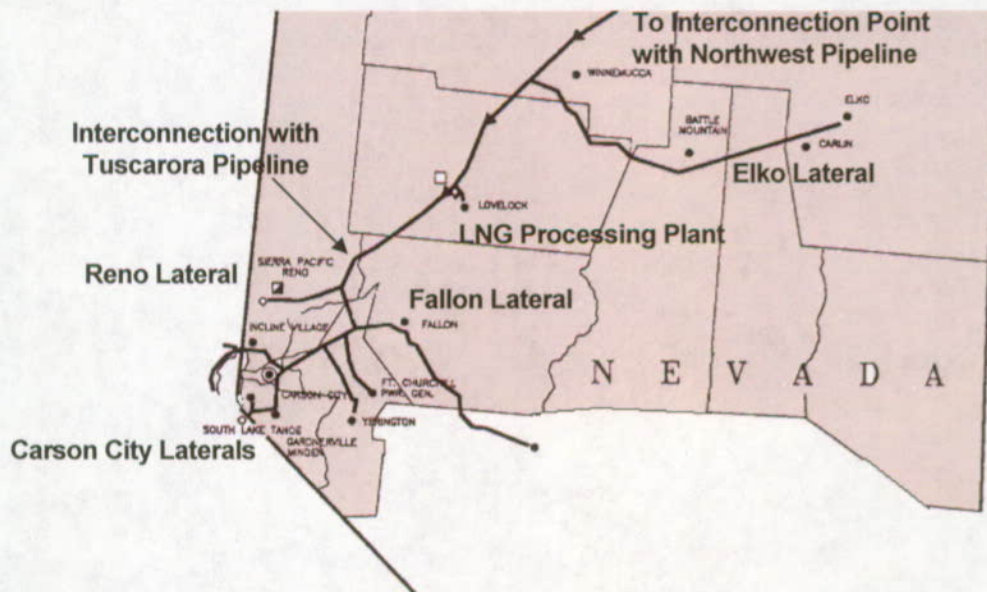
Southwest's northern Nevada service territory receives natural gas by way of the Northwest and Tuscarora interstate pipelines that draw gas from the four basins noted above, as well as the San Juan basin. Northwest delivers that gas to the Idaho-Nevada border where the Southwest owned Paiute Pipeline receives the gas and delivers it to northern Nevada customers through pipelines and "laterals." Figure 3-3 shows the five major laterals that deliver natural gas to Elko, Reno, Carson City (2), and Fallon as well as a number of other communities along the various routes. Strategically located compressor stations along each major pipeline establish the flow of gas in these pipelines. A portion of nearly all natural gas shipments is used to provide power to these compressors.

Within the last two years, Southwest and Sierra agreed to interconnect their two pipelines, Paiute and Tuscarora, respectively, near Wadsworth, Nevada in Washoe County. This decision, coupled with the accompanying capacity expansion of the Tuscarora Pipeline,

allows Southwest and Sierra operational flexibility in times of unusual demand or supply interruptions. It also allows Sierra to avoid, at least in part, the use of LNG processing facilities near Lovelock. The LNG plant is designed to provide peaking service during times of extremely cold weather.

Southwest's southern Nevada service territory receives natural gas by way of four interstate pipelines, including the Kern River (actually, two roughly side-by-side pipelines, except in the Las Vegas Valley, one added in 2003), El Paso and Transwestern pipelines. The combined Kern River Pipeline passes through Las Vegas, where it interconnects with the Southwest system. They then move on into California and merge with the Mojave Pipeline to form the Kern-Mojave Pipeline, which serves southern California customers. The El Paso and Transwestern pipelines both pass south of Las Vegas, but provide natural gas to the Las Vegas area with laterals owned by Southwest. Both of these pipelines terminate at the Topock Compressor Station in Topock, Arizona from which natural gas is delivered into California. For the most part, these pipelines draw from the Permian, Anadarko and San Juan basins, while the Kern River pipelines draw primarily from the Rocky Mountain basin. This provides some degree of fuel diversity for the Las Vegas area and likely contributes to a relatively small basis differential (the difference in commodity price between the two basins).

3-3 Figure Southwest Gas Paiute Laterals



During the biennium, the Consumer Advocate in the Attorney General's office was able to obtain a large judgment, relative to services rendered to Southwest Gas and the cost

of electricity during the western energy crisis, against the El Paso interstate pipeline company. Detailed information about the settlement has been included in Appendix V.

Special System Constraints

During the last biennium, the two most important constraints in the Southwest system were addressed. New Kern River capacity to the valley has provided the physical ability needed to keep up with customer demands, largely residential, in Southwest's LDC in southern Nevada, and also meet the demands for industrial growth and the new natural gas electric generating stations in the south. The other constraint faced by Southwest in the north was the inability to substantially increase supplies down the Paiute Pipeline without very significant investments. The interconnection with the Tuscarora Pipeline provides an additional source of supply.

Southwest has no other significant physical barriers to meeting demands in northern or southern Nevada. Like many gas companies, however, it has continued to experience declining average gas usage by customers. This is positive in that it indicates greater efficiency, but it also has ratemaking consequences that Southwest believes are harmful to its shareholders.

Planned Additions and Retirements

There are no major additions to or retirements from the Southwest systems in northern or southern Nevada over the next three years.

Sierra Pacific LDC

Sierra is the LDC in the Reno area, as well as nearby portions of Washoe and Storey County.

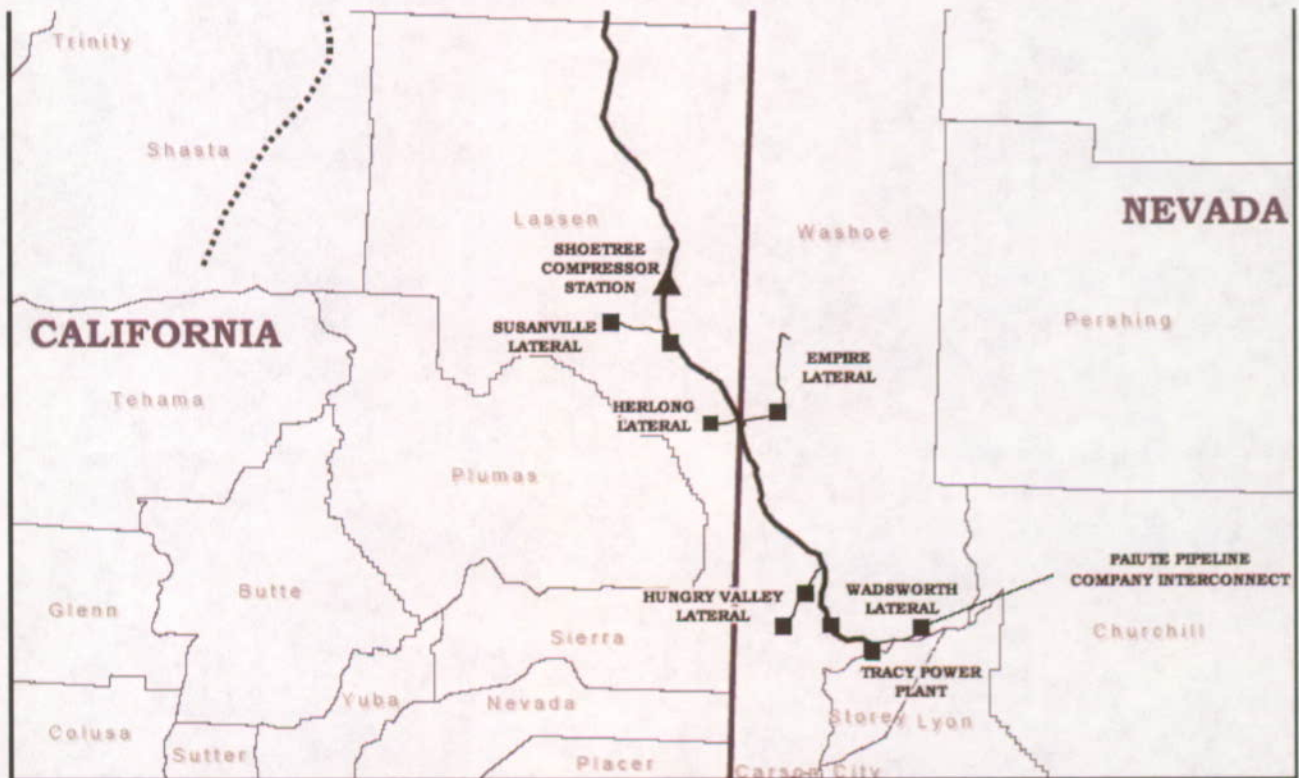
Natural Gas Supply and Transmission

Sierra's supplies typically come from four basins: the Rocky Mountain, British Columbia, Western Canadian Sedimentary, and Saskatchewan Basins. These basins and their nominal basin delivery points; Opal, Sumas, and Kingsgate (Alberta and Saskatchewan), respectively; are shown in Figure 3-2, above. In general the production of natural gas from Canadian and northern US basins is increasing or steady.

Sierra receives natural gas by way of the Northwest Gas Pipeline, an interstate pipeline that draws gas from the four basins noted above, and potentially, from the San Juan basin as well. Northwest delivers that gas to the California-Oregon or Idaho-Nevada border where the Tuscarora Pipeline or the Paiute Pipeline receives the gas and delivers it to northern Nevada customers through a mainline and several laterals. Figure 3-4 shows the

three laterals that deliver natural gas to Empire, Hungry Valley and Wadsworth. Mainline gas goes to Reno and the Tracy Power Plant. Strategically located compressor stations along the Tuscarora pipeline establish the flow of gas in the pipeline. A portion of nearly all natural gas shipments is used to provide power to these compressors.

3-6 Table
Sierra Pacific LDC
Tuscarora Laterals



Within the last two years, Southwest and Sierra agreed to interconnect their two pipelines, Paiute and Tuscarora, respectively, near Wadsworth, Nevada in Washoe County. This decision, coupled with the accompanying capacity expansion of the Tuscarora Pipeline, allows both Southwest and Sierra operational flexibility in times of unusual demand or supply interruptions.

Special System Constraints

With the completion of the interconnection with Paiute last year and the low variability in gas demand, compared with Southwest's southern territory, the Sierra system is adequate to meet customer demands for the next several years. Sierra has made operating adjustments, including the use of storage, swing contracts and the LNG processing facility

that will allow it to respond to changes in customer demands, according to normal and reasonably expected conditions.

Planned Additions and Retirements

There are no major additions to or retirements from the Sierra Pacific LDC system over the next three years.

Natural Gas Adequacy

Natural Gas Prices

The concept of “adequacy” necessarily includes both the idea of availability of supply and the idea of price. It is not adequate, for example, to have all the natural gas you can possible use if it will cost \$10.00 per dekatherm, or if the price is so highly variable that a customer has no way of predicting what the gas will cost. High and/or uncertain costs are major concerns for residential customers. Importantly, it is just as difficult for businesses because price volatility often discourages businesses from making investments that could provide more jobs, greater economic vitality and a more diverse base for Nevada’s state and local governments.

Moreover, a critical strategic element of the Governor’s CEPN is to ensure that energy is available to Nevadans at reasonable and *affordable* prices. And, as with electricity and petroleum products, the alternatives for putting downward pressure on prices are (1) increase the supply, (2) decrease the demand, or (3) impose a regulatory structure that results in decreasing prices.

Before going through these alternatives, it is important to ask whether the existing supply-price condition results in natural gas “adequacy.” This begins by asking whether North American exploration and development companies are finding new supplies of natural gas. The basic answer to this first question is, “yes” – exploration companies continue to drill wells. It is encouraging that new supplies are being located and developed, but it is somewhat discouraging that the new sources are at best only able to offset the decline in existing natural gas fields – at least in North America. This means that indigenous supplies of natural gas are generally unable to keep up with demand increases.

Does that mean that natural gas prices will go up? The answer to this question also is, “yes,” and indeed, the average price has gone up by more than 50% in the last two years. Importantly, while volatility remains a problem, it is the average price increase that will be a heavy burden for Nevada consumers. There are several reasons for the price increase, certainly the expectation that North American supplies will be unable to keep up with demand increases is a factor. It is also true that there is a link, economists call it a “cross-elasticity,” between crude oil prices and natural gas prices – higher crude oil prices tend to

increase the price of natural gas, a partial substitute fuel and feedstock – and that too has had an effect on natural gas prices. Finally, the dramatic increase in demand by natural gas fired electric generation has affected prices.

Will natural gas prices continue to escalate in the coming years? The answer to this question is, “probably not,” at least not when compared to inflation. There will, of course, be peaks and valleys, but a steady increase in price is unlikely for two reasons. First, as natural gas prices rise, customers will simply use less. Residential customers will pay more attention to insulation and appliance efficiencies when they buy a new house, will be more willing to invest in appliance upgrades or heating system repairs in their existing homes, or simply turn their thermostats down. Business customers will seek more efficient use of natural gas, and when they see that prices are likely to remain at current levels for some number of years, they will make business decisions about new investments that will improve their overall profitability.

Second, the upper limit to natural gas price increases is practically set by the cost of imported liquefied natural gas (LNG). This, of course, assumes that it will be possible to establish ports that can off-load a sufficient number of LNG tankers to have an effect on domestic prices. There will be substantial controversy on this subject, not only in Nevada, because some – those persuaded by safety or environmental issues – will argue that we can accomplish the same end by simply reducing demand for natural gas. Others – those persuaded by the link between low-cost energy and business vitality (and jobs) – will argue that LNG ports are a necessary risk if we are to maintain...well, adequacy.

In any case it is also important to point out that growing reliance on imported LNG is similar in some respects to a growing reliance on imported crude oil. Both trends violate the President’s call for decreased reliance on imported fuels, both trends result in Nevadans sending more money out of state (and country), and both trends result in a greater need to become involved in efforts to protect our supply of foreign fuels.

Returning to the original question, “Can we increase the supply of natural gas?” The basic answer is probably, “no.” Nevada has no known reserves of natural gas and has no ports that could be used to import LNG. Any action we would take to increase supplies would need to be related to the actions of other western states, or of the federal government. We simply have no direct control of the supply of natural gas.

“Can we then force a reduction in the demand for natural gas?” The answer is probably unimportant because to accomplish this, it would be necessary for the state to either increase the cost of gas artificially, for example with an energy tax, or to impose a system of intrusive rules that would cause Nevadans to use less natural gas than they otherwise would. Neither of these options is under consideration by the Governor or being studied by NSOE.

Besides, the most effective mechanism to reduce demand for natural gas is an increase in the price and that has already been taken care of. Without this increase in price, many consumers have been quite willing to buy new homes that are energy inefficient, or to allow energy wasting behaviors to continue. It is possible that with the increase, consumers will act differently and that demand will come down. It will be important over the next biennium to measure how consumers respond to the price increases.

There is a relevant footnote to this section. Interestingly, Nevada's two LDCs take very different views about natural gas purchasing practices. Southwest Gas points out that buying gas at the market price, whatever that might be, assures customers of the least gas cost. Further, attempts to "beat the market" price are inherently risky, where the chances of losing are just as great as the chances of winning. The consequence of this approach is gas costs that tend to be more volatile for the utility and its customers. In response to these concerns, Southwest's practices call for the purchase of about half of its expected gas requirement at a fixed price; this has the effect of smoothing market volatility.

In the past, Sierra Pacific has taken the view that providing more certainty about the cost of gas has value to customers and the utility, and therefore, it purchases gas using options and other hedging tools. Both approaches have been found to be just and reasonable by the PUC.

Energy Efficiency/Conservation Opportunities

Opportunities for energy efficiency and energy conservation with natural gas generally come in three areas. One of the most interesting technically is the recovery of the potential energy of high pressure gas through a pressure letdown system. The stored energy in high pressure gas is often wasted by throttling or bleeding pressure down to the lower operating pressure most home and small commercial systems use. Several manufacturers now offer letdown turbines that capture this energy as electrical energy.

Another highly effective conservation measure comes from simply upgrading home heating systems. In the northern part of the state, two of the most effective actions that can be taken are to replace a home furnace with a new 90 percent efficient (or better) unit and to have heating ducts sealed to prevent warm air from spilling into areas that do not need the heat. Insulation, helpful in hot and cold climates, and automatic thermostats are also effective in reducing the amount of natural gas expended for home heating.

Finally, larger commercial customers who need both heat and electricity in the right proportions can use combined heat and power (CHP), or what was once called "cogeneration." When the timing, the heat and the electrical demand are aligned, even small CHP units can rival the thermal efficiency of some large utility turbine-generators because most of the energy in steam power plants is rejected – thrown away – when the

steam is condensed. CHP units use that heat for process or space heating and save both energy and water.

LPG, Fuel Oil and Other Heating Fuels

Nevadans use a number of different fuels for home heating. Natural gas and electricity are by far the most widely used, but other common alternative fuels include propane, wood in various forms (chips, pellets, logs) and distillates, such as kerosene. When these fuels are purchased, rather than harvested, they are usually bought and sold in unregulated markets. Of the alternative fuels, only propane is, in some instances, regulated by the PUC.

It is hard to know the extent to which these alternative fuels affect Nevadans. In most cases they are used because the expense of obtaining natural gas or electricity is very high – a common occurrence in rural locations. NSOE intends to analyze the use of alternative fuels for home heating during this calendar year and will include the results of that effort in its report to the Governor next January.

Regional Considerations

Nevada is fully engaged in cooperative discussions with other western states on issues related to natural gas. For the most part these discussions concentrate on the adequacy of natural gas supplies for electricity generation. The Nevada participants are from NSOE, the PUC and the utilities. Natural gas used by local distribution company service providers – Southwest and Sierra in Nevada – has been the subject of successful state regulation for many years and is, therefore, not a significant part of these discussions.

The issue of adequacy of natural gas is closely related to the issue of electricity adequacy because natural gas is a significant fuel used in the generation of electricity. If natural gas supplies were inadequate for essential electricity generation, then the consequences would be felt well beyond any one state's borders; hence, the need for a regional approach.

Regional Organizations

NSOE and the PUC, along with colleagues from the Consumer Advocate's office and the natural gas utilities are called upon to engage their counterparts in other western states on electricity and natural gas issues. Much of the interaction among the states is directly in response to a greater willingness of the Western Governors Association to assert the interests of the western states in response to federal intentions to compromise those

interests by proposing to exercise greater direct authority in western markets. In responding to the governors' directions, a fairly large number of organizations have emerged to perform analyses, communicate with Congressional Delegations, and basically formulate a cogent position for the western states. These organizations are identified in the following paragraphs.

Western Governors Association (WGA)

The WGA is a forum established by the governors to explore and act jointly on issues of mutual interest or concern. Recent WGA activities include environmental issues (for example, joint action on the status of listing the sage grouse as an endangered species) and several energy issues. Energy issues are generally addressed by the WGA directly or through the Western Interstate Energy Board. The WGA has chosen to deal with the Clean and Diversified Energy resolution directly (this is the resolution that calls for the building of 30,000 MW of "clean and diversified energy" and the 20 percent improvement of energy efficiency by 2020). In particular, it is not clear whether natural gas is part of the 20 percent improvement in energy efficiency, or whether it will apply only to electric utilities.

Western Interstate Energy Board (WIEB)

The WIEB is a non-profit organization established to implement some of the energy initiatives of the WGA. Issues that fall within the purview of WIEB include activities related to (1) the Western Interstate Nuclear Compact, (2) the WGA protocol on electric transmission siting in the west, and (3) a series of activities related to operational electric transmission issues and regional transmission organizations. WIEB is also responsible for conducting the analysis in response to the WGA's request for a determination of electricity (and therefore natural gas) adequacy by June of 2006.

