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(PUBLIC SECTOR, BUSINESS AND INDUSTRY)	

Nevada Statewide Energy Conservation Plan

INTRODUCTION

In recognition of Nevada's goal to conserve energy, the Governor issued the Nevada Energy Conservation Plan for State Government. The State also recognizes the important role that counties, cities, businesses and residents must play in the formulation, implementation, and ultimate success of energy conservation policies and programs. With growing development pressures and fiscal challenges facing a large number of our communities, the State encourages efforts by all Nevadans to conserve energy and to improve the efficiency of energy use.

With the threat of rising energy costs, households, businesses, institutions and governments must concern themselves with reducing energy usage to minimize a negative financial impact. Conservation measures can assist in reducing costs and offsetting rising energy prices. Additionally, because energy use can adversely affect air quality and other natural resources, energy issues are also environmental quality issues. An effective energy conservation plan can reduce air pollution and improve water quality.

Over the long term, energy conservation can result in additional benefits. As energy supply meets or exceeds demand and energy prices become more stable, conservation can result in economic advantages. Clearly, by reducing energy consumption, we can all experience a financial savings that can be applied to other initiatives within government, businesses and households. Further, this will allow for the preservation of, and promote increases in, the current level of money circulating in our local economy.

PURPOSE

The purpose of this plan is to encourage, support, and facilitate conservation measures, as well as implement exchange of information regarding statewide energy-related use and activities between public and private entities. Each of the various entities involved, including State and local government, business and industry, utility providers, and residential consumers, can contribute to this effort through appropriate conservation means. This includes, but is not limited to, joint development of projects, interagency coordination, information sharing, and the sharing of relevant expertise. In addition, it is hoped that implementation of this plan will encourage, support, and facilitate collaborative programs to achieve maximum energy conservation.

PLAN OBJECTIVES

- Minimize the likelihood of energy supply disruption.
- Develop awareness of the role played by energy statewide, and recognize the need to plan for the effects of growth on energy resources.
- Reduce the vulnerability of the State's economy relative to energy disruptions that may be caused by shortages in electricity, natural gas and other energy sources through conservation measures.
- Encourage the development of energy technologies that reduce dependence on fossil fuels and take advantage of Nevada's natural resources including the State's abundant geothermal, solar and wind resources.
- Provide for the collection and analysis of energy data at the State level in order to develop a comprehensive energy information exchange system.

- Provide for the development and exchange of technical expertise and information in various energy related fields.
- Ensure that the needs and issues of industry, business, and residential energy consumers are considered during energy policy and program development.
- Assist all consumers in conserving and using energy effectively.
- Support residential and other energy consumers in meeting their energy needs while promoting the application and use of cost-effective energy efficiency, renewable energy, and other clean energy technologies.
- Encourage weatherization of new and existing buildings.
- Propose energy conservation measures and retrofits to improve energy efficiency.
- Encourage public education and awareness.

PLAN ORGANIZATION

To ensure the concerns of all energy users within the State of Nevada are addressed, this plan is divided into two major sections:

- Public Conservation Programs including State and Local Government Energy initiatives.
- Private Conservation Programs including Utility Provider, Business and Industry, and Residential initiatives.

Each section will provide information on programs and initiatives which are already in place, as well as suggested conservation measures. The appendices to this plan contain further details on the measures suggested in each section, as well as additional measures which may be implemented.

SITUATION AND ASSUMPTIONS

Energy Resource Situation

- Energy resources are limited and Nevada is dependent upon out-of-state supplies.
- As long as Nevada is dependent upon energy imports from outside, the State will be affected by adverse regional conditions.
- The population of the State is increasing at a high rate and new businesses are creating a greater energy demand.
- It takes time to develop new energy suppliers and/or resources, and the construction time of additional facilities increases due to the lengthy environmental and siting processes required by law.
- Energy costs may continue to rise as long as demand exceeds supply.

- An energy shortage may occur and may require additional conservation measures.

Planning Assumptions

- The population of the State will continue to increase at a high rate with a corresponding increase in energy consumption.
- A shortage of energy in one form (such as electricity) may cause shortages in water, natural gas and petroleum fuels.
- Conservation measures may prevent an energy emergency from occurring.