Discovery and Transmission Projects

There are no known discovery efforts ongoing in Nevada; however, the level of prices and the apparent establishment of an unusually high average price of natural gas have spurred investment in new and existing resource development all around the world. Alaskan and Canadian developers are expanding and it appears likely that there will be a new pipeline from Alaska to the lower 48 states, perhaps shortly after the beginning of the next decade. Moreover, the high prices also provide the incentive to develop offshore fields even in areas where drilling and development have not, heretofore, been contemplated.

Elevated price levels are also spurring an expansion of LNG markets. Sustained prices above four dollars per mmBTU are likely high enough that foreign gas resources can be exploited, compression facilities built, port facilities built in North America, LNG tankers

built and used for transportation, legal issues confronted, and reasonable profits earned. Current natural gas prices are in the five to seven dollar per mmBTU range.

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Chapter

4**Transportation Fuels Assessment**

Transportation fuels – gasoline, diesel, jet fuel and a group of versatile fuels called “distillates” – have been effectively deregulated for many years. This means that states and the federal government do not try – are not permitted to – (1) limit profits to a fixed percentage of company investments or sales, (2) require production of specific amounts of fuels at the refinery, (3) require distribution and storage of fuels at locations that seem appropriate to government regulators, or (4) demand access to a company’s books and records without due cause. Consequently, the United States relies on market forces to allocate transportation fuels and provide incentives for new facilities.

For a number of reasons markets for transportation fuels in Nevada do not function as “free markets.” The principal feedstock for petroleum products is crude oil, and the Organization of Petroleum Exporting Countries (OPEC) deliberately and openly manipulates the international crude oil market. Additionally, the economic and environmental barriers to building new refineries or significantly expanding the capacity of existing refineries are so substantial that no new refineries have been completed in the United States in two decades. With demand literally bumping up against refinery production capacity limits, and with no practical ability to increase the supply by building more capacity, it has been increasingly necessary to import petroleum products that are refined outside the US. This practice is well established in the eastern part of the country and is beginning to be necessary in the west, as California refineries reach their upper production limits. While local distribution and retail markets do function reasonably well, the flaws in the crude oil and refined products markets significantly affect prices and supplies to customers.

The NSOE monitors the supply and demand for transportation fuels to determine that they are reasonably balanced and sustainable, but has no ability to require actions that might be viewed as helpful. NSOE also actively engages refiners and distributors in voluntary actions that improve coordination and the flow of information, of course, without violating anti-trust laws. Finally, NSOE maintains effective communications with the owner of the three petroleum pipelines, Kinder Morgan, that deliver refined products to our major population centers. This is because many of the supply interruptions that have occurred are as a result of pipeline problems.

It is clear that a long-term adequacy challenge exists in the supply of transportation fuels. Just as with natural gas, this challenge can be addressed by increasing supply or by decreasing demand – there are no regulatory solutions under existing laws. Unlike the situation with natural gas, Nevada has no ability to directly affect the supply of transportation fuels except in very limited circumstances, and the Governor does not intend to artificially reduce demand, nor is NSOE studying such options. This assures that gasoline and other transportation products will be allocated by price.

Unregulated Transportation Fuel Markets

Nevada received more than 90 percent of its refined products through three interstate “products” pipelines owned by Kinder Morgan, Inc.: an eight-inch pipeline from Concord Station in northern California to Sacramento to Reno, and then on to the Naval Air Station in Fallon; a fourteen-inch pipeline from the Colton Terminal in Orange County California to Las Vegas, and then on to Nellis Air Force Base; and an eight-inch pipeline physically collinear with the fourteen-inch pipeline from the Colton Terminal to McCarran International Airport, and then on to the Las Vegas Terminal.

Petroleum product markets in Nevada face a long-term supply problem tied to the inability of California refineries – the only refineries now linked to Nevada terminals by pipeline – to keep up with demand in California, Nevada, Arizona and Oregon. While the pipelines themselves can be limiting during an event, Kinder Morgan has the ability to increase capacity by increasing the horsepower of pumps that move products into Nevada. Moreover, the Reno and Las Vegas terminals have tankage for 611 thousand barrels and 1.47 million barrels, respectively. Still the challenge is the total quantity of products demanded in each of the states served will soon exceed what can be refined in the 13 California refineries. While the answer seems simple enough, “import product from foreign refineries,” existing port facilities for receipt of liquid petroleum products are currently inadequate for the quantity of imports needed to solve the long-term problem.

Petroleum product markets in Nevada also face an acute reliability problem. Pipelines into Nevada have been shutdown for leaks discovered in Kinder Morgan’s pipelines (one in northern California near Pittsburgh, CA and one in southern California near the Cajon Pass), for a train derailment involving rail cars with hazardous cargo resting on the ground above the pipeline, and for excessive erosion of soil covering the pipeline; in all, six such interruptions during the past thirteen months. Within the last few years product deliveries have also been slowed by refinery fires and other shutdowns, and by insufficient electrical power to drive the pumps that move product. In each case Nevada consumers have been confronted with the potential for insufficient supplies of gasoline, diesel and/or jet fuel. And, because we use the market to allocate scarce supplies, which means Nevada consumers face the possibility of price spikes.

Four Semi-Independent Markets

International Crude Oil Market

The international crude oil market is routinely manipulated by the OPEC oil cartel. Cartels are groups of market suppliers, companies, that band together in order to form a monopoly – a market with only one seller or supplier. Cartels and monopolies frustrate the operation of a free market because they allow the monopolist to collect

economic rents, also called excess profits. They are “excess” profits because they are substantially larger than they would be in a competitive market.

It is instructive to note that cartels do not always work. Most particularly, they do not work well when the demand for a product – in this case, crude oil – is substantially less than the supply. OPEC countries become very concerned, for example, when industrialized countries suffer a recession. This is a problem for OPEC because it means demand decreases for crude oil and OPEC members must either continue to produce more crude oil than the market needs – thus reducing the price – or make the difficult decision of how much each OPEC member must reduce output – and therefore, a fraction of their revenue stream – in order to keep the prices high. These kinds of decisions sometimes lead to the breakup of cartels.

Cartels also have a difficult time staying together when the demand for a product is so low that market suppliers who are not members of the cartel are able to supply enough product to fulfill demand.

When the OPEC cartel has been able to hold together, either because the political will is strong enough to overcome economic self-interest (for example, the oil embargo of the early to mid 1970s), or because market supplies are sufficiently in doubt so that speculators control a large amount of available supplies (for example, the current strife in Iraq), or because demand is increasing (for example, the relentless growth of demand in the United States and the waking economies of eastern Asia), then the cartel's influence has been high. When the cartel has held, as it did in the fall of 2004, light, sweet crude oil prices exceeded \$55 a barrel and pump prices in Nevada exceeded \$2.25 per gallon by a good margin. In times of weak demand, crude oil prices have slipped to below \$10 per barrel, resulting in correspondingly lower pump prices here at home. The price of crude oil accounts for approximately half of the cost of gasoline at the pump.

It is interesting to note that it is not always in a cartel's or a monopolist's self interest to raise the price of their product too high. For example, sustained crude oil prices of \$55 a barrel would be a problem for OPEC. It is a problem because at that high a price, alternatives for traditional oil supplies become important. Canadian tar or oil sands in northern Alberta are estimated to contain as much as 1.7 trillion barrels of oil; it is just expensive to recover...but cheaper than \$55 a barrel. OPEC does not want to spur the development of this type of alternative to their product. But even without alternatives, there is considerably more oil at \$55 a barrel than there is at \$35 a barrel. This is because there are a number of alternative oil recovery methods that do not pay off at a lower price, but may be well worth the expense at a higher price. So, an increase in the long-term cost of crude oil also brings about an increase in the volume of proven oil reserves – again, more competition for the cartel.

To put these few paragraphs in perspective, much of this is completely outside the control of NSOE or the State of Nevada and even the company that owns the local filling station. But the price of crude oil is an important determinant of what we pay for the gasoline we use.

Finally, it is instructive that the fraction of domestically produced crude oil consumed in the US has dropped quite significantly from the mid 1970s, when US production peaked. This is true even with the addition of Alaska North Slope oil. This means that, in some respects, US consumers are more exposed to the political manipulation of the OPEC cartel than in earlier years. It is true that spot market prices of all producers, OPEC and non-OPEC, rise and fall together, however a large fraction of crude oil is sold under contract, where the exact exposure to spot market prices may be lessened. The consequence of being exposed is the potential for broad price spikes that are the direct result of international political events.

Refined Products Market

The refined products market that serves Nevada does not function properly, due in large part to the inability or unwillingness of refining companies to build new refineries or to significantly increase the capacity of existing facilities. The feedstocks for the refined products market are crude oil and additives; the outputs are gasolines of various grades and qualities, diesel fuel, jet fuel and certain other distillates. Nearly all refined products consumed in Nevada are refined in California. Utah refineries supply refined products in the eastern part of the state above Las Vegas.

The Nevada Department of Agriculture and the Clean Air Act State Implementation Plan (SIP) Administrators set gasoline standards for the state. In Nevada the SIP Administrators are the Clark County Department of Air Quality Management for Clark County, the Air Quality Management Division of the District Health Department for Washoe County, and the Nevada Department of Environmental Protection for all jurisdictions outside of Clark and Washoe Counties. Gasolines for use within each of the three SIP areas, regardless of where they are refined, must meet these Nevada standards. Generally, gasolines used in Nevada consist of federally approved "clean burning gasoline" (CGB) combined with additives that are determined by the respective SIP Administrators. Diesel fuel used in Nevada must meet EPA on road standards, while jet fuels are typically required to meet customer requirements referencing standards from the American Society for Testing and Materials (ASTM).

Gasoline supply issues are complicated by the fact that the states served by the 13 refineries located in California; namely California, Nevada, Arizona and Oregon; all have somewhat different gasoline formulas. This requires different production runs at the refineries and segregated storage of refined products, both of which add to the cost of gasoline and to the complexity of meeting demands when refinery or pipeline

problems cause temporary shutdowns. Similar problems routinely occur during the seasonal change over to oxygenated fuels in the winter months.

There are several other factors that contribute to problems with the supply of refined products. The lead paragraph of this subsection noted that refiners were unable or unwilling to add significant new refining capacity. Generally, the reasons are that environmental permitting of such facilities is quite difficult to accomplish and that the companies making the investment in such facilities believe (1) they are no more likely to fully recover their investment in the US (due to limited demand growth compared with other countries and expected state and federal efforts to reduce gasoline consumption) and (2) are able to earn a better return on their investment in other countries. The inability (or unwillingness) to increase long-term supplies means that during periods of shortage due, for example, to a refinery fire or a pipeline break, gasoline prices will rise, as they always do when demand is constant and supplies are diminished. Market participants collect higher revenues, which in a competitive system would be used to increase long-term capacity and thereby benefit customers. But, because long-term capacity is effectively capped, the extra dollars collected from customers have no useful public benefit and show up only in the bottom lines of market participants.

Supply shortfalls can be addressed by decreasing demand, which will be addressed briefly under the subsection entitled, "Retail Market," below. Shortfalls can also be addressed with (1) imported refined product, (2) bio-fuels and (3) hydrogen. It is certainly possible for Nevada distributors to purchase imported products. This is commonly done in the east, but has been relatively rare heretofore in the west. Foreign sites are attractive for refiners, as noted above, because low wage rates, liberal environmental restrictions and higher rates of return mean higher profitability, even after the cost of shipping is included. But there are practical limitations. California ports have moved rapidly to increase their ability to receive container ships because they are more profitable to handle than ships that carry liquid cargo. According to the California Energy Commission's (CEC) Integrated Energy Policy Report, it will be necessary to build additional port facilities to import refined products. Additional information about California refinery capacity, port facilities and options for improving the balance between supply and demand for petroleum products can be found in this recent CEC effort. The document is included with this report as Appendix VI.

Bio-fuels represent a growing part of the transportation fuel mix. Ethanol is now used as an oxygenate in both California and Nevada, now that methyl tertiary butyl ether (MTBE) has been eliminated for that purpose. Ethanol – ethyl alcohol – has long been used as a transportation fuel in major farming areas, and its use is growing in states that mandate or subsidize its use, such as Minnesota. In Nevada ethanol is "splash blended"; that is, added directly to CBG in tanker trucks, when transported to

retailers. It is usually mixed in a ratio of five percent by volume and is generally not transported by pipeline. Because ethanol is not a perfect substitute for gasoline, there are limits to how much ethanol can be added to an ethanol-gasoline mixture without requiring modifications to vehicles. Also, it is interesting to note when MTBE was outlawed; refineries were actually required to supply more petroleum-based product because MTBE was blended in a ratio of ten percent by volume.

Biodiesel is another bio-fuel that can increase the supply of transportation fuels. Like ethanol, refining biodiesel is much less complex than petroleum refining. Common oils, such as waste cooking oil or soybean oil, can be used as a feedstock and energy inputs are far less than for petroleum products. Importantly, biodiesel is nearly a perfect substitute for petroleum diesel and, in some cases, it offers advantages not found in its more traditional competitor.

In both cases, ethanol and biodiesel, there are several key issues that need to be addressed if they are to be refined in Nevada. Perhaps the most important issue for ethanol is where the water will come from. One million gallons of ethanol require nearly four million gallons of water as an input to the refining processes used in Minnesota. It is likely this number can be reduced, but it is necessary to carefully determine how much water will be required. Another important issue is where the energy for the refining processes will come from. It seems a step backward, and correctly so, to use refined products to make a substitute for refined products. With Nevada's excellent renewable resources, particularly geothermal resources, it may be possible to provide both electricity and process heat. Another important issue is the establishment of facilities and markets for the byproducts of refining, particularly for ethanol. The waste products of ethanol production should be used as the feedstocks for other downstream processes. Ultimately, it is necessary to carefully analyze the cost of the primary feedstocks, grains in the case of ethanol and oils in the case of biodiesel, as well as their transportation to Nevada, if the refineries are to be located in Nevada; or the cost of the finished bio-product, if the refineries are located near the growing locations.

Hydrogen as a transportation fuel is certainly possible, but it is more than a decade away as an automobile fuel. The Regional Transportation Commission in Washoe County is pursuing an aggressive plan to use a mixture of hydrogen and compressed natural gas in both internal combustion engines and fuel cells, but even this project should be described as applied research. Once again, a traditional method of separating hydrogen, using natural gas or electrolysis from conventional power plants makes very little sense, if the goal is to establish hydrogen as a major transportation fuel.

Distribution Market

The feedstocks and the output of the distribution market are refined products. Functionally, the distribution market is a wholesale market where goods are gathered in warehouses (tank farms) and distributed to retailers (gas stations). The distribution market consists of the pipelines that move product from the refineries and the regional and local storage facilities located in Nevada. For northern Nevada, products are supplied by a Kinder Morgan pipeline that extends from Concord, CA through Sacramento, CA on into Reno, NV and the Fallon Naval Air Station. Refer to Figure 4-1 for a drawing of the northern system. For southern Nevada, products are supplied by two Kinder Morgan pipelines that extend collinearly from Colton, CA into the Las Vegas area, serving both Nellis Air Force Base and McCarran International Airport. Refer to Figure 4-2 for a drawing of the southern system. The northern and southern pipelines can deliver a sufficient quantity of gasoline, diesel fuel, jet fuel and other distillates per day, to meet about 110 percent of consumer demand under normal conditions. Kinder Morgan owns and maintains storage facilities both at the California ends of their pipelines and at the Nevada ends. Table 4-3 below shows the storage capacity in Reno and in Las Vegas. While Kinder Morgan owns the pipeline and storage facilities, it typically does not own any of the products it carries and stores. Product is owned by distributors, who may hold and sell the product themselves, or may store and deliver product to retail chains or independent gasoline stations.

4-1 Figure
Kinder Morgan, Inc.
Concord to Reno Pipeline System



The map does not show exact locations or terminal names, but it correctly represent the general pipeline structure in Northern California and Nevada.

When the Kinder Morgan pipelines are not able to supply products or when supplemental supplies are needed, it is possible to carry fuels into the Reno and Las Vegas markets using trucks (more common) and rail cars (less common). Transporting products in this way is only a stopgap measure. It is very hard to deliver enough product in this way because:

- *There are not enough trucks that can be committed to this purpose for long periods of time,*
- *The number of available drivers is limited,*
- *Rail cars are not easily obtained and converted to this purpose in the short run, and*
- *Railroads are already unable to fulfill some of their customer demand with existing engines and crews*

To the extent that these problems are overcome, two new challenges emerge:

- *Gasolines require different formulas in California, Las Vegas and Phoenix and are not interchangeable, and*
- *Truck drivers are limited in the number of consecutive hours they may drive.*

4-2 Figure
Kinder Morgan, Inc.
Colton to Las Vegas Pipeline System



It is possible for the SIP administrator to request "enforcement discretion" from the US Environmental Protection Agency to allow the use of non-conforming gasolines under very unusual circumstances. Such authority, when granted, is limited in duration. Enforcement discretion has been requested in Nevada during a small number of events.

It is also possible to request a waiver of driver time limits from the US Motor Carrier Safety Administration in the US Department of Transportation. Doing so requires a declaration of emergency and presents a safety issue – driver fatigue – that is not easy to quantify. Nevada has not requested this type of waiver in the past.

4-3 Figure
Kinder Morgan, Inc.
Tank Storage & Delivery Capacity at Reno and Las Vegas

Reno Services

Pipeline: Concord CA (10") to Rocklin CA (Sacramento)
Rocklin CA (8") to Reno NV
Reno NV (6") to NAS Fallon NV

Storage: 33 Tanks
611,200 bbls

Facilities: 3 Truck Racks
Mixgrade Blending & Splash Blending (Ethanol)
Additive Injection Systems, including Red Dye

Las Vegas Services

Pipeline: Colton CA (14") to Las Vegas NV
Colton CA (8") to Las Vegas/McCarran Airport NV

Storage: 63 Tanks
1,473,000 bbls

Facilities: 3 Truck Racks
Automated Truck Rack
Tank Car & Truck Loading/Unloading
Laboratory Testing
Vapor Recovery & Incineration
Mixgrade Blending & Splash Blending (Ethanol)
Additive Injection Systems

About ten percent of the volume of storage tanks is generally not available for distribution. This is the product located in the bottom (also referred to as "the heels") of the tank that usually contains a higher concentration of impurities and water. The appropriate SIP administrator has the authority to allow release of gasoline in the

heels of tanks for distribution. This option requires a demonstration of need and has been exercised in Nevada.

Operation of the distribution market is functionally quite simple, but market economics can be complex. The reason is that storing product – maintaining inventory – costs money. The actual fee for storage, like the actual fee for transporting fuels, is relatively small per gallon of product delivered to a retail customer. What can become expensive is related more to the value of the product in the tank. In periods of rising retail prices, product in storage appreciates in value, but when prices are falling, the value of a distributor's inventory decreases. This means that successful distributors must be able to predict general price swings and take advantage of them to the extent possible. If prices are expected to fall, for example, a distributor might want to keep a small inventory. But this, too, represents some level of risk. A refinery or pipeline problem could quickly lead to fuel outages if, for example, only two days of inventory are maintained.

The distribution market, like other petroleum markets, is not regulated economically. This means that decisions about how much inventory to maintain are wholly within the discretion of the distributor and his retailers. Clearly, if the goal is to avoid fuel outages, large inventories are desirable. But there is no way for the state to require distributors to maintain a given quantity of fuel on hand. Who would take the price risk and pay for the lost value of inventory, if prices declined?

How much inventory is available when a problem occurs is an all-to-frequent question. Some low-cost retail competitors may choose to hold small inventories as a way to give them a cost advantage over major company retail outlets. It seems simple enough to allow them to take the supply risk, but it is also important to recognize that when gas stations start placing signs on their pumps that they are out of gas, a different market mentality ensues. People begin to "top-off" their gas tanks and the demand for gasoline far exceeds normal draw down rates. This occurred in Phoenix in 2003. The consequence is a general supply crisis – panic-buying leads to excessive demand and outages at nearly all gasoline stations. What is not widely understood is that the largest amount of gasoline (and to a lesser extent, diesel) storage capacity in Nevada is in the tanks of automobiles. If customers top-off their tanks, there is not enough supply to keep up with demand in normal times, let alone during a pipeline shutdown.

It should be noted that jet fuel markets operate a little differently. Because airlines and airports work together to ensure adequate supplies of jet fuel, most airports, including McCarran and Reno-Tahoe, have more storage as a fraction of their daily draw down than gasoline markets do. It is not uncommon for airports to maintain an inventory of a week or more at normal usage rates. Airlines also have the ability to truck in product and to change their fuel loading practices to minimize the loading of fuel at an airport where supplies have been curtailed.

Retail Market

There are retail markets for gasoline and diesel, but the jet fuel market operates, for the most part, as a wholesale market except for the relatively small amount dispensed to general aviation customers. The inputs and outputs of these markets are the same as in the distribution market – refined products. The retail gasoline and diesel markets take product from distributors and sell it to customers in gasoline stations. These are perhaps the most competitive of all the petroleum markets.

Retailers typically have a great deal of discretion in their pricing policies and often combine gasoline and diesel products with convenience stores. Prices are known to change rapidly and to vary quite significantly among the various brands of gasoline sold in Nevada. Price differentials at competing stations within two or three blocks of each other are often as large as five, or even ten, cents per gallon.

Retailers also have a large amount of storage in their tanks. This storage is typically not tracked, but it can provide as much as an extra day or two of capacity under normal usage conditions.

The economics of retail gasoline stations are again deceptively complex. Individual retailers, for example, may choose to keep their prices high – even in the face of a competitor reducing his prices – if their inventories are running low and it is some time before trucks will provide a new delivery of product. Running a retail gasoline station is quite an entrepreneurial task.

It is important to note that the practice of artificially raising the price of gasoline using taxes is not widely used in the US or Nevada. This is, however, normal practice in many other countries in Europe and Asia. Nevada does have a high gasoline tax, but its purpose is related to geography – big state, long roads, few people – than to energy policy. Taxes do account for about 25 percent of the price of gasoline at the pump.

Energy Efficiency/Conservation Opportunities

Market forces drive the price of transportation fuels, which means that they are allocated to customers using price signals. Plenty of fuel generally means that prices at the pump will be relatively low, whereas a fuel shortage usually means that prices will be high.

The most effective conservation tool for transportation fuels is what we want the least – high gasoline prices. As noted above, the price of gasoline is a relatively complicated mix of what is occurring in four semi-independent markets, markets in which the State of Nevada has very little direct influence. The roles for the NSOE in these markets are to assist in the management of supply interruptions and to provide consumers with information that may help them conserve fuel.

Energy efficiency, as applied to transportation fuels, deals primarily with the fuel efficiency of the automotive fleet. Here the state has very few direct responsibilities because the federal government is responsible for fuel efficiency through the US Department of Transportation's Corporate Average Fuel Economy (CAFE) standards.

Short-Term Conservation Opportunities

Short-term conservation opportunities can be divided into actions drivers may take and actions the state and local jurisdictions may take. For the most part, actions taken by drivers will be the most effective, because actions taken by law enforcement authorities are directed first to public safety.

4-X Table **Nevada State Office of Energy** **Short-term Actions to Minimize Fuel Costs**

- Tune your engine according to manufacturer's recommendations,*
- Ensure that tire pressure is at least the minimum recommended by the tire manufacturer,*
- When possible, avoid long idling times such as early morning warm-up (gasoline engines) or traffic delays,*
- Check brakes as recommended by the manufacturer or whenever there are signs or sounds of the brakes rubbing during normal driving,*
- Minimize unnecessary travel by carpooling and combining or eliminating trips,*
- When accelerating, ensure that speed increases are gradual, except where safety requires a more rapid increase in speed,*
- Take public transportation, when possible.*

Long-Term Conservation Opportunities

Long-term conservation opportunities are directed at significant changes in life-style or major purchases. They represent the best opportunity for families to minimize the transportation fuel costs.

4-Y Table **Nevada State Office of Energy** **Long-term Actions to Minimize Fuel Costs**

- Purchase a fuel-efficient automobile,*
- Live near your place of work, and*

- Choose a life-style and home location so that you can use public transportation.

The list of long-term actions is quite short and obvious. That said, these are fundamental life choices that are not made lightly. The consequence of making these changes, however, is dramatic. Shown below is a simple table that illustrates the number of gallons consumed and the cost of gasoline only for an individual who lives originally 35 miles from work and drives a large sport utility vehicle (the calculations assume that gasoline costs \$2.00 per gallon, that the SUV gets 15 miles per gallon and the hybrid gets 45 miles per gallon).

These long-term changes are roughly ten times as effective as the short-term actions in saving fuel and money.

Some states have attempted to encourage conservation with public service advertising (PSA) campaigns. There have been circumstances when PSAs have been very effective, for example, Ad Council sponsored, anti-drunk driving campaign in the middle 1980s. The effectiveness of that campaign, however, was linked to comprehensive and nearly uniform public support from state governments, activist groups and law enforcement agencies. It seems unlikely that a similar coalition can be formed in the near term for conservation of transportation fuels. For this reason, there is no recommendation for a program of PSAs.

4-Z Example Calculation

Nevada State Office of Energy

Annual Fuel Savings by Making Life-style Choices

Life-style Change	Gallons Consumed	Cost
Old Commute: 35 miles to work, large SUV	1,213	\$2,427
Purchase a hybrid automobile	404	\$809
Move to within 5 miles of work	173	\$347
Move to within 5 miles of work & purchase a hybrid automobile	58	\$115

No maintenance penalty was assigned to the original, high-mileage vehicle, which would further increase the cost of the long commute.

CAFE Standard

After the oil embargo and price-supply shocks of the middle 1970s, the National Highway Traffic Safety Administration (NHTSA), an agency in the US Department of Transportation, began to systematically increase the CAFE standard. That effort had a significant impact on transportation fuel consumption. It is important to note two things about that sequence of events. First, the impact of the increases was not really seen until many years after the standard was changed. This is because there is a delay in when the standard changes and when compliance must be achieved, and even then, the average fraction of vehicles replaced each year is relatively low.

Second, light trucks – the basic chassis for sport utility vehicles – are not counted as part of the automobile fleet. This means that as SUVs became a larger and larger part of the vehicles in the fleet, the actual average fuel economy decreased. But the decrease was not measured because only automobiles were counted as part of the standard.

This does not mean that the CAFE standard is useless. In fact the new hybrid technologies and the growing efficiency of European diesels would offer very practical ways to comply with a more aggressive standard. The State of Nevada is not able to affect this process directly, but can seek higher standards through the Congressional Delegation and through direct requests to the US Department of Transportation.

Transportation Fuels Adequacy

Refined Products Prices

The adequacy of transportation fuels is challenged by the prices of refined products. In general Nevada prices are among the highest in the nation, at least among the continental states. Even so, Nevada faces the prospect of occasional price spikes due to the vulnerability of the supply chain and the likelihood of long-term price increases due to the small and declining number of refineries serving the Nevada market and the concomitant need to import refined products from foreign countries.

These problems are expected to persist for some time because all of the potential fixes are very expensive and require a long period of time to implement. Moreover, the quantity of money removed from the Nevada economy to pay for transportation fuel price increases is quite substantial, especially when added to the price increases for natural gas and electricity. During the last biennium, calculations showed that more than \$2.5 billion went to pay for imported (from outside Nevada) fossil energy, more than half of which was for transportation fuels. Given the price increases that have occurred and the general growth of the economy, preliminary estimates are that

this number now exceeds \$3 billion. This is money that would otherwise be available to build the strength and diversity of the Nevada economy.

Special System Constraints

The transportation fuel system has sufficient capacity to meet normal Nevada demands. But the isolation of Nevada cities, especially Las Vegas, and the limited number of pipelines providing service to the state – three – makes the system marginally reliable.

The easiest and most direct way to improve reliability is to store more refined products in Nevada. Generally this has been accomplished for jet fuel, by the military and the commercial airports in Reno and Las Vegas. Supplies of diesel fuel are generally sufficient because the supply lines to refueling stations for commercial trucks are relatively dispersed. This means that trucks unable to refuel completely in Las Vegas have the opportunity to do so within a relatively short driving distance in nearly all directions; for example, Barstow, CA and Kingman, AZ. Supplies of CBG regular and premium are more problematic. Inventories of these fuels tend to be somewhat lower, and therefore, more susceptible to supply interruption. Strong consumer pressure to keep prices low exacerbates this condition; attempts to increase storage of these fuels have not always been successful for the reasons mentioned above.

Planned Additions and Retirements

NSOE is not aware of any significant planned additions to the delivery or storage systems for transportation fuels. There have been persistent press accounts about one of the 13 California refineries, the one in Bakersfield, ceasing operations in the spring of 2005. The Bakersfield refinery, owned by Shell Oil, produces a disproportionate share of the diesel supply on the west coast. A permanent shutdown of the facility would likely cause some stress in the supply of diesel fuel and an increase in the price.

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Chapter

5**The Office of Energy**

The Governor and the Legislature establish energy policies for the State of Nevada. The Nevada State Office of Energy (NSOE) manages energy policy development and implementation for the executive branch of government.

Nevada State Office of Energy

The Nevada State Office of Energy currently consists of six individuals: a Director, who is also the Governor's Energy Advisor and directly responsible for recommending policies to the Governor and implementing policies adopted by the Governor and the Legislature, the management of NSOE activities and the representation of Nevada's energy interests among various regional and national organizations; a senior individual and a specialist who are responsible for grant administration, including direct interface with subgrantees and contractors, and with the Western Regional Office of DOE; an engineer who is responsible for developing and implementing the state's Energy Assurance Plan, for monitoring state energy conservation efforts and performance contracting, and for support of certain types of grants; an accountant who is responsible for administering compliance with state accounting standards, as well as meeting controls on NSOE and implementing controls on subcontractors and subgrantees required under federal grant programs; and a management assistant.

NSOE is established by NRS 701.160 through 701.240, inclusive. Its statutory responsibilities are listed below.

**5-1 Table
Nevada State Office of Energy
Statutory Responsibilities**

- *Preparation of a "comprehensive state energy plan,"*
- *Preparation of petroleum allocation and rationing plans,*
- *Adoption of regulations for energy conservation in buildings,*
- *Administering the prohibition against electric resistance as a means of heating spaces, and*
- *Administering a program to distribute money in support of net metering systems, per AB 429 (2003).*

Organizational Structure of NSOE

The Nevada State Office of Energy is responsible for developing energy policy recommendations for the Governor's review and managing the development and implementation of energy policies in Nevada. NSOE is located within the Governor's Office and thus is held directly accountable for implementing the Governor's policy. Within the context of the Governor's energy policy, NSOE is also bound by Nevada statutory requirements and by requirements established in the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). The obligations associated with the EERE program are requirements that stem from the State Energy Program (SEP) formula grant that is the primary source of funds for NSOE. This section describes the responsibilities of the NSOE and generally how those responsibilities were fulfilled in the '03-'05 biennium, with some discussion of how they will be addressed in the coming biennium.

An essential element of NSOE's responsibilities is coordinating the implementation of Governor Guinn's Nevada Energy Protection Plan (NEPP). The elements of the Governor's Plan were listed earlier in the Executive Summary and are repeated below as Table 5-2.

5-2 Table **Nevada State Office of Energy** **Governor's Nevada Energy Protection Plan**

- *Support State Government & Statewide Conservation Planning*
- *Encourage Coordination of State Permitting Processes*
- *Perform Annual Energy Resource Assessments*
- *Promote the Availability of Reliable Energy Sources*
- *Encourage Improvement in Federal Permitting*

Statutory Responsibilities

NSOE is also responsible for complying with the responsibilities of the office outlined in Chapter 701 of the Nevada Revised Statutes.

Certainly the most far-reaching of NSOE statutory responsibilities is to draft and implement the Comprehensive Energy Plan for Nevada (CEPN), NRS 701.190. The Governor's NEPP has been used as the foundation for formulating the CEPN. The NSOE near term strategic action plan for implementing the NEPP and CEPN is discussed in chapter 6 and provided in its entirety in Appendix II. The long-term issues associated with formulating and implementing the CEPN in the coming biennium are discussed in chapter 6 as well.

5-3 Table
Nevada State Office of Energy
Statutory Responsibilities – Functional Matrix

	Policy Formulation	Education, Outreach & Coordination	Policy & Program Implementation	Grant Administration
Energy Research & Policy	180, 190	180(2), (4), (8)	160, 180, 190	170
Renewable Energy	190(1)b, (2)b, (2)c, 2(d)2	180(7)b, (8)	160, 190 (1)b, (2)b, (2)c, (2)d2	170, 170(5), 180 (7)b
Conservation and Energy Efficiency	180(2), (4), (5)b, 190(1)c, (2)b, (2)d3, (2)e, 200, 220	180(2), (7)c, (8), 200, 220(5)	160, 180(4), (5)b, (7)c, 200, 230, 240	170, 180(7)c, 240
Projects that Promote Economic Development	180(5a), 190(1a, 2a)	180(6, 7a, 8),	160, 180(5a), 190(1a, 2a)	170, 180(7a), 190(2d(1))

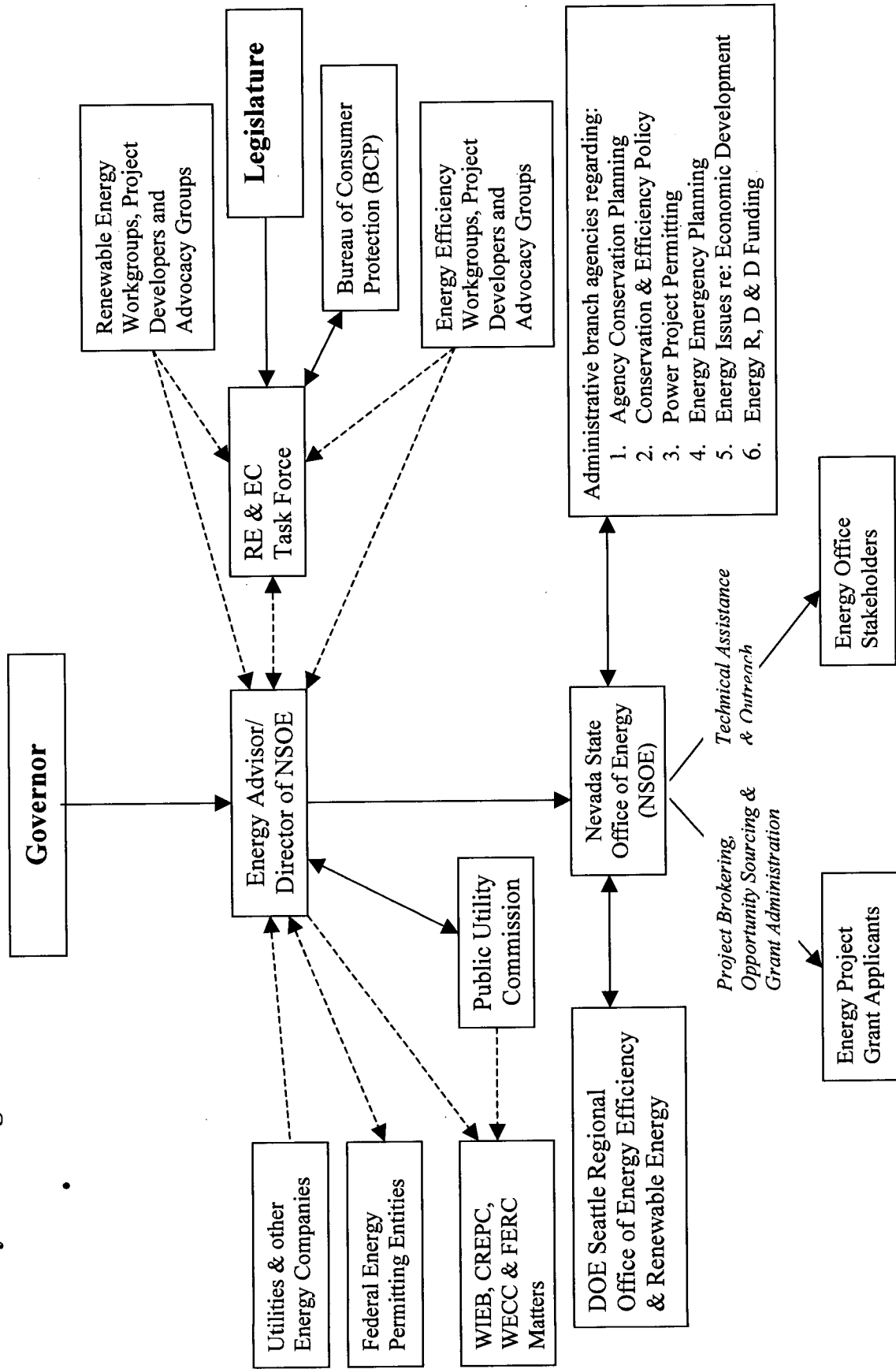
Another important aspect of the statutory requirements is the requirement that NSOE and the Renewable Energy and Energy Conservation Task Force (“Task Force”) coordinate their activities and programs relative to Renewable Energy and Energy Efficiency. The Task Force is also charged with advising NSOE on the renewable energy and energy conservation components of the CEPN.

Chapter 701 also directs NSOE to serve as the point of contact in Nevada for federal grants in support of energy projects, and NSOE is thus the designated administrator for the Department of Energy’s State Energy Program (SEP) in Nevada. Through the SEP, NSOE supports renewable energy, energy efficiency and clean transportation education, demonstration, and technology utilization projects. NSOE seeks to use the SEP funds to encourage renewable energy and energy efficiency technology adoption in state and local government, and in the private sector through market-based solutions.

Activity and Program Network

NSOE would not be able to carry out its programs without the financial support of the SEP, a formula grant program created in 1978 and administered by the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy. The goals of EERE and a description of the SEP are provided in Appendix VII. Figure 5-4 on the next page graphically illustrates the activity and program network. Some of the more significant grant activities of NSOE are summarized in Table 5-5 on the following page.