NEW ENERGY SUPPLY

The need to conserve energy in Nevada is especially important because increasing the supply of energy is an expensive and time consuming process. By the summer of 2003, Nevada and the other western states are expected to have significant amounts of new supply coming on-line. As a result, conservation measures are especially important in the near term to limit increases in energy prices and enhance the reliability of service.

The new energy facilities that are being developed in Nevada and throughout the western interconnection include gas transmission expansions and electricity transmission expansions as well as renewable, new fossil fuel, and distributed generation facilities. Nevada currently relies primarily on energy technologies that depend upon fossil fuels such as natural gas, oil and coal, with most of the proposed facilities using natural gas. However, Nevada is rich in geothermal, wind and solar resources, and renewable energy projects are being proposed to produce additional energy. All new facilities, whether they are renewable or fossil fuel based, require at least two years to develop and often end up taking three to four years. Consequently, conservation will be crucial in keeping prices low and maintaining a high level of reliability relative to existing resources.

More information on energy technologies may be found at the following websites:

Federal Government Sites:

www.nrel.gov
www.eren.doe.gov
www.energy.gov/sources

Other sites:

www.crest.org
www.geotherm.org
www.cader.org
www.epri.com

CONSERVATION NEEDS

Statewide Needs

In order to insure that conservation plans and policies developed by both the public and private sectors are consistent and effective, a statewide analysis is recommended. This analysis would take place within the Nevada State Energy Office, and should cover both short term, intermediate and long term conservation plans and policies.

An energy auditing program is recommended to provide technical assistance to energy users in various economic sectors of the State. This program should be utilized to identify patterns of energy consumption, the problems that arise due to such consumption, and to propose adequate conservation solutions to these problems.

Energy Information Management

The vital role of information in the development of energy conservation activities cannot be overstated. A conservation database that facilitates the exchange of information with other states is critical.

CONSERVATION PROGRAM ANALYSIS

Before implementing energy conservation measures, it is suggested that all potential energy conservation projects be evaluated. on the following criteria:

- Identify and define the projects.
- Calculate annual energy savings for each project.
- Project future energy costs and calculate annual financial savings.
- Estimate project costs.
- Evaluate the merit of each project.
- Assign priorities to projects.
- Monitor and evaluate the performance.

PUBLIC CONSERVATION PROGRAMS

The Public Conservation Programs section of this plan provides an overview of conservation plans, programs and initiatives currently existing within State Government, Local Government, and regionally. A list of possible conservation measures which can be applied by the public sector, as well as a contact list of phone numbers and websites which can provide more information on energy conservation, is available in Appendix I.

State Government Conservation Initiative

The Governor's Office directs State government in achieving energy conservation goals through policy and the issuance of executive orders. Within the office of the Governor, the Press Secretary is responsible for conducting briefings and preparing press releases to the media as well as providing public service announcements (PSA) for public education/awareness. The Nevada State Energy Office is the primary State agency responsible for initiating, maintaining and coordinating statewide energy resource information.

State Energy Management Plans

A Nevada Energy Conservation Plan (NECP) for State Government has been developed to guide agencies in energy conservation measures. As a formalized written energy program, this plan outlines procedures and guidelines that State agencies are to follow, and is the driving force to achieve the goals and objectives of the Governor. The plan suggests immediate, short term, and long term measures that can be implemented to reduce energy consumption. The NECP is available on the Division of Emergency Management's website at www.dem.state.nv.us.

Additionally, each agency is required to develop and implement energy conservation plans containing conservation and contingency measures specific to their agency.

Nevada State Energy Office Programs

The Nevada State Energy Office (NSEO) facilitates new building energy efficiency. The NSEO promotes the adoption of building energy codes for all new buildings, developing design and construction training for builders who want to learn how to enhance new building efficiencies, and co-sponsoring the annual "Governor's Award for Excellence in Energy Efficiency in New Home Construction." The NSEO also promotes improved efficiency for existing buildings by offering training to individuals who want to be certified to perform Home Energy Ratings and

by supporting the U.S. Department of Energy’s Rebuild America program in Nevada. Additionally, the NSEO provides information to individuals on improving the energy efficiency of their homes. For more information about these programs, visit the State Energy Office website at www.nseo.state.nv.us.