5-4 Figure
Nevada State Office of Energy
Activity and Program Network



5-5 Table
Nevada State Office of Energy
Grant Activity – Current Biennium

Grant Source	Year Awarded	Amount (\$ X 1000)	Purpose
DOE – Cooperative Agreement	2004	52	Advancing the Choice – Clean Cities
DOE – Formula Grant	2004	397	State Energy Program
NREL – Subcontract	2004	75	Tech Asst – Nevada Workshop
DOE – Special Project Grant	2004	100.	Rebuild Nevada
DOE – Special Project Grant	2004	73	Wind Energy Support
DOE – Clean Cities Grant	2004	25	Las Vegas Coalition Support
DOE – Clean Cities Grant	2004	25	Truckee Meadows Coalition Support
DOE – Cooperative Agreement	2005	70	Clean Cities – Peer Exchange
DOE – Cooperative Agreement	2005	20	Geothermal Energy Support
DOE – Cooperative Agreement	2005	10	Wind Energy Support
DOE – Formula Grant	2005	391	State Energy Program
DOE – Special Project Grant	2005	82	Codes & Standards
DOE – GeoPowering the West	2005	40	Geothermal Energy Support
DOE – Special Project Grant	2005	93	Codes & Standards
DOE – Special Project Grant	2005	150	Industrial Workforce
NREL – Subcontract	2005	13	Tech Asst – Transmission Roadmap
NREL – Subcontract	2005	81	Tech Asst – Energy Efficiency Strategy & Rural Renewable Development
DOE – Special Project Grant	2005	130	Rebuild America

Implementing the NEPP, formulating the CEPN, abiding by the statutory requirements of NRS 701 and fulfilling NSOE's responsibilities as the federal administrator of the SEP requires an enormous amount of coordination and communication. Thus coordinating the implementation of energy policy in Nevada involves numerous administrative branch agencies and requires coordination and information sharing with many public and private sector entities. Figure 5-M, the "NSOE Activity and Program Network" graphically illustrates NSOE's interaction among the various agencies and commissions responsible for energy policy implementation.

This network of relationships has supported the implementation of programs and activities in three areas in the current biennium: conservation and efficiency, renewable energy and support for energy projects that promote the economic development and energy security of Nevada.

The next section of this chapter describes NSOE activities and programs in support of conservation and energy efficiency. The breadth of NSOE activity relative to initiating, participating, administering and coordinating in programs that support improved energy efficiency in Nevada are described.

The following section describes NSOE activities and programs in support of renewable energy research and development. The section discusses NSOE activities to promote renewable energy development through education, outreach, grant support and coordination with other activities in the state, including support for the timely implementation of the RPS, and for federal research grants for renewable project development.

The final section describes NSOE activities related to the permitting and siting of energy projects in Nevada. The NEPP priority for improving the energy security of Nevada, the President's NEP priority for increasing our energy security through development of domestic energy sources, and the statutory requirement to facilitate the development of energy projects that promote the economic development of the state coalesce around the common denominator of helping to encourage the permitting and construction of energy projects in Nevada. This section describes the energy planning and permitting processes in our state and region and then discusses the role of NSOE in facilitating project development and provides a summary of all projects currently under development in Nevada. Projects considered in this section include energy infrastructure projects, fossil generation projects and renewable generation projects.

Links with External Organizations

Nevada maintains alliances with several regional and national organizations. Some of these alliances are with governmental agencies from the federal or state

governments, some are with industry organizations and some are with professional or regional associations. NSOE's and the state's relationship with these organizations is explained in the following paragraphs.

Federal Government – Federal Energy Regulatory Commission

The function of the Federal Energy Regulatory Commission (FERC) is to regulate interstate commerce related to the business of energy. For the most part this means interstate commerce related to electricity and natural gas transmission and wholesale market transactions. The Nevada PUC functionally coordinates with FERC activities in that the state maintains jurisdiction of retail transactions and many other aspects of retail service, including costs (tariffs) charged to customers.

The State of Nevada is represented by the PUC and NSOE in certain matters where there is direct interface with FERC. The three most prominent areas during the last biennium were in the areas of resource planning (primarily transmission), market monitoring and resource adequacy assessment. While FERC maintains jurisdiction over interstate transmission tariffs, utilities and state commissions play an active role in transmission planning at least in part because the state is generally responsible for the siting of electric transmission. During the last biennium, and perhaps in the future – depending upon whether a national energy bill is (1) passed and (2) includes language that involves FERC – there was a FERC effort to impose a federal presence in the resource planning process through “Regional Transmission Organizations.”

At the same time, western states in particular, have worked to improve the viability of multi-state planning processes. The most successful of these has been the Rocky Mountain Area Transmission Study (RMATS), which affects Nevada because one of the goals of that organization is to relieve congestion in the region east of Midpoint Substation in Idaho. Midpoint is an important source of imports into Nevada and increased capacity east of Midpoint should generally allow a greater amount of relatively low cost power into Nevada. Another potentially important effort is currently being formed to provide transmission for base load “clean” coal plants and wind generators to deliver energy into California. At least two of the plans surrounding this latter effort would provide access to Nevada both to the low cost base load power and to the transmission line for exports – largely renewable energy – to other states and, perhaps, to electrically link the two Nevada electric utilities.

There is a third electric transmission planning effort sponsored by TransCanada, an international natural gas pipeline company, called the Northern Lights Project. TransCanada is currently using heat rejected from natural gas powered electric generators to extract petroleum from oil sands located in northern Alberta. As a result, TransCanada is seeking a market for what amounts to “waste electricity,” and

in relatively large amounts. One of the plans for this project also includes a transmission line that would pass through Nevada.

The multi-state plans and the TransCanada plan are all subject to FERC jurisdiction, but may well obviate the need for FERC to become directly involved in some of the most important (to Nevada) electric transmission plans.

FERC is also responsible for interstate natural gas transmission pipelines. However, for natural gas, FERC has siting responsibilities and state governments are less directly involved in new natural gas transmission.

Federal & State Governments – Nevada Southwest Energy Project

The function of the Nevada Southwest Energy Project (NSWEP) is to coordinate the application of federal research dollars committed to Nevada with state priorities and capital planning. It consists of representatives from the U.S. Department of Energy, the National Renewable Energy Laboratory, Nevada's education and research centers – UNR, DRI and UNLV – and NSOE. Additional information about the function of NSWEP is provided below under the Renewable Energy section.

State Government – Nevada Regional Coordination Group

The functions of the informal Nevada regional coordination group are to coordinate coverage of important regional conferences and meetings, exchange information regarding the content of such conferences and meetings, coordinate the collection and transfer of Nevada-specific information for federal legislators and regulators, and coordinate interagency policies related to regional and federal programs and initiatives.

The coordination group generally meets monthly and includes members from the PUC, NSOE, and the Consumer Advocate's Office, and also may include invited parties, such as the electric or natural gas utilities. The group may also confer on the Executive Branch's positions on matters before the Nevada Legislature.

State Government – Nevada Renewable Energy and Energy Conservation Task Force

The functions of the Renewable Energy and Energy Conservation Task Force (Task Force) are to advise NSOE, coordinate its activities with NSOE, the PUC and the Consumer Advocate's office, expend resource entrusted to it in order to educate the public, create incentives for renewable energy and energy conservation, distribute grants, and conduct feasibility studies, and prepare an annual report for the Governor and the Legislative Commission or Legislature. Additional information about the Task Force is provided below under the subchapter by that title.

State Government – California Energy Commission

The function of the California Energy Commission (CEC) is to provide both technical and policy information to California regulators. The CEC is the only organization of its size and type in the west and it has undertaken a number of California analyses that directly affect Nevada and other western states. Two examples of this are the CEC Integrated Energy Policy Report and the ongoing development of its natural gas market model (called "NARG") in support of CREPC's electric resource adequacy efforts.

Industry Association – Western Electric Coordinating Council

The function of the Western Electric Coordinating Council (WECC) is to establish and coordinate regional, voluntary reliability standards for the western interconnection. While reliability standards are voluntary, they are widely treated as mandatory by the member utilities. WECC is part of a national system of coordinating councils organized under the North American Electric Reliability Council (NAERC). One aspect of previous Congressional efforts to enact a national energy bill has been the reliability section, which made NAERC's and WECC's reliability standards mandatory and would establish penalties for non-compliance. Passage of a reliability section is considered likely because it addresses, in part, the shortcomings in the national electric grid uncovered by the August 14, 2003 northeastern power outage.

Nevada entities engaged in WECC include the electric utilities, Sierra and Nevada Power, the PUC and NSOE. Generally, the role for non-utility members is to oversee the activities of the utilities to ensure that ratepayer and state policy interests are not compromised by the collaboration of, for the most part, for-profit utilities.

Industry Association – Western Governors Association (WGA)

The WGA is a forum established by the governors to explore and act jointly on issues of mutual interest or concern. Recent WGA activities include environmental issues (for example, joint action on the status of listing the sage grouse as an endangered species) and several energy issues. Energy issues are generally addressed by the WGA directly or through the Western Interstate Energy Board. The WGA has chosen to deal with the Clean and Diversified Energy resolution directly (this is the resolution that calls for the building of 30,000 MW of "clean and diversified energy" and the 20 percent improvement of energy efficiency by 2020).

Industry Association – Western Interstate Energy Board (WIEB)

The WIEB is a non-profit organization established to implement some of the energy initiatives of the WGA. Issues that fall within the purview of WIEB include activities related to (1) the Western Interstate Nuclear Compact, (2) the WGA protocol on transmission siting in the west, (3) a series of activities related to operational

transmission issues and regional transmission organizations, and (4) actions taken to unify resource adequacy assessments, a role that has been delegated to CREPC.

Industry Association – Committee on Regional Energy Policy Coordination (CREPC)

CREPC functions in concert with WIEB and is active in carrying out several WGA initiatives. These include a very substantial effort to determine electric resource adequacy for the west. In connection with its work on electric adequacy, it soon became apparent that in order to determine electric resource adequacy, it was necessary to determine natural gas resource adequacy. These parallel efforts are underway with considerable assistance and participation by the California Energy Commission. CREPC is also active in coordination with FERC on market monitoring and, through a subgroup called SSG-WI, efforts to coordinate transmission planning among the western states and the nascent RTOs.

Regional Association – Regional Transmission Organizations

More than two years ago, FERC correctly identified that the integrated power grids were not functioning well together as a wholesale market, and that considerable efficiencies were possible if larger and larger groups of control areas would jointly manage their assets. To address this problem FERC proposed the now infamous "Standard Market Design." Western states firmly believed that they could accomplish the efficiencies FERC sought in a much more effective manner that respected the unique transmission conditions that exist in the west. Indeed, they proceeded to create at least three of these "larger groups of control areas" – called regional transmission organizations or RTOs.

The three or four distinct RTO formation efforts, included GridWest (formerly known as RTO West) covering the Pacific Northwest as well as northern Nevada and possibly southern Nevada, TransConnect covering the desert southwest and possibly southern Nevada, the California Independent System Operator (CAISO), and a relatively unformed regional organization covering Utah, Colorado, Wyoming and potentially parts of other states. It appears that during the last several months, this RTO effort has not been advanced, perhaps because FERC is wary of acting until its statutory authority is clear, and states (and utilities) are wary of acting if federal legislation could undo much of the work done before the energy bill is passed.

Program Activities of NSOE

Program activities of NSOE are broadly divided into actions related to energy efficiency and energy conservation, on the one hand, and renewable energy deployment on the other. These activities are coordinated with state agencies and state priorities, and with federal programs and priorities, as administered by EERE.

Energy Efficiency and Energy Conservation

While the respective meanings of “energy efficiency” and “energy conservation” are not strictly defined, in this report energy efficiency programs are efforts intended to improve the effectiveness with which energy is used or applied to a given task and energy conservation programs are efforts to minimize or eliminate the need to apply energy to a given task. For example, programs to establish architectural standards for new state-owned buildings or to establish certain design elements in heating, ventilation and air conditioning (HVAC) systems to ensure occupant comfort or to require minimum gas mileage for state-owned vehicles would be considered energy efficiency efforts. Conversely, programs to set back thermostats in the evening hours (when occupant comfort is not an issue) or to minimize the number of trips taken in state-owned vehicles would be considered energy conservation measures. Similarly, most behavioral modification efforts are considered to be energy conservation programs.

The most important point about the definitional distinction between efficiency and conservation is that an effective energy management program for the state needs to include both efficiency and conservation. The Governor’s Comprehensive Energy Plan for Nevada does, indeed, include both of these characteristics. Good energy management, like good government, requires a provident approach.

Actions in support of energy efficiency and conservation are described in detail in Chapter 6, but the following Table 5-6 lists the major programs administered over the last biennium and for the future, as well.

5-6 Table Nevada State Office of Energy Energy Efficiency and Energy Conservation Program Activities

- *Engagement of organizations that influence residential and commercial building codes and energy standards,*
- *Promotion of programs that increase energy efficiency “beyond code” – for example, Energy Star and Energy Smart Schools,*
- *Support for secondary appliance standards,*
- *Active engagement of state and local organizations involved in performance contracting per AB 398 (2003),*
- *Conduct of periodic energy usage surveys,*
- *Administration of the prohibition on electric resistance heaters,*
- *Coordination of state agency energy conservation efforts,*

- *As requested, coordination with and assistance to jurisdictional agencies for weatherization and energy-related low income support programs,*
- *Support for traditional utility demand side management programs,*
- *Active engagement in support of more aggressive load management programs,*
- *Promotion of appropriate combined heat and power applications,*
- *Support for more a aggressive CAFE standard,*
- *As requested, energy management assistance to small businesses, as well as Nevada's major businesses – mining, manufacturing and gaming, and*
- *Cooperation with regional and national energy conservation partners*

Renewable Energy

NSOE is responsible for supporting and encouraging policies that lead to (1) the further diversification of Nevada's electricity supply and (2) a reduction in the per capita use of fossil energy. Diversifying electricity supply includes promoting diversification of the fuels used to produce electricity as well as diversification of the locations of electric generation facilities and the production areas for electric generator fuels. Diversification of fuel supply and location increases Nevada's energy security by decreasing dependence upon specific plants and specific transmission lines. Diversification of fuel supply and location promotes economic development by encouraging development of Nevada's indigenous – and generally renewable – resources and promoting the development of new power facilities in locations that can accommodate those facilities and their associated environmental costs and benefits.

NSOE seeks to support renewable energy development by supporting policies that:

- Enhance market demand for renewables by promoting market mechanisms such as the **renewable portfolio standard, green power tariffs and renewable energy tags or tagging systems;**
- Reduce the cost of producing renewable energy in Nevada by improving **renewable resource mapping, seeking grants to support renewable projects,** and providing **business modeling support** for community-based renewable projects; and
- Mitigate barriers to bringing renewable energy to market such as addressing **utility interconnection issues** and mitigating unduly onerous or redundant **permitting policies.**

Nevada's Renewable Portfolio Standard

Efforts to diversify fuels used in Nevada to generate electricity benefit greatly from the Renewable Portfolio Standard (RPS) established by the 2001 Legislature and modified constructively by the 2003 Legislature. The statute makes Nevada policy relative to renewable energy used in generating electricity clear and direct: the use of moderate amounts of renewable energy in meeting our electric needs is in the public interest. The corresponding regulations issued by the Public Utilities Commission further the public interest element of the law by requiring the electric utilities to use competitive means to purchase renewable energy. This is in stark contrast to other RPS laws that create public benefit charges or other means to provide direct subsidies to renewable developers.

Nevada's RPS statute requires that an increasing fixed fraction of the energy consumed by the customers of the electric utilities (and former customers who become retail access; that is, AB 661, customers) be generated by renewable means. This fraction moves, in 2 percent increments every two years, from 5 percent of total consumption in the years 2003 and 2004, to 15 percent in year 2013 and thereafter. The standard also requires that 5 percent of the renewable consumption be produced by solar means. Refinements of the RPS provide special subsidies or treatment for solar photovoltaic power, run-of-the-river hydro, and tire depolymerization technologies. The statute also provides for qualification of renewable power generated outside of Nevada, so long as the energy is consumed in Nevada and that the renewable facility is "connected to the transmission system of the electric service provider." Neither Nevada's statute, nor those of any other state in the Western Interconnection, allows qualification of renewable energy consumed in another state, regardless of where it is produced.

NSOE is also actively engaged with other state parties to establish an effective and reliable system for tracking renewable generation. Nevada currently has its own system administered by the PUC, as required in current statutes. At the same time, a west-wide system that accounts for various state laws is under development. The system is called WREGIS – Western Renewable Energy Generation Information System. It will be administered by the Western Electricity Coordinating Council, according to a board of directors that will be formed later this year.

Compliance with the RPS law has been less than what had been hoped for, and less than what was expected. Initial implementation of the law was delayed as technical concerns about the RPS regulations were addressed. Once corrected, implementation of the regulations was relatively slow, as the utility worked carefully to establish contract provisions that provided relatively rigorous performance goals and penalties for renewable developers who failed to deliver the contracted amount of renewable energy. Once these issues were successfully addressed, seven new renewable energy contracts were signed. These contracts, if fully implemented,

would have met both Sierra's and Nevada Power's portfolio standard roughly through the year 2008. Unfortunately, the contracts were not all fully implemented. At the beginning of 2005, only two of the seven contracts were generally proceeding as originally negotiated, two had been cancelled and three had not been cancelled, but were not proceeding as intended and still could be cancelled.

The Nevada Southwest Renewable Partnership (NSWEP)

A number of NSOE's programs are broadly based to support all types of renewable technologies. One of these programs, the Renewable Portfolio Standard, has already been discussed. A second effort supported by NSOE in conjunction with the National Renewable Energy Laboratory (NREL) is the Nevada Southwest Energy Partnership. Nevada has been afforded a unique opportunity to develop renewable energy deployment centers under a system of grants sponsored by Senator Reid and other members of the Congressional Delegation. Two centers are currently planned, one at the University of Nevada Reno's (UNR) Redfield Campus in south Reno and the other at the University of Nevada Las Vegas (UNLV), possibly with a remote location near the planned Boulder City solar energy facility in Eldorado Valley. The non-profit Desert Research Institute (DRI), also associated with the University of Nevada system, is a full partner in both locations. Additional information about NSWEP and the new deployment centers is found in the next chapter under the "Overhaul and Refocus Federal Energy Programs in Nevada" subsection.

The Temporary Renewable Energy Development (TRED) Program

The final NSOE effort involving all renewable technologies has been the development of the TRED Program. When it became clear that some renewable developers, who already had contracts with Nevada's electric utilities, were having difficulty financing their projects, NSOE formed a working group of individuals from the renewable developers and their financial advisors, the electric utilities, the PUC staff and the Bureau of Consumer Protection (BCP). The goal of this working group was to find a way to improve the likelihood of the renewable developers obtaining financing on reasonable terms. This was viewed as potentially helpful because the contract or power purchase agreement (PPA) with the two electric utilities, once considered the *sine qua non* for access to development funds, was generally not considered favorably by at least one of the traditional rating agencies. The reason for this tepid reception by a rating agency, and the potential lenders they tacitly represent, was the credit status of the Nevada electric utilities. That status was adversely affected by its balance sheet after the un-recovered expenses associated with the western energy crisis and potential liabilities – principally to Enron creditors – in unresolved legal matters.

The working group, after long and difficult negotiations, came to a consensus about the TRED Program. Basically, the program called for the separation of revenues in support of the renewable PPAs from other revenues collected from customers. It

then required that the renewable revenues be placed in a trust, the TRED trust, so that a financial trustee could distribute funds to qualified renewable developers, who would then have the funds to make required payments to their lenders. In concept it is fairly simple, but the details are anything but trivial.

It is important to have appropriate expectations about the TRED program because it is not a panacea; there are other factors that can still lead to project cancellation, even cancellation related to financing. First, it is virtually impossible to make a program like this “bankruptcy proof,” meaning that it cannot protect lender assets no matter what a bankruptcy judge might choose to do. Bankruptcy judges simply have too much authority and are ultimately responsible for protecting the interests of the creditor, not the customers or ratepayers. The TRED program segregates funds – so that they do not belong to the utility – and relies on a state law that mandates an RPS to give a bankruptcy judge ample reason for leaving the contract, and therefore the developer’s and lender’s revenue stream, in place. Also, the TRED program calls for the creation of an ample reserve – at least three months of payment to developers without incoming revenues – this reserve is not intended, however, to protect developers or lenders except through temporary interruptions that might occur in the event of a bankruptcy or significant contract dispute.

Geothermal Energy Support Activities

NSOE supports geothermal energy development in Nevada. The principal advantage of geothermal generation is that it is relatively constant and can operate at a fixed output for many days at a time. The principal weakness of geothermal is the resource – it is difficult to determine how productive a particular resource will be until it is developed, and once developed it can be quite fragile if operated improperly. Geothermal power typically costs somewhere around 5 or 6 cents per kWh for existing fields with known resources, to between 6 and 7 cents per kWh for new fields.

The office actively participates and administers, in part, the work of the Geothermal Working Group. Working groups are part of a U.S. Department of Energy (DOE) effort to “get the word out” about successful projects and strategies, and to act as an informational focus for “things that work, and things that don’t.” Other state partners in the working group include the Great Basin Center for Geothermal Energy, the Nevada Division of Minerals, UNR’s Mackay School of Mines, and the Management Assistance Partnership. The working group also includes a number of local, non-profit and private participants – individuals that do the groundbreaking work that is shared with and encourages other members of the group.

Large geothermal development generally is not a part of working group activities. The money involved is quite substantial and much of the information related to a resource is proprietary. The focus of the working group, then, is characterization of

Nevada's geothermal resources, developing good public databases that can lead to more sophisticated private development, support for governmental or small business projects, and for the many direct use applications for geothermal energy. Direct use geothermal; that is, a project that uses heat directly and does not generate electricity, is widely available for space and process heating, for ground-source heat pumps, and for district heating projects. Generally, these can be market driven, especially as natural gas and petroleum prices remain high.

NSOE is also an active participant in DOE's GeoPowering the West program, and relied heavily on its other state partners, especially the Nevada Division of Minerals, in hosting "trade missions." Trade missions are workshops that usually involve a host state with special experience or knowledge, and a visiting state that hopes to learn from the experiences of the host state. This is much like the working group concept, except it is interstate and usually only involves two or three states. Nevada hosted a trade mission with Idaho two years ago and a similar trade mission with Alaska last year. DOE has provided funds to host an additional trade mission this coming year with Nevada's Indian Tribes.

Wind Energy Support Activities

NSOE supports wind energy development in Nevada. The principal advantage of wind power is that it is relatively inexpensive; it costs somewhere between 3 and 4 cents per kWh of energy. Its principal weakness is that it is intermittent in nature; as a result it is necessary to "firm" wind power with some other type of generator that can rapidly ramp up or down to accommodate changes in wind intensity.

Again, the office actively participates a Wind Working Group that functions much the same as the Geothermal Working Group. Partners in this working group are generally divided into two types of needs: individuals seeking small, single customer wind installations, and local governments or organizations seeking medium sized or "community" wind installations. Small wind installations typically range from a few kilowatts to about 150 kW and can be used on-grid or off-grid to meet an individual customer's needs such as water pumping for stock or irrigation or merely to supplement energy received from the utility in a net metering installation (30 kW or less). Larger, community based wind installations can range from a single mid-sized wind turbine of 500 kW to multiple large turbine installations of up to 2 MW each. Generally rural community based installations must work electrically with the utility's distribution system, so there is a practical limit to the number of turbines that can be added. The practical limit varies with location but it is usually no larger than 3 to 5 MW, and can be much smaller.

It is also true that working group activities generally do not become directly involved in large "wind farms," though potential developers often participate in group activities and generously share their experiences. As with geothermal resources, the cost of

obtaining data sufficient to support the financing of a project tends to be highly proprietary and reasonably expensive.

Nevada also supports DOE's initiative called WindPowering America, and participates in peer evaluations and information exchange workshops in various locations throughout the west.

Solar Energy Support Activities

NSOE supports solar energy development in Nevada. Solar energy's principal advantage is that it typically provides energy just when it is needed the most in hot climates like Las Vegas. Its principal disadvantage is its cost; large concentrating arrays today cost two or three times as much as electricity from a natural gas plant. Photovoltaic (PV) installations are not any better, though most manufacturers claim that there are benefits associated with its being "distributed" throughout the grid. As installed today, PV is even more expensive than concentrating solar, although it is not really fair to compare the two. Concentrating plants are much larger, hence some savings due to the scale of such projects and currently use water to cool the plant, which is unnecessary for PV installations.

Again, the office actively participates in a Solar Working Group that functions much the same as the geothermal and wind groups. Other partners in the working group are most often associated with photovoltaic and solar hot water installations. Other solar technologies, such as concentrating solar and solar dishes tend to be either too expensive or too experimental for small-scale installations. Photovoltaic cells are beginning to make fairly substantial market penetrations in Nevada in response to the Legislature's AB 431 (2003). NSOE is assisting, as needed, in the fine work being done by the Renewable Energy and Energy Conservation Task Force, the PUC and the electric utilities. It is anticipated that nearly 1 MW of PV will be available to the utility by the end of this year, most of it in small one or two kW installations. The City of Reno and many other private and public sector customers are adding installations up to the net metering limit of 30 kW. Southern Nevada Water Authority is adding quite a bit more based on their status as an SB 211 (2001), or retail access customer.

NSOE is a strong supporter of a resurgent solar hot water program. Early solar hot water installations, while quite functional, were often installed improperly and not maintained. As a result, many became basically inoperative within four or five years. New installations for multi-family units are particularly attractive for state and local governments trying to come to grips with energy costs in low and moderate income neighborhoods. Nevada's labor community has stepped up to just this kind of challenge in the past, with AFL-CIO training initiatives for PV installations – a program designed to ensure high quality reliable power supplies. Given the reasons

for limited success of earlier hot water solar heating programs, high quality installations will be particularly important if the industry is to be successful today.

NSOE is also an active participant and supporter of DOE's "Million Solar Roofs" initiative, intended to put PV installations on 1 million American homes. Interestingly, PV costs have been relatively stable for some number of years; however, within the last year new fabrication technologies have begun to lower retail prices of the PV cells themselves.

Biomass Energy Support Activities

NSOE supports biomass energy development in Nevada. The cost of electricity from biomass generators varies widely. Most biomass facilities are highly entrepreneurial in nature, involving a number of special circumstances that all may have an effect on whether a project will be a moneymaker or not.

Again, the office actively participates in a Biomass Working Group. Partners come from three different technologies: forest waste biomass, municipal waste – methane – biomass, and renewable transportation fuels development – biodiesel and ethanol.

Nevada has three areas where forest wastes are large enough to have value in the generation of power. These areas include the greater Tahoe basin, the Mount Charleston area near Las Vegas and the Ruby Mountains in northeastern Nevada. To be feasible for power generation, forest wastes need to be reasonably concentrated, accessible (topography can not be too steep, for example) and available under a long-term (10 years) stewardship contract. Under these general conditions it is possible to establish gathering techniques, to prepare culling standards, to locate milling and power generation facilities reasonably close to the forest management activities, and to install the electrical interconnection needed to export the power. The sustainable annual generation from Nevada's forest wastes is fairly small, probably amounting to somewhere between 25 and 50 MW.

The techniques for generation of electricity from municipal wastes are not very complicated, but they do require that we manage waste streams differently than we have in the past. Generally, wastes need to cure for some period of time in order to generate methane gas, which needs to be collected and retained. The wastes also need to be enclosed with some form of liner to retain the liquids needed for methane generation. Using only wastes from Nevada, the sustainable annual generation from municipal wastes is also fairly small, probably less than 100 MW. If Nevada imports wastes from other states, as is planned in several jurisdictions, the generation capacity can increase accordingly.

The development of biofuels from organic matter is the third area for biomass working group activities. Two fuels are generally considered, biodiesel and ethanol, and are discussed in more detail in Chapter 4. It is also possible to use certain

biomass products directly. For example, the El Dorado in Reno and several hotel-casinos in Las Vegas have been burning used cooking fats directly to provide space and water heating, or shipping off their used cooking fats for biodiesel production. Again, this is an opportunistic application, but it can save a considerable amount of energy when managed properly.

Renewable Energy Rural Development Activities

Rural communities in Nevada rely very heavily on farming and ranching activities. Even those not directly involved in farming and ranching are surely affected by the spending of farmers and ranchers or the businesses that support such activity. In Nevada, farming and ranching are particularly sensitive to the price of natural gas and petroleum products. Natural gas is used directly by some for process and space heating and indirectly farmers and ranchers are exposed to natural gas prices in the electricity they use to pump water for crops and stock. Petroleum products are used by ranchers to tend animals, move them to market and to get into towns sometimes located far away from their homes. Farmers also need to get their crops to market and to plow their fields.

When energy costs are known, it is generally possible for rural Nevadans to manage their activities and protect their margins when it comes time to sell their crops. With volatile, high energy prices their ability to manage margins is greatly diminished. At the same time, the U.S. Department of Agriculture (USDA) offers grants and loans to farmers to support investments in renewable energy technologies. For this reason NSOE is proposing actions to support rural Nevadans. Details about the proposal are included in Chapter 6.

Energy Reliability and Assurance

Permitting and Interconnection Support

Among the most important components of the Governor's Energy Plan was to encourage the development of energy infrastructure and energy generation facilities in Nevada. For the last four years, the Office of the Governor and the Nevada State Office of Energy have developed a network of relationships with state, regional and federal bodies that affect the construction of energy facilities. The goal in developing this network has been to gain an understanding of the permitting, siting and interconnection processes and to seek to help developers of new energy facilities at key times in those permitting processes. We have met regularly with the utilities, merchant power plant developers and the developers of renewable energy to seek to understand their difficulties and to work with them to identify solutions. The Western Governors Association has concluded a memorandum of understanding with the BLM and the Department of Interior in a pledge to cooperate with these federal agencies to seek solutions to regional permitting problems (see Appendix VIII).

The permitting, siting and interconnection processes are complex, and NSOE's efforts to act on behalf of the Governor's Office in facilitating these processes continues to be a work in process. The office is committed to continuing to better understand the processes and the positions of the stakeholders in the processes so that NSOE can become an ever more effective mediator in overcoming barriers to development. Resource Concepts, Inc. developed table 5-7 which shows the permitting entities and permits that are required in developing energy projects in Nevada.

Energy Assurance and Emergency Management

NSOE plays a significant role in the development and implementation of the State's energy assurance and emergency management functions. This includes the development of an Energy Assurance Plan in accordance with new DOE guidelines. These new guidelines are substantially more demanding in terms of required effort; they divide activities into actions to prevent emergencies from occurring and actions to take during an emergency. Completing a revised Energy Assurance Plan is one of the ten energy actions recommended by NSOE for the coming biennium, and is further described in Chapter 6.

During the next biennium, NSOE will need to work closely with several state agencies, as well as gas and electric utilities to ensure a number of activities have been completed. For example, have utilities identified critical infrastructure related to their operations. While NSOE is not required, or able for that matter, to make these identifications, it is important that NSOE coordinate energy assurance activities throughout the state. NSOE will also need to work closely with other state and local agencies to ensure that their plans are prepared and that they work constructively with state planning.

During an emergency NSOE staff members are called upon to man position ESF-12 (Emergency Support Facility) in the Department of Emergency Management's offices in Carson City. The PUC also has personnel trained to perform ESF-12 support activities and have participated on joint exercises with NSOE.

5-7 Table
Nevada State Office of Energy
Energy Project Permits & Permitting Agencies

AGENCIES		PERMIT OR CONCURRENCE
FEDERAL		
U.S. Bureau of Land Management	1	Environmental Impact Statement pursuant to the National Environmental Policy Act
	2	SF-299 ROW Grants and ROW Amendments
	3	Concurrence on no effect to paleontologic resources pursuant to the Antiquities Act of 1906; NEPA
U.S. Fish and Wildlife Service	4	Concurrence on no adverse effect to endangered species under Section 7 of the Endangered Species Act
U.S. Army Corps of Engineers, Reno Field Office	5	Permit to modify/cross drainages carrying Waters of The U.S.; demonstration of the absence of wetlands
Federal Aviation Administration	6	No Hazard Declarations pursuant to 14 CFR 77
Federal Highway Administration	7	Permits to Cross Federal Aid Highway
STATE OF NEVADA		
Nevada State Historic Preservation Office (SHPO)	8	Concurrence on no effect/no adverse effect to historic properties pursuant to Sec. 106 of the National Historic Preservation Act
Public Utilities Commission of Nevada	9	Permit to Construct a Utility Facility under the State Utilities Environmental Protection Act (UEPA)
Nevada Department of Transportation	10	Right-of-way occupancy permits
Nevada Division of Wildlife/Division of Forestry	11	Development Permit for a water body
Nevada Division of Water Resources	12	Develop permits for change in manner and place of use and point of diversion
	13	Zero Discharge Permit for use of evaporation pond(s)
Nevada Division of Environmental Protection	14	Authorization to construct waste water facility
	15	NPDES storm water general permits for operation
	16	NPDES storm water general permits for construction
	17	Permit(s) for above ground storage tank(s)
	18	Air Quality Class I Permit (construction/ operation)
	19	Chemical Accident Prevention Program
COUNTY		
Building Department / Public Works	20	Construction Permit
	21	Potable Water System
Health District	22	Permit for a privately owned wastewater facility (septic system)
	23	Land Use Applications and acquisition of Special Use Permits
County Fire Marshall	24	Hazardous Materials Management Plan
	25	Emergency Response Plan
OTHER ENTITIES		
Lessor or lessee's requirements stipulated in Realty Transaction	26	Phase I Environmental Site Assessment

Summary of Nevada Energy Projects

One of the key functions of the federal Energy Policy Act of 1992 was to deregulate interstate electricity markets, generally referred to as wholesale markets. These are markets based on the three interstate transmission systems in the United States, and are analogous to the interstate highway system. There are several economic efficiency benefits from a deregulated, or more competitive, market. A more efficient Western Interconnection does have benefits for Nevada. However, one of the most important responses to a more competitive wholesale market is the need for as many alternative electricity suppliers as possible. That is why the Governor has supported the building of power plants in Nevada, both for reliability concerns related to the 2000-2001 energy crisis and for the protection of Nevada's businesses who will need to rely on electric power to maintain their competitiveness.

For these reasons the 2003 report included a summary of Nevada Energy Projects and the 2005 report provides an updated version of a similar document entitled Proposed Generation Plants in Nevada. This document was created by the PUC and is dated January 2005. It consists of two pages and is included as Table 2-8.

Policy Development

The 2001 Legislature created the Nevada Renewable Energy and Energy Conservation Task Force (Task Force) in NRS 701.350. Task Force funding was \$250,000, provided from the Public Utilities Commission reserve fund in 2001, and has not been replenished since. Task Force members are to serve without compensation or travel reimbursement, except that members who "represent the interests" of a non-profit may receive the same per diem and expense reimbursements allowed state employees, and members who are state employees are allowed to receive per diem and expense reimbursements from their state agency employer.

The Task Force accomplishes its mandate by actively reviewing the status of energy in Nevada, deciding which energy conditions or issues it is best able to address with policy analysis, engages members or consultants to conduct a study or survey existing information about those conditions or issues, and then brings the results of studies or surveys before the Task Force in its scheduled open meetings. Details of the discussions are documented for minutes and action items are assigned.

The Task Force consists of ten members who are individuals of accomplishment in the area of renewable energy and energy conservation. Members are appointed by the Governor and selected members of the Legislature, and generally serve terms of three years. The Bureau of Consumer Protection provides administrative support for the Task Force, which meets from 10 to 15 times a year, normally by teleconference.

**5-8 Table
Public Utilities Commission of Nevada
Proposed Generation Plants in Nevada – January 2005**

NAME/OWNER	MW	LOCATION	ANNOUNCED	PERMITS	CONSTRUCTION	PROPOSED ON LINE
Bighorn Reliant Energy www.reliantresources.com	550 Combined Cycle	Primm Clark County 40 miles south of Las Vegas	APR 2001	Complete	Commenced OCT 2001	In Service FEB 2004
Silver Hawk Power Pinnacle West Energy www.pinnaclewest.com	570 Combined Cycle	Apex Industrial Park Clark County 20 miles north of Las Vegas	DEC 2000	Complete	Commenced AUG 2002	In Service MAY 2004
Desert Peak 2 Ormat www.ormat.com	25 Geothermal	Desert Peak KGRA Churchill County 50 miles northeast of Reno	NOV 2002	Ongoing	Expected AUG 2005	FEB 2006
Boulder City Solar Project ¹ Solargenix Energy www.solargenix.com	50 Solar	El Dorado Valley Clark County 20 miles southeast of Las Vegas	DEC 2002	Ongoing	Delayed	Delayed
Ely Wind Generation Facility ² Carlson & Associates	50 Wind	Ruth White Pine County 5 miles east of Ely	NOV 2002	Ongoing	Expected 2006	Early 2007
Galena 2 ³ Ormat www.ormat.com	13 Geothermal	Steamboat KRGGA Washoe County 9 miles south of Reno	NOV 2002	Ongoing	Expected NOV 2005	AUG 2006
Hot Sulphur Springs Earth Power Resources	25 Geothermal	Hot Sulphur Springs Elko County 60 miles north of Elko	NOV 2002	Ongoing	Expected Early 2005	NOV 2005
Chuck Lenzie Generating Station ⁴ Nevada Power Company www.nevadapower.com	1200 Combined Cycle	Moapa Valley Clark County 20 miles north of Las Vegas	JUN 2004	Ongoing	Commenced	MAR 2006
Harry Allen Unit 4 Nevada Power Company www.nevadapower.com	80 Peaking	Harry Allen Plant Clark County 20 miles north of Las Vegas	JUL 2003	Ongoing	Expected 1 st Qtr. 2004	APR 2006

¹ Project has applied for participation in the Temporary Renewable Energy Development Program

² Project has applied for participation in the Temporary Renewable Energy Development Program.

³ Project location was changed from Desert Peak to Steamboat.

⁴ Nevada Power acquired the partially constructed power plant from Duke Energy.

NAME/OWNER	MW	LOCATION	ANNOUNCED	PERMITS	CONSTRUCTION	PROPOSED ON LINE
Toquop Energy Vidler Water Company http://www.toquopenegy.com/	1100 Combined Cycle	Near Mesquite, NV Lincoln County 100 miles northeast of Las Vegas	AUG 2001	Ongoing	Expected May 2004	MAY 2006
Blue Mountain Geothermal Nevada Geothermal Power http://www.continentalridge.com	30 Geothermal	Blue Mountain Humboldt County 20 miles west of Winnemucca	OCT 2002	Ongoing	Expected Mid-2005	Mid-2006
Ivanpah Energy Center Diamond Generating http://www.dgc-us.com/	500 Combined Cycle	Goodsprings Clark County 30 miles south of Las Vegas	FEB 2002	Ongoing	Expected JUN 2004	Summer 2006
Copper Mountain Power Sempra Energy	500 Combined Cycle	Adjacent El Dorado Power Plant Clark County 20 miles southeast of Las Vegas	JUN 2000	Complete	Expected Summer 2005	Summer 2007
Granite Fox Power Project Sempra Energy	1450 Coal	Gerlach Washoe County 100 miles north of Reno	Winter 2004	Ongoing		
Western 102 Generation Project ⁵ Barrick Goldstrike Mines	115 Recip. Engines	Near Tracy, Nevada Storey County 17 miles east of Reno	Spring 2004	Ongoing	Under Construction	SEP 2005
Salt Wells Geothermal Project Nevada Geothermal Specialists	10 Geothermal	Salt Wells Churchill County 10 miles east of Fallon	Spring 2004	Ongoing	Expected Spring 2005	Late 2005
White Pine Project LS Power	1600 Coal	White Pine County	Winter 2004	Ongoing		Expected 2010
TS Power Plant Newmont Mining Corp.	200 Coal	Eureka County	Spring 2004	Ongoing	Expected 2005	Mid 2007
Galena 1 Ormat http://www.ormat.com	20 Geothermal	Steamboat KGRA Washoe County 9 miles south of Reno	JUL 2004	Ongoing	Expected NOV 2005	MAR 2006

⁵ Barrick Goldstrike Mines exited Sierra Pacific's system under AB 661 and will sell 8 MW back to the utility.