Public Utility Commission Reliability Enhancement Programs

The Public Utilities Commission has established load curtailment tariffs that provide financial incentives for customers to shed load during peak load periods. The curtailment tariffs have been entitled “conservation tariffs” and have been approved by the Commission and are now available to eligible customers in Sierra Pacific and Nevada Power’s control areas. More information regarding this program can be obtained at the Sierra Pacific Resources conservation website at www.sierrapacific.com/takecontrol/.

The Public Utility Commission is considering two additional programs to provide for energy conservation. These programs are:

- A pilot parallel generation program that allows those companies who have already invested in parallel generation facilities to sell back to the utility during peak load times. The pilot parallel generation program is still under development but should be available as an option to the conservation tariff by this summer.
- A wholesale interruptible program that compensates eligible wholesale commercial customers for interrupting their load. The wholesale interruptible program is currently under development.

Once these programs are developed, other programs that will improve resource reliability for the summer of 2002 and beyond will be pursued. Possible programs include:

- A distributed generation program that will seek to facilitate the installation of additional parallel distributed generation.
- Additional demand response tariffs and programs that facilitate the installation and use of time-of-use meters.

For updated information on the programs in development call the Public Utility Commission at 1-800-ASK-PUCN or visit the PUCN website at www.pucn.state.nv.us.

Federal Grants and Programs Administered by State Government

The Weatherization Assistance Program (WAP) provides funds for low income households to pay for weatherization expenses. Effective weatherization of a home includes measures such as improving insulation, identifying and sealing leakages, and installing double-paned or reflecting windows. For more information on the weatherization program contact the Nevada WAP administrators at the State Housing office at (775) 687-4258 (ext. 226).

The Low Income Home Energy Assistance (LIHEA) program is a federal program that provides assistance to low income individuals and households for heating expenses. Increased funding and extension of the program to cover cooling expenses is being contemplated in current federal legislation. For eligibility criteria and other information on this program contact the Nevada LIHEA administrators at (775) 687-4420.

Local Government and Regional Conservation Initiatives

Colorado River Commission and Southern Nevada Water Authority

The Colorado River Commission and the Southern Nevada Water Authority have established a cooperative program for shifting water pumping to off-peak times when possible. This program both reduces the cost of energy for water pumping and contributes to regional energy conservation by reducing energy demand during peak times.

Las Vegas Valley Water District

The Las Vegas Valley Water District has established and implemented an energy conservation plan. This plan includes descriptions of measures that can be utilized on an institutional level as well as measures that can be undertaken by individual employees. Information from the Las Vegas Valley Water District can be found at www.lvwd.com.

PRIVATE CONSERVATION PROGRAMS

The Private Conservation Programs section of this plan provides an overview of conservation plans, programs and initiatives currently provided by or for the Utility Companies, Businesses and Residential consumers. A list of possible conservation measures which can be applied by the private sector, as well as a contact list of phone numbers and websites which can provide more information on energy conservation, is available in Appendix II.

Utility Provider Initiatives

Sierra Pacific Power/Nevada Power

Sierra Pacific Power Company has initiated a program called “Take Control” designed to take complex or generalized energy conservation information and translate it into real and practical choices for consumers. The program will include web-based home audits that consumers can do themselves, educational programs, and partnerships with supplier and other energy experts to encourage energy conservation measures for homes and businesses. The “Take Control” program provides information on both electricity and natural gas conservation. The Sierra Pacific website can be found at www.sierrapacific.com/takecontrol.

Southwest Gas

Southwest Gas Corporation produces several guides for the consumer which provides information on conservation measures which may be used in the home, business, or in new construction. They also provide a question answering service regarding natural gas. This service can be accessed by calling 800-654-2765, or visiting their website at www.swgas.com.

National Propane Gas Association

The National Propane Gas Association provides energy saving tips for consumers on their website, at www.npga.org. Additional information can be obtained from a local propane supplier, listed in your local phone directory.

Business and Industry Initiatives

The Nevada Resort Association has formed two special committees to address the issue of conservation within the gaming industry. These Energy Management Committees have set a goal of 20% reduction in energy usage.

Residential Initiatives

There are many sources which provide energy conservation advice and assistance for residential consumers. Appendix III provides a list of possible conservation measures which may be useful in the home. Also provided is a contact list of phone numbers and websites which can provide more information on energy conservation.

CONTINGENCY

In the event that energy conservation measures become inadequate to mitigate against an energy emergency, resulting in the energy demand exceeding the energy supply, the Nevada Division of Emergency Management will coordinate statewide response and recovery activities according to the State Comprehensive Emergency Management Plan, and in accordance with NRS 414.

LIABILITY

The State may not be held liable for the implementation of these measures unless there is evidence of willful misconduct, gross negligence, or bad faith on the part of any person complying with or attempting to reasonably comply with the provisions set forth in NRS 414.110.

The State has also included references to websites that include useful information. However, including a website does not constitute an endorsement of any products that may be offered.

AUTHORITIES AND REFERENCES

Nevada Revised Statutes, as amended:

- Chapter 223, Governor
- Chapter 228, Attorney General
- Chapter 232, State Departments
- Chapter 232b, Legislative Review of Public Agencies
- Chapter 233b, Nevada Administrative Procedure Act
- Chapter 281, General Provisions
- Chapter 338, Public Works Projects
- Chapter 353, State Financial Administration
- Chapter 366, Tax on Special Fuel
- Chapter 416, Emergencies Concerning Water or Energy
- Chapter 433, Administration of Programs
- Chapter 445A, Water Controls
- Chapter 486A, Fleets, Use of Alternate Fuels
- Chapter 523, Energy
- Chapter 590, Petroleum Products and Antifreeze
- Chapter 703, Public Service Commission of Nevada
- Chapter 704, Regulation of Public Utilities Generally

Reports:

The Nevada Electric Energy Policy Committee Report to the Governor, January 2001.

_____ Located on the State of Nevada website at www.silver.state.nv.us

APPENDIX I

SUGGESTED CONSERVATION MEASURES

PUBLIC SECTOR

CONSERVATION MEASURES:

Measures that work for most work environments

Heating and cooling accounts for about 30 - 50% of our energy costs.

- Use the automatic setting on your thermostat so the fan turns on only when you need heating or cooling. On the manual setting, the fan operates continuously and can increase your energy usage.
- Set the heating controls at 68 degrees F. (70 degrees F for seniors) with a set back at night or when unoccupied to 60 - 65 degrees.
- Cooling controls should be set no lower than 78 degrees F.
- Consider raising cooling settings and lowering heating settings on programmable thermostats for both occupied and unoccupied hours.
- Heating and cooling should start no sooner than ½ hour before you begin the day.
- Heating and cooling may be set back ½ hour before the end of the day.
- Clean or replace filters regularly. Keep outside units free from leaves or debris that may clog vent.
- Do not use space heaters if your building has centralized heating.
- In the winter, close window coverings at the end of the day to cut down on heat loss. In the summer, close window coverings during the day to avoid the heat gain of direct sunlight.

Other measures to save energy

- Turn off your computer monitor when you are away from your desk for more than 15 minutes and at the end of the day. Most monitors now come with power management features; talk to your staff's computer expert about activating these features. Note that screen savers don't save energy; complex screen savers actually increase energy use.
- Eliminate unnecessary hot plates, coffeepots and other small appliances in your area and turn off all tools, office machines and portable appliances when not in use. If you're the last one leaving at the end of the day, turn off the photocopiers and other office equipment. Instead of having many coffee pots in various cubicles, select one to cover the whole office.
- Turn off all lights at night, including task and office lights.

- Use natural light whenever possible. Turn off lights near windows when daylight is adequate.
- Turn off lights when they are not in use.