The Task Force is specifically directed to (1) advise the Nevada State Office of Energy (NSOE) and (2) coordinate its activities and programs with those of NSOE, the PUC, the Consumer Advocate, and other agencies, as appropriate, (3) spend the money in the Task Force trust fund according to instructions in the statute, (4) take other actions, as appropriate including the engagement of consultants, to support its activities and programs and (5) prepare an annual report to the Legislative Commission and the Governor about the activities and programs of the Task Force. Additional detail about activities and programs, and the content of the report are also provided in statute.

Future of the Task Force

The Task Force does not have an organizational home within an executive or legislative agency, nor does it have a permanent source of funding. One or both of these conditions would need to be corrected if the Task Force is to have a future in energy policy formulation in Nevada.

The fundamental question that needs to be addressed is whether the Task Force should be "reauthorized." To answer that question, it is important to understand what the current organization is able to do well, and what tasks are actually more difficult for a group like the Task Force to perform. It is reasonably clear that there are no similar organizations in the state. It consists of highly qualified individuals from disparate backgrounds and business interests, all of whom are willing to provide advice and to work with others who may disagree with them. It generally makes decisions on a consensus basis; that is, it is institutionally forced to find common ground before it is able to participate in a particular issue or resolution. As an organization it does not provide expert testimony or stake out political positions; rather, it seeks to ensure that the agencies that do make decisions – the Public Utilities Commission, the electric and gas utilities, the NSOE – are provided with information and perspectives that help them make better decisions. In general the Task Force is equipped to provide advice and recommendations, but generally not well equipped to perform programmatic tasks – it has no permanent staff, other than the generous, but limited support from the Consumer Advocate.

If the answer is to continue the Task Force in some manner, perhaps the most straightforward method is to add funds to the trust account created by the 2001 Legislature. This would allow the Task Force to continue as a quasi-independent organization, not tied to an agency, but responding to an agenda set by the Legislature. This would likely be valuable to the Legislative Commission in identifying and outlining the substance of potential issues for the next legislative session. The Task Force could also be directed to prepare reports or surveys of existing information that would be useful to the Legislative Counsel Bureau and its research organization.

Alternatively, the Task Force could be placed under the executive branch, either as a standing commission or within an agency like the NSOE. In both cases it would be necessary to establish the "portfolio" of the Task Force. If, indeed, the Task Force's forte is policy analysis and high-level recommendations, how would the agenda be set, and by whom? Also, would these instructions be very specific, or would the Task Force be allowed to participate in the formulation of its activities and priorities? Clearly, establishment in the executive branch would also require integration of the Task Force with the executive budget cycle and the provision of new funds.

On balance, it seems important to retain the unique capability of the Task Force to synthesize policy from widely differing points of view. It also seems important for the state to be more prescriptive in what it wants the Task Force to accomplish or investigate.

Chapter

6**Comprehensive Energy Plan for Nevada**

The 2001 Legislature established a requirement that the Director of the Nevada State Office of Energy draft a comprehensive energy plan for Nevada. The 2003 Status Report and its Executive Summary identified the transformation of Nevada's energy sectors from their "at risk" condition in 2001 to their comparatively stable condition at the beginning of 2003. It acknowledged the role of Governor Guinn's Nevada Energy Protection Plan, the recommendations of the Governor's Nevada Electric Energy Policy Committee, and the initial activities of the Nevada Renewable Energy and Energy Conservation Task Force. A copy of the 2003 Comprehensive Energy Plan for Nevada is included with this report as Appendix IX.

This chapter presents the 2005 version of the Comprehensive Energy Plan for Nevada. It begins, of course, where the 2003 Plan concluded, updates plan elements where emerging conditions provide new challenges and opportunities and where existing conditions have abated or become less threatening. Nevertheless, the key strategic elements of the plan remain the same, to support and encourage:

- *A reliable, affordable, and sustainable supply of electricity and natural gas,*
- *Further diversification of Nevada's electrical supply,*
- *The efficient use of energy, and*
- *Further diversification and increased reliability of Nevada's transportation fuel supply.*

These strategic elements of the plan are applied to conditions that have changed since the preparation of the 2003 Plan. The most significant changes include:

- *Substantially higher costs for natural gas and, consequently, electricity,*
- *A troublesome and persistent decline in the supply reliability of transportation fuels,*
- *Increasing economic pressure on rural Nevadans based on their unique exposure to energy costs,*
- *Evolving renewable energy technologies and applications,*
- *Continuing economic burdens on Nevadans resulting from the financial condition of the electric utilities,*
- *Emerging opportunities to improve the efficiency of Nevada's electric transmission systems,*

- *Evolving energy assurance requirements related to homeland security,*
- *Evolving administrative changes to federal energy grant programs, and*
- *Potential changes in the development and management of energy policies in the state.*

Nevada Energy Strategies

This section of Chapter 6 provides information about the scope and significance of the four key energy strategies identified above, and the actions the Nevada State Office of Energy takes to implement each strategy.

Goal 1: To Support and Encourage a Reliable, Affordable and Sustainable Supply of Electricity and Natural Gas

The NSOE is responsible for supporting and encouraging policies that lead to a reliable, affordable and sustainable supply of electricity and natural gas. The office is concerned both with the effective management of short term energy emergencies and the longer term effort of effectively planning for energy production and use in Nevada that will prevent emergencies. Demand and supply side policies can each contribute to this result. Therefore the programs, activities and performance measures encompass short term and long term efforts and they address policies that affect both the use and production of energy. Listed below are the programs associated with Goal 1.

Energy Emergency Contingency Planning

- *Handling of an energy emergency when it occurs and*
- *Prevention of and preparation for energy emergencies.*

Permitting, Siting and Interconnection

- *Governor's Forum on Natural Resources and Electricity Generation,*
- *Incremental changes in tariffs to allow net metering and self-generation and*
- *Changes in tariffs and interconnection rules to accommodate distributed generation.*

Energy Adequacy Assessments

- *Continue to participate in west-wide efforts to develop a common approach to measuring resources and detailing special conditions; e.g., bad hydro years.*

The programs of this strategy are designed to increase our energy security both in the short term, with more effective energy emergency planning and response, and in the longer term, by instituting policies that facilitate the permitting, siting, interconnection and construction of power projects and that promote conservation and energy efficiency. This goal echoes the Governor's proposal, which calls for joint energy adequacy assessments with other states in the Western Interconnection.

A final note is worth mentioning. Fossil fuels are seldom described as "sustainable," as listed in this goal. In the long run they of course cannot be sustainable, but the aim of this goal is the present planning horizon, which extends practically for the next 15 to 20 years. These are years when the decline in hydrocarbon resources will begin to affect our lives in very noticeable ways. This plan actually refers to sustaining and managing the decline in fossil fuels to protect Nevadans during this period.

More detail on the specific policies, programs and activities that are being undertaken to support this strategy are provided in Appendix II.

Goal 2: To Support and Encourage the Further Diversification of Nevada's Electricity Supply

The NSOE is responsible for supporting and encouraging policies that lead to the further diversification of Nevada's electricity supply. Diversifying energy supply includes promoting the use of different fuels to generate electricity and the physical siting of generating facilities in different locations. It is important, also, to recognize that there is an appropriate symmetry between actions taken to make supply more reliable and actions taken to reduce demand; that is, actions that build-in energy efficiency or promote energy conservation. The latter, in effect, reduces the amount of supply that must be made reliable.

Fuel Diversity

- *Support diversity in the electric utilities' fuel portfolio: balance among coal, natural gas, coal, distillates and renewables,*
- *Support periodic review of the "balanced portfolio" as economics and market changes occur,*
- *Support a cautious approach to increased distributed generation, including utility-owned distributed generators, and*
- *Support a balanced portfolio of resource types, including base load, intermittent, peak load, rapid response generators for support of intermittent renewable generators.*

Geographical Diversity

- *Support geographic diversity of intermittent wind and solar generators,*

- *Support a cautious approach to self-generation, expansion of net metering and combined heat and power installations,*
- *Promote economic development in rural parts of the state through beneficial energy projects,*
- *Reinforce local efforts to use their air shed and water resources wisely.*

NSOE attempts to accomplish this strategy by improving cooperation among the utilities, project developers, electric customers and public entities so that the broader interests of the State of Nevada are incorporated in project planning and in ensuring that feasible projects are built at the lowest possible cost.

Goal 3: To Support and Encourage the Efficient Use of Energy

The NSOE is responsible for supporting and encouraging policies that improve the efficiency of electricity and natural gas use. During calendar year 2004, NSOE joined with the Renewable Energy and Energy Conservation Task Force and the electric utilities to commission a study performed by the Southwest Energy Efficiency Project (SWEET). NSOE has chosen to make the SWEET recommendations the focus of its energy efficiency efforts during the coming biennium. While not endorsing all of the SWEET recommendations, NSOE will pursue each – some with more caution than others. NSOE's recommendations are listed below and are tied to the SWEET report included as Appendix X.

Energy Efficiency and Conservation Program Planning

- *Adopt energy savings standards*
- *Increase funding to support demand side management programs,*
- *Support updated building codes and energy codes,*
- *Establish natural gas demand side management programs,*
- *Increase funding for low income weatherization programs and stimulate demand for consumer investment in home weatherization,*
- *Study the benefits of a residential energy conservation ordinance to assist renters,*
- *Review state energy conservation program and establish updated energy savings targets for state agencies,*
- *Investigate more aggressive load management strategies to reduce Nevada Power's needle peak.*

In addition, NSOE will continue to support efforts on education and helping to build the infrastructure that is necessary for a market-driven efficiency sector to build from true economic incentives rather than subsidies. Education efforts run the gamut from

engendering awareness of energy efficiency to providing specific training opportunities for professionals. The infrastructure needed to support an efficiency industry includes an educated consumer who expresses a demand for greater efficiency, trained and certified professionals to provide efficiency services, an educated financial community that understands the economic benefits of increased efficiency and reduced energy use, and public officials who understand efficiency well-enough to design regulation, rules and laws that promote rather than inhibit increased efficiency.

Goal 4: To Support and Encourage Further Diversification and Increased Reliability of Nevada's Transportation Fuel Supply

The State of Nevada has very little direct authority or influence on transportation fuels markets. Nevertheless, the state is highly dependent upon ready access to transportation fuels for the tourism that drives our economy. So, while the options are limited, it is particularly important that certain market characteristics are maintained.

Ensure Effective Competition in Transportation Fuels Markets

- *Work cooperatively with the states of California, Arizona and Oregon, and with the Consumer Advocate to monitor transportation fuel supplies and prices,*
- *Continue to engage Kinder Morgan, as well as the Western States Petroleum Association and Nevada petroleum distributors to exchange information during supply interruptions, and*
- *Continue discussions with alternative transportation fuels suppliers.*

Investigate Reliability Enhancements

- *Establish a blue-ribbon commission to investigate reliability enhancements including new pipelines, additional storage, in-state refineries, and biofuels production.*

Nevada Energy Actions

Energy actions are the specific actions to be pursued by the Governor's Office and the Governor's Cabinet in order to implement the Governor's Comprehensive Energy Plan for Nevada. These actions have been divided into ten strategic action areas, and then further subdivided into steps taken to implement each strategic action area.

Improve Energy Efficiency

Energy efficiency actions are defined loosely as actions taken to improve the utilization of energy above a given design standard. It is routinely applied to building and appliance designs, but is also used to describe industrial process improvements. Actions

related to transportation fuel energy efficiency are addressed in the Improve Transportation Fuel Reliability subsection.

Work with Local Governments to Improve Building Energy Codes

Space conditioning and lighting are significant contributors to energy consumption in homes, commercial buildings and industrial applications. In the south, high temperatures result in high summer energy consumption, while in the north low temperatures lead to high winter energy consumption. Increasing penetration of air conditioning in northern homes is contributing to a growing summer peak in energy consumption.

Minimum standards for building thermal efficiency are found in building codes or energy codes that apply to new buildings. Usually these codes are developed by local authorities, often county governments, although the state does maintain a system of building codes that apply in the absence of other governance. While many thermal energy efficiency provisions are the same for hot and cold weather, there are also many reasons for differences in building design in the various regions of the state. So, there are good reasons for having different code requirements in different parts of the state. Similarly, there are subtle differences in how buildings should be lighted.

Promote Aggressive Advances in Residential and Commercial Energy Codes

The Nevada State Office of Energy will continue to work with state and local governments that establish building energy codes. This work has been productive but goals need to be set more aggressively. At the same time, developers and builders who pursue Energy Star ratings, for example, should receive a capacity benefit for selecting energy efficient electrical and natural gas equipment, commensurate with the reduced cost of providing service to customers who buy their homes.

Establish Architectural Energy Efficiency Goals

The Western Governors Association, on behalf of their respective states, has made a commitment to achieve a 20 percent improvement in energy efficiency over the next 15 years. While it is not yet clear exactly how this improvement will be measured, it is clear that the commitment is dramatic. To do its part, Nevada will need to act forcefully and directly. Much of this change is more than eliminating sources of waste; change must come from a fundamental change in our understanding of what is possible. This may also call for changes in how we achieve a comfortable home or workspace. Many jurisdictions in Europe, for example, have minimized the use of forced air heating and cooling systems, replacing them with water systems that move the energy, and local ventilation that circulates the energy to make the space

comfortable. This is an old idea, but its energy efficiency attributes make it worthy of reconsideration.

Architectural standards – standards that prescribe major design criteria, such as annual energy consumption per square foot of interior space – are important determinants of long-term energy consumption. Notably, establishing architectural standards that stretch current energy efficiency technologies can help. Temperate climate standards in Europe use roughly half the energy as many corresponding standards in the U. S. The different building equipment supply systems cannot be ignored, however, because moving too rapidly to new architectural standards may have significant financial consequences for Nevada businesses and builders that are responding to the extraordinary demand for new residential and commercial buildings. These competing interests need to be balanced so that energy consumption per unit of area and per resident or worker can be substantially lowered over the next five to ten years.

Collaborate with Western States to Establish New Architectural Standards

The Nevada State Office of Energy, will pursue with interested Nevada architectural firms and the Architectural School at the University of Nevada Las Vegas a joint effort with other western states to support and encourage dramatic changes in government building designs in order to achieve energy savings while maintaining comfort, flexibility and functionality. The collaborative should focus first on desert southwestern applications, providing conceptual designs and guidance on cost-efficiency trade-offs. Preliminary discussions have begun with California parties and the Center for Building Performance & Diagnostics at Carnegie Mellon University. This effort will be coordinated with the UNLV Renewable Energy Deployment Center and the UNLV School of Architecture described under the Nevada Southwest Energy Partnership program.

Support Secondary Appliance Efficiency Standards

This is a recommendation contained in the Nevada Energy Efficiency Strategy report prepared by the Southwest Energy Efficiency Project, which is attached to this report as Appendix X.

Many appliances must comply with federal energy efficiency standards. Generally, states are not permitted to impose standards different from those established by the federal government. There is, in effect, federal preemption for those appliances where the federal standards exist. There are, however, a number of appliances, some of them important when it comes to energy consumption, where there are no federal standards. This recommendation is relevant to such appliances.

As with most standard-setting exercises for energy efficiency, experts must weigh the potential energy savings of a new standard, in terms of dollars, with the capital cost

required to achieve those savings. Very simply, much depends on what assumptions are used to measure the value of energy savings. For example, it would take much longer when the cost of electricity is 6 cents per kilowatt-hour to "pay back" the capital cost of a new appliance that reduces the consumption of electrical energy, than when electricity is 12 cents per kilowatt-hour. For this reason, in times of rising energy prices, it is likely that the value of energy efficiency is understated; that is, it is likely that stricter standards would be more cost effective.

Once again it is important to note that the sudden imposition of new standards can adversely affect Nevada businesses that are often called upon to make purchases with long lead times. So, once again, it is necessary to balance the strictness and the timing of new standards with the Nevada business environment.

Collaborate with Western States to Establish Secondary Energy Efficiency Standards for Appliances

The Nevada State Office of Energy will work to implement the recommendation regarding secondary energy efficiency standards for appliances contained in the Nevada Energy Efficiency Strategy Report.

Encourage Point-of-Sale Residential Energy Efficiency Models

Consumers generally have a difficult time determining whether energy saving features and appliances are worth their initial expense when they purchase a new home. Quite often their focus is on the number of bedrooms or the physical layout of the home, and not the more mundane issue of how expensive it will be to heat or cool. Many homebuilders already have the capability to offer generic or even model-specific advice on what the expected operating costs will be for natural gas and electricity, based on the options ordered by a potential buyer. From an energy policy standpoint, it is desirable to make this type of information available to the customer at the point-of-sale, much the same way gasoline mileage information is physically attached to new automobiles.

There are a number of software products commercially available for customers, although these are often either very difficult to use or so general that they are not really useful. Builders, on the other hand, use software packages to help customers visualize their home purchases and options. It would be helpful for customers if they could relate energy efficiency upgrades to (1) their monthly utility bill and (2) a longer-term payback analysis. The software package would need to integrate inputs related to the selected house, such as its internal area, external wall and window areas, and orientation to the sun; and to the customer's behaviors, such as the thermostat setting(s), use of draperies, and general appliance use patterns.

Collaborate with Home Builders throughout the State to Create Point-of-Sale Guidelines to Assist Customers Evaluate Energy Efficiency Options

The Nevada State Office of Energy has, for some time, been working in this area via home energy efficiency ratings conducted by Energy Star builders. NSOE intends to continue this work with state builders associations and others to create guidelines for energy efficiency information that should be available to customers at the point-of-sale. Guidelines would be voluntary, but would be encouraged for all homebuilders who produce more than 50 units per year or who produce multiple unit buildings for rental or for condominium sales.

Establish a Methodology to Measure Energy Efficiency Gains

Measuring the effect of things that are avoided is unusually difficult and subject to manipulation. Accordingly, one of the most difficult tasks when trying to describe the effect of energy efficiency gains is finding a useful metric. What we hope to do is to quantify the amount of energy that *would have been consumed* had not energy efficiency provisions been installed. At best the measurement is a reasonable estimate; at worst, it is an over or underestimate that misleads consumers and public policy makers.

Nevada is not alone in needing an effective methodology for measuring energy efficiency gains. The Western Governors Association (WGA), in adopting a goal of 20 percent improvement in energy efficiency by 2020, has set the same task for all western states. The WGA has created an advisory group to assist it in achieving its goal. This group is called the Clean and Diversified Energy Advisory Committee (CDEAC) and will wrestle with such issues as what is clean and diversified energy, as well as how to measure energy efficiency gains. CDEAC meetings will begin in early February 2005. The organization will be staffed and supported by a "steering committee" of members taken from the staffs of western governors. Governor Guinn's Energy Advisor is a member of the CDEAC steering committee.

Collaborate with WGA and CDEAC to Adopt a Methodology to Measure Energy Efficiency Gains

Governor Guinn's Energy Advisor will work with the Nevada electric and natural gas utilities and with counterparts in other states and CDEAC to adopt a reasonable methodology to track the benefits derived from energy efficiency actions. Resulting energy efficiency measurements should be included in the NSOE's annual report to the Governor and biennial report to the Legislature.

Improve Energy Conservation

As noted in Chapter 5, the respective meanings of "energy efficiency" and "energy conservation" are not strictly defined, in this report energy efficiency programs are efforts

intended to improve the effectiveness with which energy is used or applied to a given task and energy conservation programs are efforts to minimize or eliminate the need to apply energy to a given task. In this section the actions recommended could fall into either category, but adhering to strict definitions would have made the report more difficult to read and understand. With that caveat, NSOE recommends a number of conservation efforts. These efforts include remodeling, adding insulation, replacing aging equipment such as furnaces and air handlers, air conditioning (or heat pump) compressors or systems, as well as a number of behavioral changes – programming thermostats to control temperature more effectively, selecting off-peak times to wash dishes or clothes, and turning off unneeded lights. Behavioral changes include Actions related to transportation fuel conservation are addressed in the Improve Transportation Fuel Reliability subsection.

Deploy Third-Party Financing for Home/Commercial Improvement Projects

One of the most promising means of encouraging home and small commercial energy conservation projects is through third-party financing options. Residential programs work well when the utility administers such programs – identifies qualifying contractors and includes repayment of authorized modifications and equipment on regular utility bills – and when local and regional lending institutions provide capital. Commercial programs for state and local government buildings can be financed through the AB 398 (2003) performance contracting mechanism, while private programs can be supported through cooperative efforts of the utility and the commercial customer.

There is no question that third-party financing programs have also been unsuccessful or unreasonably expensive in some jurisdictions. Effective administrative controls bring costs that need to be allocated fairly among the lender, the customer and the utility (ratepayers). These same controls need to weed out programs that are not cost effective or do not result in meaningful reductions in energy consumption.

Moreover, the State of Nevada has already completed work in this area. The action recommendations begin with a recommendation to redouble efforts to implement a program developed jointly with the Nevada State Business Development Center and other state stakeholders, and then, if necessary, to look more carefully at programs instituted in other jurisdictions.

Support Funding and Implementation of the Continuous Business Energy Improvement Program (CBEIP)

The CBEIP program was developed by the Nevada Small Business Development Center and other stakeholders using a 2003 State Energy Program Special Project Rebuild Nevada Grant. This program would employ the use of a “loan pool” and “on-bill financing” (OBF) to provide an easy means for business owners to finance efficiency and conservation improvements. Administration of such loans would be handled by a third party to avoid the addition of debt on the

utilities' balance sheet. This program will be reviewed again under today's changing circumstances.

Deliberate with the Electric and Natural Gas Utilities and Lenders to Develop Alternatives for Third-Party Financing Programs

The NSOE will conduct a workshop with relevant parties to outline the potential costs and benefits of establishing a utility-based, third party financing program in Nevada. NSOE is aware that this is not the first time some form of third-party financing has been explored. Given the dramatic increases in natural gas prices, another effort should be made. Depending upon the results of that workshop, NSOE will pursue actions to institute such a financing program in order to spur private investment in home energy conservation measures.

Deliver Broad-Based Public Service Advertising on Energy Conservation

Public service advertising, especially for video media, is typically very expensive for the measured benefit received. Other media, however, can be important contributors to changing consumer attitudes. Careful choices in advertising media can result in increased levels of consumer awareness and positive shifts in consumer attitudes about energy conservation. This means that consumers can be influenced to consider energy conservation actions that would otherwise not even be on a consumer's "radar screen." Messages such as, "Energy audits generally result in affordable energy conservation options," is not an unattainable goal for Public Service Advertising. Many businesses also carry similar messages in their paid advertising.

Nevada is already an active participant in the "Energy Hog" program, a series of energy conservation video, audio and print spots aimed primarily at school-aged children. This participation should be continued and expanded to promote energy conservation and to discourage thoughtless consumption of unneeded energy.

Collaborate with the Ad Council, the Utilities and Other States to Improve the Effect of the Energy Hog and Other Energy Efficiency & Energy Conservation Programs

NSOE will initiate contacts with the Ad Council and private businesses that have a vested interest in residential and small commercial conservation programs.

Encourage Inexpensive Conservation Models for Homeowners and Contractors

Consumers are generally uninformed about the quantitative benefits of the various energy conservation options. Inexpensive software, available in retail stores or home improvement outlets, offer the best opportunity to help consumers make energy conservation choices. By knowing certain information about your home and your natural gas or electricity demand history (available on most bills) consumers should

be able to estimate the potential monthly savings of energy conservation actions, as well as the payback time, or the time to recoup the original investment.

Collaborate with DOE, EPA, and Nevada Home Improvement Stores and Software Providers to Help Consumers by Providing Objective Information about Energy Conservation Savings

The NSOE will review the status of free or low cost software available from the federal government regarding energy conservation programs. Based on the results of those contacts, NSOE will also engage major home improvement stores in the state to determine what consumer aids are available to estimate the value of conservation options. Based on the results of those contacts and an evaluation of products used, NSOE will publish capabilities on its website and take other actions to make consumers aware of this opportunity.

Establish a Methodology to Measure Energy Conservation Gains

As noted above, measuring the effect of things that are avoided is unusually difficult and subject to manipulation. Just as measuring the effect of energy efficiency gains is especially difficult so, too, is measuring the effect of energy conservation gains. Again, finding a useful metric is the most important task. What we hope to do is quantify the amount of energy that *would have been consumed* had not energy conservation provisions been instituted. At best the measurement is a reasonable estimate; at worst, it is an over or underestimate that misleads consumers and public policy makers.

It is also very likely that conservation provisions will be treated the same as energy efficiency provisions when it comes to the WGA energy efficiency objective. As a result, it is expected that CDEAC will be an important body in establishing the methodology for measuring energy conservation achievements.

Collaborate with WGA and CDEAC to Adopt a Methodology to Measure Energy Conservation Gains

Governor Guinn's Energy Advisor will work with counterparts in other states and CDEAC to adopt a reasonable methodology to track the benefits derived from energy conservation actions. Resulting energy saving measurements should be included in the NSOE's annual report to the Governor and biennial report to the Legislature.

Improve Transportation Fuel Reliability

Transportation fuel reliability is an emerging issue in Nevada. During the last 13 months, there have been six significant interruptions in petroleum-based fuel supplies to

Nevada. Supply interruptions have been caused by excessive erosion around pipelines, pipeline breaks and precautionary interruptions based on the potential for pipeline damage (train derailment). In the past, such interruptions or capacity reductions have also been caused by refinery malfunctions and interruptions of electricity supply to pipeline pumps. The consequences have ranged from virtually no effect to increased prices and short-term supply shortages.

Given the important contribution of tourism to Nevada's economy, these types of interruptions pose a substantial threat to the state's financial interests. Significant supply shortages, such as the one that occurred in Phoenix in 2003, would have a deleterious effect on visitors because the shortage would likely be widely circulated in the media and potential visitors – by car and air (jet fuel is moved in the same pipelines as automotive gasoline) – might simply decide to go elsewhere.

Assess Options to Improve the Supply Reliability of Refined Products

Potential actions to improve supply reliability of refined products are limited and unusually expensive. The construction of a new pipeline is difficult because existing pipelines have the ability to supply enough fuel (under normal operating conditions) to accommodate growth for the next decade. Development of indigenous crude oil resources is uncertain because the state does not have access to information about the quantity and value of the reserves. Development of alternative fuels has a number of uncertainties, as well, including questions about water usage, capital investment and basic economics.

The difficulty and costs, notwithstanding, Nevada needs to understand the gravity of its supply reliability problems and to describe options that would mitigate those problems.

Appoint a Blue Ribbon Commission to Address Nevada's Petroleum Product Supply Reliability Problems and Recommend Mitigating Actions

The NSOE will recommend that Governor Guinn name a blue ribbon commission to conduct an 18 month review of the reliability of petroleum product supplies over the next decade including the adequacy of supplies, the role of imported refined products, the value of additional storage tanks, the value and cost of additional product pipeline capacity, the development of indigenous crude oil reserves in Nevada, the value and cost of importing crude oil and refining it in whole or in part in Nevada, the role for alternative fuels and the potential for demand side measures to reduce the need for certain products. The commission should develop recommendations and issue a report in time for the 2007 Legislature

Improve Consumer Education on Transportation Costs

The very substantial increase in the prices of gasoline and other transportation fuels have begun to affect Nevadans' budgets. Just like a tax refund tends to increase

consumer spending by putting more money in circulation, significant price increases on essential expenses tends to do the opposite. For most of us, these price increases tend to take a little bit out of our wallets every week. For some of us, construction workers, for example, who need to use big vehicles in their work and travel long distances to job sites, the impact is more immediate and much more difficult to deal with. "Getting the word out" on ways to confront transportation fuel costs relies in part on having partners willing to help – partners such as the Nevada AAA, retail outlets, and high schools. Nevada AAA has long been an advocate for fuel-efficient practices and finding ways to work with them seems particularly important, now.

Conduct a Workshop with Fuel Efficiency Stakeholders to Review Successful Fuel Efficiency Programs in Other States and Investigate New Approaches

NSOE will conduct a workshop of state and local fuel efficiency advocates and other stakeholders to learn about programs established in other states, to consider metrics used to identify successful programs and investigate new ideas that update an old situation. NSOE will particularly look at activating retail outlets and high school students; and at how to upgrade website information to make it more effective.

Establish Reasonable Goals for Ethanol and Biodiesel Production

With a few notable exceptions, Nevadans do not have a history of making fuels from renewable biomass or waste products. With the advent of higher, perhaps permanently higher, transportation fuel prices, the payoff for entrepreneurial activity becomes even more interesting. Given Nevada's renewable resources, are there ways in which we can use this natural advantage to make renewable fuels more economically? Are there ways in which biodiesel and other biofuels can be used to meet renewable portfolio standards, not only in Nevada, but in other states, as well? Currently, we do not have good information on the relative costs of producing or refining fuels in Nevada, using indigenous croplands – probably supplemented with imported feedstocks. It is not clear that this would be an advantage or not when compared with simply importing the finished bio-product from an area that has more water and more cropland. Nevada should explore the potential for domestic production and, if economically feasible, set goals for future production.

Investigate the Economic Feasibility of Nevada Biofuels Industries; Activate those Industries if Feasible and Set Production Goals

NSOE will conduct a workshop with biofuels production stakeholders to determine the economic feasibility of producing and using biofuels. If determined to be potentially profitable, determine what steps are appropriate to advance the industry locally, including the establishment of production goals and market incentives.

Join with Other States in Seeking Higher CAFE Standards

The U. S. Department of Transportation (DOT) is responsible for setting Corporate Average Fuel Economy (CAFE) standards. States are generally prohibited from setting their own fuel economy standards, although news reports indicate that some states may be willing to challenge federal preemption on this issue. Another less confrontational option would be for various entities throughout the country, including states, to seek increases in the CAFE standard by petitioning the DOT. With the introduction of hybrid vehicles in the U.S. and the likely introduction here of high efficiency diesel engines already in use in Europe, higher fuel economy standards are technically possible. As noted earlier in Chapter 5, it takes a long time for changes in the CAFE standard to reduce gasoline consumption, but past changes have made an important difference.

Prepare a Joint Petition to DOT Seeking a More Aggressive Agenda for Increases in the CAFE Standard

The Energy Advisor to the Governor will coordinate with peers in other western states and interested Nevada parties in an effort to develop a joint petition by selected western governors in support of a more aggressive agenda for increases in the CAFE standard. Agreement and help from the Nevada Congressional Delegation should be sought.

Support Development of Renewable Energy in Rural Nevada

Rural Nevada is generally more sensitive to the cost of energy or, more directly, rural Nevadans are disproportionately harmed by rising energy prices. This is because farming and ranching have become energy intensive businesses, both to pump water for crops and stock, and to power vehicles that plant, tend and harvest crops. In addition, rural businesses must bring in their raw materials and then get their products to market, processes which are also sensitive to energy prices.

Electricity tariffs and rural transportation fuel tax adjustments already provide special benefits to farmers and ranchers. Still energy costs, due to their link with natural gas prices, remain both high and volatile. One method of benefiting rural Nevadans is to expand their utilization of renewable energy – renewable generation of electricity and production of renewable transportation fuels. This minimizes the cost of continuing subsidies and increases the ability of farmers and ranchers to maintain control of their businesses without continuing reliance on financial support from state and local governments.

Expand Efforts to Develop Rural Renewable Development “Templates”

By and large, rural Nevadans are not in the energy business. They don't generate electricity, nor do they produce ethanol or biodiesel. As a result, they do not have a basis for making decisions to enter these businesses.

Preparing business “templates” that provide reasonable, Nevada-specific estimates of revenue streams and costs would allow rural Nevadans to consider renewable investment options. Linking these templates with actual business examples in the state adds credibility and gives investors a sense of comfort when their projects are feasible.

Create Business Templates for Rural Renewable Development Projects

The NSOE will work with qualified experts in rural and renewable development to create business templates for selected renewable technologies. Targeted technologies include community-sized projects in the following areas:

- Wind Generation Projects
- Geothermal Generation Projects
- Direct-use Geothermal Projects
- Solar Hot Water Projects
- Forest Biomass Projects
- Solar Photovoltaic Projects

Encourage Energy Service Providers to Update Tariffs for Renewables

While more than 90 percent of the state’s electricity is provided by Sierra Pacific and Nevada Power, much of the rural part of the state receives its electricity from rural electric cooperatives, municipal utilities and general improvement districts in addition to the two investor owned electric utilities (IOUs). The specific companies involved are identified in Chapter 2.

These smaller unregulated utilities enjoy one major advantage over the larger IOUs – their customers are typically their owners, or board of directors, or electors. As a result, there is a direct tie between the needs of the customers and the needs of the utility. Preparation of tariffs and interconnection rules that give the utility comfort that its costs will be recovered and allocated fairly to “cost causers” and still benefit customers who accept the risk of investing in generation would be a positive step toward improved energy security for rural Nevada companies and customers.

Develop Generic Renewable Energy Tariffs and Interconnection Rules for Rural Electricity Providers

The NSOE will work with qualified experts in the development of generic electricity tariffs, including interconnection rules, to assist rural electric cooperatives, municipal utilities and general improvement districts to appropriately allocate costs and revenues associated with customer-owned renewable generation equipment. Such tariffs would be offered to, but not imposed on, rural electric providers. Generic tariffs would be modified as experience is gained with different rural electric providers.

Engage Rural Nevadans in the Production of Bio-Fuels

Ethanol and biodiesel are easily produced bio-fuels made from various types of organic matter. Both fuels have wide application in rural and urban applications throughout the western states.

Ethanol is commonly used as an oxygenate, in low concentrations (about 5 percent – expressed as “E5”), and can replace gasoline in higher concentrations up to about E85. Concentration greater than E10 generally requires that an automobile’s fuel system be modified (many state vehicles have been so modified).

Biodiesel is a very close substitute for regular or fossil diesel. It does not require modification of a standard diesel engine or fuel system, and provides some emission and lubricity benefits not found in regular diesel. Biodiesel may be added directly to regular diesel fuel in virtually any proportion; B10 and B20 (10 percent and 20 percent biodiesel, respectively) are common mixtures in other states. Biodiesel has been made from waste cooking oils in the Las Vegas area, but the quantity of waste oils is not nearly sufficient to meet the demand for diesel fuel.

Nevada has some natural disadvantages when it comes to producing bio-fuels. As produced in other states, both bio-fuels mentioned above require a large amount of water. Some process options may reduce the amount needed for fuels produced in Nevada, but water is still a basic feedstock. Also, the lack of rainfall limits the amount of organic matter than can be grown in Nevada, hence the need to import at least part of the organic feedstock.

On the other hand, Nevada enjoys two significant bio-fuel production advantages. First, Nevada has abundant renewable energy that can be used to provide electricity and, in the case of geothermal resources, heat required in the refining processes. Also, Nevada has secondary markets for the byproducts of ethanol and biodiesel production that are wide open; that is, there are not very many suppliers of bio-fuel byproducts. These two characteristics permit the creation of “eco-industrial parks” – industrial parks that use the waste product from one process as a feedstock for another process. For example, waste geothermal heat can be used to provide warmth needed for a greenhouse, while waste carbon dioxide from the ethanol refining process can be used to “spike” the greenhouse; that is, to increase the greenhouse’s productivity by creating a carbon-dioxide rich environment, which increases plant growth.

Collaborate with the Nevada Economic Development Commission to Bring Potential Bio-fuel Developers to the rural parts of the State

The NSOE will work with the rural group of the NEDC and private firms interested in building bio-fuels refineries in Nevada to explore development of a bio-fuels industry.

Emphasis will be placed on furthering the eco-industrial park concept for sustainable development.

Amend the Renewable Portfolio Standard

Nevada's Renewable Portfolio Standard (RPS) was written during the 2001 Legislature and envisioned an environment in which electric utilities were as financially healthy as they had been for many years. Based on events during the western energy crisis of 2000 and 2001, the creditworthiness of Nevada's jointly owned electric utilities was undermined. As a result, the expectations for penetration of renewable generation in the Nevada market has materialized only partially. It is now time to update the RPS to reflect commitments made by the Western Governors Association and changes in the marketplace for renewable energy and renewable energy credits.

Integrate Energy Efficiency/Conservation with Renewable Goals

The intent of the RPS was to reduce the consumption of imported fossil fuels and electricity. It is clear that renewable generators further this goal and improve the state's balance sheet by reducing its expenditures for out of state resources. It is also true, however, that avoiding the consumption of imported fossil fuels and electricity through energy efficiency and energy conservation measures accomplishes the same goal. Actually, energy efficiency and conservation may even be a superior alternative because they typically result in the development of Nevada businesses to complete efficiency and conservation modifications.

Support Modification of the Renewable Portfolio Standard to Include Energy Efficiency and Energy Conservation

The Governor's Energy Advisor will recommend that the Governor endorse legislation that allows renewable energy consumption requirements under the RPS to be fulfilled with energy consumption avoided through energy efficiency and conservation measures. Energy consumption avoided should be limited to no more than 25 percent of the RPS requirement and to efficiency and conservation technologies approved by the Public Utilities Commission.

Continue Coordination with the Western Governors Association

Nevada is under a state mandate – the Renewable Portfolio Standard – to increase renewable generation, and has also committed to increase its "clean and diversified" energy generation, while increasing its energy efficiency by 20 percent by the year 2020. This latter commitment was made within the context of a Western Governors Association resolution in the summer of 2004. As noted above in the section entitled, "Improve Energy Efficiency," the WGA has created an advisory group – the Clean and Diversified Energy Advisory Committee (CDEAC) – to assist it in achieving its

goal. CDEAC will be staffed and supported by a "steering committee" of members taken from the staffs of western governors. Governor Guinn's Energy Advisor is a member of the CDEAC steering committee.

Participation in this type of regional activity also allows Nevada to participate in emerging west-wide transmission and generation projects. The construction of 30,000 MW of new generation requires enormous capital, both for the power plants to be built and for the transmission system upgrades needed to deliver that power to growing markets.

Continue Participation in WGA Clean and Diversified Energy Generation and Energy Efficiency Improvement Activities

The Governor's Energy Advisor will participate in CDEAC Steering Committee activities, and continue existing regional coordination activities with the Public Utilities Commission.

Improve Portability and Value Determination of Portfolio Energy Credits

Nevada is an active participant in the Western Renewable Energy Generation Information System (WREGIS). This association grew out of a California statute requiring the formation of an accounting and tracking system for the value of the renewable content of energy from renewable generators. Even though the Nevada PUC has already established a system for tracking what are called Renewable Energy Credits (RECs) here, participation in the west-wide effort will be helpful in (1) ensuring the credibility of renewable credits and (2) improving the administrative efficiency of interstate transfers in support of renewable portfolio standards.

WREGIS is in the process of completing its formation and initial funding, most of which is coming from California, and the establishment of a permanent home in the Western Electricity Coordinating Council. It expects to be operational by the end of 2005, with substantial membership of western states.

It is important to note that while most states allow renewable generators to compete in their own state, provided the energy is delivered and consumed in the state; none of the western states allow energy generated and consumed in another state to be counted toward their portfolio standard. In other words, states or utilities may not simply buy the renewable credits from another state; the renewable energy must actually be consumed in the home state for the renewable credit to qualify.

Continue Participation in WREGIS Activities

The Governor's Energy Advisor will participate jointly with the PUC in development activities of WREGIS. Such participation may include sitting on the governing board responsible for determining the charges for WREGIS registration.

Support Assurances to Lenders Who Provide Capital for Renewable Projects

By the middle of 2003 it became clear that some renewable developers, who already had contracts with Nevada's electric utilities, were having difficulty financing their projects. As noted in Chapter 5, NSOE formed a working group of individuals from the renewable developers and their financial advisors, the electric utilities, the PUC staff and the Bureau of Consumer Protection (BCP). The goal of this working group was to find a way to improve the likelihood of the renewable developers obtaining financing on reasonable terms. This was viewed as potentially helpful because the contract or power purchase agreement (PPA) with the two electric utilities, once considered essential for access to development funds, was generally not considered favorably by at least one of the traditional rating agencies. The reason was the credit status of the Nevada electric utilities. That status was adversely affected by its balance sheet after the un-recovered expenses associated with the western energy crisis and potential liabilities.

The working group, after long and difficult negotiations, came to a consensus about the TRED Program. Basically, the program called for the separation of revenues in support of the renewable PPAs from other revenues collected from customers. It then required that the renewable revenues be placed in a trust, the TRED trust, so that a financial trustee could distribute funds to qualified renewable developers, who would then have the funds to make required payments to their lenders. In concept it is fairly simple, but the details are anything but trivial.

It is important to have appropriate expectations about the TRED program because it is not a panacea; there are other factors that can still lead to project cancellation, even cancellation related to financing. But the program ultimately offers savings to Nevada ratepayers and is, therefore, worth pursuing in earnest.

Closely Follow the Implementation of the PUC's Temporary Renewable Development Trust (TRED) Program

The Governor's Energy Advisor will monitor progress as the TRED trust is applied to existing and new renewable energy contracts. Difficulties in the application of the new regulation will be identified and recorded for future action by the PUC or the Legislature, as applicable.

Endorse Responsible Actions to Return the Utilities to Creditworthiness

It would be improper to simply give the electric utilities an unwarranted boost in their regulated rate of return. These companies are, however, called upon to perform certain actions to support the public interest. These actions include the development of renewable generation and support for energy efficiency, energy conservation and other demand side management (DSM) functions. The utility is allowed a special rate of return for its investments in DSM functions, but not for the other activities.

This disparity should be corrected and, at the same time, the corrective actions should improve the utilities' balance sheet in a responsible and appropriate manner.

Provide Financial Incentives for Successful Deployment of Renewable Energy Projects

The Governor's Energy Advisor will support the granting of financial incentives for successful deployment of renewable energy projects.

Under the current regulatory structure and financial condition of the utility, the best the utility can do is break even on renewable projects. This is because it is only allowed to earn a profit on invested capital. In its current condition the utility does not have sufficient capital or operating experience to invest in renewable projects. Therefore, in order to comply with Nevada's renewable portfolio statute, it has chosen to contract with an outside developer. All contracted developer costs are passed through, just as they are with fuel costs or purchased power costs. The utility is not allowed, therefore, to make a profit on renewable projects. Even so, it still faces the consequences for failure to comply with the statute and this amounts to risk without reward.

Provide Financial Incentives for Successful Implementation of Energy Efficiency and Energy Conservation Measures

The Governor's Energy Advisor will support the granting of financial incentives for successful deployment of verified energy efficiency and conservation measures.

Under the current regulatory structure, actions taken by the utility to encourage energy efficiency or conservation must be taken under the DSM programs. Actions taken outside that program do not provide any financial incentive for the utility; in fact, they would reduce revenues and return on investment because collection of fixed costs locked into the Base Tariff General Rate would diminish. Currently, the utility has a vested interest in increasing energy demand, not reducing it. This is contrary to the public interest and should be corrected by allowing the utility to be a partner in efficiency and conservation measures.

Support Temporary Measures to Offset the Negative Financial Effects of Long-term Renewable Contracts

The Governor's Energy Advisor will support temporarily allowing a return to the utility for taking on long-term renewable energy contracts.

Under the current regulatory structure and financial condition of the utility, the utility is obliged to enter into long-term contracts with renewable energy developers in order to comply with the renewable portfolio standard. This is harmful to the utility stockholders because such contracts are treated as debt by rating agencies, thus making a return to creditworthiness artificially more difficult than it otherwise would

be. This is not only unfair to stockholders; it also penalizes ratepayers because they are saddled with many of the costs associated with reduced creditworthiness.

Enhance the Electric Transmission System

The electric transmission system is the super highway for electricity. Until the mid 1990s, the transmission system was essentially structured to serve a handful of contiguous control areas – it needed only to serve a relatively small area with roughly similar financial interests. It needed only to be comparable to the system of state highways.

With the advent of the federal Energy Policy Act of 1992 (EPAct) came wholesale deregulation (not to be confused with retail deregulation that contributed to the energy debacle at the beginning of this decade). Wholesale or interstate market reforms have made it nearly imperative for states and regions to act jointly to optimize the structure of the interstate transmission system. This was the basis for the development of regional transmission organizations that were intended to operate and plan these much larger groups of control areas. This is a very complicated process because the variety of interests and circumstances color the types of compromises that must be made to arrive at a consensus position about the expenditure of what will be several billions of dollars.

Nevada clearly has a stake in this process for a number of reasons. Early estimates by the federal government identified only two or three states that might be harmed by a new system of regional transmission organizations – Nevada was one of those states. On the other hand, the opportunities offered by joint state action are very important to Nevada. We currently import a large fraction of the power we use and stand to gain by improving the efficiency of the system. Within the next decade, it is likely that we will have the ability to export renewable energy, which is only possible with an efficient transmission system. Finally, we have much to gain from a transmission system that will provide transportation “coal by wire” or “hydro by wire” to parts of the state that do not currently have such access.

Support Recovery of Monies Spent on Regional Transmission Activities

Nevada has two organizations that have meaningful expertise in the design and operation of electric transmission systems. They are the electric utilities and the Public Utilities Commission that regulates them. Both of these organizations need to participate in the activities of the various FERC-sponsored regional transmission organizations; the activities endorsed by the Western Governors Association, which include the Western Interstate Energy Board, the Committee for Regional Energy Policy Coordination, and the Seams Steering Group – Western Interconnection; and the largely utility-driven Western Electric Coordinating Council. There is some evolution of activities, organizations and functions, but Nevada must maintain effective participation in this process.

Allow Recovery of Utility Expenditures in Regional Transmission Planning and Development Activities

The Governor's Energy Advisor will support a policy position that identifies appropriate activities that support regional transmission planning and development activities as being in the public interest.

Ensure that the Public Utilities Commission Has Sufficient Resources to Participate Effectively in Regional Transmission Planning and Development Activities

There is no reason to suspect that the budget request of the PUC is inadequate to the tasks that agency will perform in its regulatory oversight of the utility for regional transmission planning and development activities. However, it is fair to say that the situation is reasonably unpredictable, particularly as Congress once more takes on a national energy bill. Accordingly, the Governor's Energy Advisor will independently monitor the cost of these activities and will support supplementary requests of the PUC in the event that expenditures substantially exceed current expectations.

Join Other Western States in Support of a National Energy Policy

Nevada not only has a great deal to gain and a great deal at stake in the development of a national energy policy, but it has a unique opportunity to state its interests clearly, given the positions of members of its Congressional Delegation. While the details of federal legislation are unknown at this time, it is likely that Nevada and other western states will need to assert the unique nature of the western interconnection and its equally unique set of solutions.

Work Collectively with Western States and Directly with the Nevada Congressional Delegation to Enunciate Western and Nevada-Specific Interests in the National Energy Policy

The Governor's Energy Advisor will work jointly with the PUC, the Consumer Advocate, the electric utilities, other Nevada agencies and commissions, as well as regional agencies and commissions to develop positions on federal energy legislation that might be helpful to the Nevada Congressional Delegation. Actions will be taken to coordinate information development and to provide it in a way most useful to the delegation.

Upgrade Nevada's Energy Assurance Program

Implementation of Homeland Security measures regarding electricity generation, transmission and distribution will be required during the next biennium. The initial responses are now generally complete and the work that remains before the state is to carry out follow-on actions designed to gain an incremental level of energy assurance. The US Department of Energy (DOE), under its Energy Assurance Program, is driving these actions.

Energy Assurance, as defined by DOE, incorporates not only response to an emergency once it has occurred, but also actions to prevent the emergency from occurring in the first place. In general emergency response actions are well developed in Nevada. Preventive actions are also well developed in some areas, such as in regulated utilities. It is expected that preventive actions in non-regulated activities will contribute to new responsibilities for NSOE.

Revise the Nevada Energy Assurance Plan to Meet New Federal Guidelines

The National Association of State Energy Officials (NASEO), in cooperation with DOE, has recently issued new guidelines on the development of a Nevada-specific Energy Assurance Plan. These new guidelines represent a significant extension of planning, and perhaps, operational activities carried out by the NSOE. The existing plan needs to be revised in response to the guidelines and approved before it is possible to identify the long-term budget consequences and coordination needs. That said, Nevada has one of the best emergency management organizations and the role of NSOE is that of one agency among many during emergency response activities. Accordingly, it is appropriate to proceed deliberately before trying to implement a large number, or even a few, changes to the plan if those changes will have a material effect on other elements in Nevada's protection of the public under the Homeland Security aegis.

Revise the Nevada Energy Assurance Plan According to DOE Guidelines

NSOE will manage the revision of the existing Nevada Energy Assurance Plan, using NASEO's new guidelines. It is anticipated that federal funds will be available for this task and that an experienced contractor will be selected to lead the project under NSOE supervision. Once complete, NSOE will develop a comprehensive evaluation of the budget impacts and inter-agency coordination requirements.

Improve Integration of NSOE with Nevada Division of Emergency Management and Nevada Department of Homeland Security

NSOE is assigned several functions during responses to emergency activities. These actions are well managed and coordinated, although attention to incremental improvements of NSOE's role will continue. As new functions recommended by DOE are implemented, particularly in the area of preventive actions, NSOE will need to work closely with NDEM and NDHS.

Establish a Project Working Relationship with NDEM and NDHS during the Development of the Revised Nevada Energy Assurance Plan

NSOE will solidify its formal working relationship with NDEM and NDHS, and establish a relationship with any other state or federal agency, as required in the development and implementation of the revised plan.

Join with Other Western States in Seeking Effective Emergency Drills

In discussions with counterparts in other western states, it has become clear that energy officials who have energy assurance responsibilities are interested in developing periodic regional emergency drills in coordination with federal officials.

Work with Other WGA States to Request and Conduct an Integrated Energy Emergency Drill in Several Western States

NSOE will coordinate with energy assurance organizations in other western states to request, plan and conduct an integrated western energy emergency drill. Actions will be continued to ensure that this activity takes place on a periodic basis.

Overhaul and Refocus Federal Energy Programs in Nevada

Nevada participates in the US Department of Energy's system of activities under what it calls State Energy Program (SEP). These programs are extensive and managed by the Office of Energy Efficiency and Renewable Energy (EERE) through regional offices. Nevada is in the Western Regional Office in Seattle, WA. Periodically, it is necessary to refocus state activities to make sure that state interests continue to be served by actions taken as part of federal initiatives.

EERE's activities are divided into several different technology and programmatic areas. These include, for example, Building Energy Codes and Clean Cities (with the US Environmental Protection Agency), Energy Assurance (with the National Association of State Energy Officials), Rebuild America and Energy Smart Schools, Industries of the Future, Million Solar Roofs, and Weatherization. They also include renewable programs for each federally recognized renewable technology.

Restructure Renewable "Working Groups" to Emphasize Actual Deployment of Renewable Facilities

Federal energy programs tend to carefully distinguish between research activities, usually completed by DOE national laboratories and by universities, and "outreach" activities usually completed by state energy offices. Operating within these categories has been relatively straightforward. However, outreach activities in Nevada have concentrated on the exchange of information among working groups of people interested in similar technologies, and not necessarily on the completion of renewable projects.

Nevada needs to start putting some metal in the ground. Working groups need to identify good projects, providing support as appropriate, and then build a working facility. Once the experience is gained, working groups need to create action-oriented templates for others to use in completing their projects. These templates

need to include such information as: lessons learned, permitting tips and traps, interconnection roadmaps, working with local governments, and so on. But the principal point is, working groups should help Nevadans, or others working in the state, complete projects.

Restructure Nevada's Renewable Energy Working Groups to Focus on Completing Projects and Helping Others to Do So, as Well.

NSOE will assign a staff member to each renewable technology working group to effect this change in focus.

Join with Nevada's Premier Education and Research Organizations to Support "Renewable Energy Deployment Centers"

Nevada has been afforded a unique opportunity to develop renewable energy deployment centers under a system of grants sponsored by Senator Reid and other members of the Congressional Delegation. Two centers are currently planned, one at the University of Nevada Reno's (UNR) Redfield Campus in south Reno and the other at the University of Nevada Las Vegas (UNLV), possibly with a remote location near the planned Eldorado Valley solar energy facility. The non-profit Desert Research Institute (DRI), also associated with the University of Nevada system, is a full partner in both locations. Other research organizations and university departments are also partners in these developments including, for example, the Great Basin Center for Geothermal Energy at UNR; the Center for Energy Research at UNLV; and the UNLV College of Architecture. Public and private sector partners are also integral parts of the deployment centers including, for example, Washoe County's Regional Transportation Commission and Ormat, Nevada's largest geothermal developer. Finally, federal funds used to assist in the development of the deployment centers come from DOE and are processed through and managed by the National Renewable Energy Laboratory (NREL).

The Renewable Energy Deployment Centers will have the following major functions:

first as education and training centers. Learning activities will include everything from technician training through undergraduate, graduate and postgraduate education. For example, the Redfield Campus' partners include Truckee Meadows Community College. They will also conduct applied research on renewable technologies, hydrogen fuel development (UNR), and desert climate building efficiency improvement (UNLV). Finally, the centers will be a nexus for action and outreach. It is anticipated that international scientific visitors will be directed to the UNR center to learn about geothermal technologies in special seminars. Henderson high schools will be able to take field trips to functional solar energy generators. And

both centers will host conferences and technical working sessions related to their respective expertise.

Specific Action: Work with the Nevada University System, NREL and Nevada's Congressional Delegation to Maximize the Benefit of these Renewable Energy Deployment Centers to Nevadans.

The Director of NSOE, is a non-voting member of the Nevada Southwest Energy Partnership (NSWEP), which consists of representatives of each university and the DRI, as well as NREL. This group is responsible for recommending funding priorities and coordinating contract activities, as appropriate, with NREL. NSOE will continue to participate with the dual aims of representing the interests of the state government in renewable development and ensuring coordination of NSWEP activities with state and federal energy outreach priorities.

Enhance the Organization of Energy Policy Development

Nevada's energy policies are formulated and recommended by the executive branch of government, and approved or modified by the legislative branch. Moreover, there is a great deal of cooperation between these two branches of government in Nevada, leading to open and frank policy development. The key participants in policy development in the executive branch are the Governor, including the NSOE, and state executive branch agencies including the Public Utilities Commission, the Bureau of Consumer Protection, the Housing Division, the Welfare Division, the Conservation and Natural Resources Department, the Purchasing Department, as well as a number of other agencies that become involved for specific issues, for example the Nevada Commission on Economic Development.

Legislative participants in energy policy development are the Senate and Assembly Committees on Commerce and Labor. The Legislature also created the Renewable Energy and Energy Conservation Task Force (Task Force) composed of leading energy experts in the state, to assess priorities and promote renewable energy and energy conservation solutions. County and local governments also play important roles including, for example, the Clark and Washoe County air quality management and regional transportation organizations.

Permanently Install the Renewable Energy and Energy Conservation Task Force as a Policy Review Organization

The Task Force was created to assist the state develop renewable energy and energy conservation in concert with the renewable portfolio standard and as viable alternatives to continued reliance on ever more imported fossil fuels. It was structured so that both the Governor and the Legislature had a say in its composition and was initially assigned to promote renewable and conservation technologies.

Initial funding for the Task Force in the amount of \$250,000 came from the PUC, which at the time had a sizeable reserve fund. That money has lasted through not one, but two bienniums and is now nearly exhausted. The issues at hand are: (1) should the Task Force be reauthorized, (2) if so, how should it be funded, and (3) in what manner should the Task Force's "portfolio" be set – how should its agenda be determined.

Support Reauthorization of the Task Force.

The Governor's Energy Advisor will support the reauthorization of the Task Force. The Energy Advisor will also support up to \$250,000 per biennium to fund the Task Force, including the payment of reasonable travel expenses for government and non-profit members of the Task Force, and the creation of a permanent "home" for the Task Force so that it is clear who is responsible for preparing and defending the Task Force budget.

It is also desirable, dependent upon where the Task Force resides organizationally, that some boundaries be established for the work of the Task Force. For example, the Task Force itself could be asked to propose an agenda that is then reviewed and approved biennially during the legislative session. Another alternative would be for the Governor to approve the agenda more frequently. If the Task Force is to be reauthorized, who forms and who approves the agenda needs to be clearly delineated.

Integrate the Permitting of Energy Facilities among the Various Jurisdictional Governmental Bodies

After studying the number of applications for power plants in Nevada to serve markets generally outside the state, the Governor directed that a deliberative body be formed to look carefully at the way in which power plants consume Nevada resources, particularly air shed and water. The primary concern is that both of these resources are limited and fragile in our state, and the potential for doing permanent harm to our ability to foster the economic development and create the jobs that maintain our economic vitality is unacceptably high.

At issue is how the broader interests of the state are woven into regulatory and permitting decisions needed for power plant development. As it stands now, only one state agency, the PUC, has the ability to balance the economic benefit of a power project with the resulting environmental damage it may cause, and then make a decision that is in the interest of the state and its local jurisdictions.

The Governor has created a Forum on Natural Resources and Electric Generation to review these conditions and make a report, including recommendations, to him at the completion of their work. It is not anticipated that this will be in time for the coming legislative session, but should be available by the 2007 session.

Support the Work of the Governor's Forum on Natural Resources and Electric Generation.

The Governor's Energy Advisor will work closely with the Governor's Natural Resources Advisor to conduct the policy review necessary to ensure that Nevada's economic vitality is not diminished by the depletion of air shed and water resources required for electric power plants that may not even serve Nevada loads.