Measures that will be effective for some work environments

- Watering your landscape uses electricity along with water. The water in your home or office gets there with the use of large electric pumps. Make sure you follow local watering guidelines for proper landscape care.
- Verify that the outside air (OSA) dampers are closed during unoccupied hours, including during morning warm-up periods. Fresh air is critical while the building is occupied, but heating OSA when it is not needed increases energy costs.
- Be sure motor-operated dampers are operating properly.
- Confirm that your adjustable speed drives (ASD) are running properly. If they are operated constantly at 100% speed, they use more energy than the directly connected motor. Most ASD's have an output monitor to report percentage of operation. A motor running at 50% speed uses 1/8 the energy of a motor running at 100% speed.
- Less frequently used equipment with remote controls such as televisions and VCRs should be unplugged when not in use because they still use some power even when turned off.
- Make sure photocells (light sensors that turn on electric lights after dark) are clean.
- Also turn off lights in unused common areas such as copy rooms, break rooms, conference rooms and rest rooms. The effect on lamp life and energy use when turning the lamp back on is negligible.
- Don't set a higher temperature to "warm up faster," or a lower temperature to cool quickly. It only wastes energy.
- Check to make sure that exhaust fans operate only during occupied periods unless required to operate continuously.
- Check that dampers on exhaust fans close when the fan is not operating. Adjust fan belt tension.
- Inspect control schedules and zones so that you heat only the occupied sections of the building.
- If you only have electric space heating, stagger the start times to help reduce demand, especially during peak demand times.
- Close off unoccupied areas and shut their heat or air conditioning vents; or turn off room air conditioners. This does not apply if you have a heat pump system.
- Sitting close to a window during the cloudy winter can make you feel cold, if so, close window coverings or move further from the window.

- Try to schedule group activities in the area with the least energy use, and schedule evening meetings in areas that can be heated and cooled individually. This may include offering a work station for staff working after hours so they do not need to heat or cool half a floor or cubicles for one person on a weekend.
- Make sure that air vent grills are not blocked by plants, books or furnishings.
- Keep drafts away from thermostat to prevent an inaccurate reading.
- Dust or vacuum radiator surfaces frequently to insure a free flow of heat.
- In cold weather, dress warmly and in layers that can be adjusted for optimal comfort. Loosen clothing and dress casually during the warmest hours.
- Dressing wisely can help you maintain natural heat. Wear closely woven fabrics. They add at least a half-degree in warmth. For women, slacks are at least a degree warmer than skirts. For men and women a light long-sleeved sweater equals 2 degrees in added warmth. A heavy long-sleeved sweater adds about 4 degrees and two light weight sweaters add about 5 degrees of warmth because the air between them serves as insulation to keep in more body heat.
- Don't use an air conditioner and an evaporative cooler at the same time. An air conditioner removes moisture from the air, while a cooler adds moisture to reduce room temperature. Since they use opposite methods for cooling, running both at the same time will increase your energy bill.
- Have your vending machine operators turn off the advertising lighting in the machine. This will conserve energy and could save between \$50 and \$110 per year, depending of your cost of electricity.
- Use photocells to automatically switch lights on at night or use motion sensors to increase safety. Photocells are controls that make lights "smart". They sense whether available surrounding light is present to determine whether a light should be lit or not. The light turns on and off automatically.
- Use lower wattage bulbs in non-critical areas.
- A 50-watt reflector floodlight provides the same amount of light as a standard 100-watt bulb.
- Use one large bulb instead of several small bulbs that add up to higher wattage.
- Many areas have more lighting than is required for current tasks. Measure current lighting levels and reduce excess lighting by using power reducers, multi-level switching, or simple removal of lamps and ballasts. Note that some ballasts continue to use some energy even when lamps are not operating.
- Ask janitorial services to only light one area of the building at a time rather than having the entire building brightly lit until midnight.
- Ask janitorial services to take advantage of partial switching (such as turning on only one lamp of a three-lamp fixture that is wired to allow this) to further reduce energy use during building cleaning.
- Avoid using incandescent task light (desk lamps). Ask your building manager for a compact fluorescent lamp to replace the incandescent lamp in your task light.

- Staggering shifts or using flexible work schedules are suggested to empty offices during energy peaks.
- Teleconferencing can reduce energy use and save travel costs.
- Feel for air drafts around electrical outlets. Inexpensive pads are available, as are plugs for unused sockets.
- Confirm that the amount of outside air matches the occupant load. One improvement to consider is adding carbon dioxide monitors along with controls that will only bring in as much OSA as necessary for the current occupant load.
- Verify that the building control system is going into the night setback mode during unoccupied hours. Time clocks may require adjustments after daylight savings switch-overs or after power outages. Even computer control systems may need updating after equipment modifications.
- Confirm that OSA economizers are functioning properly to take advantage of free cooling. Most office buildings are in cooling mode when the outside air temperature is above 55 degrees F. The core of buildings over 20,000 square feet are almost always in cooling, even during the winter months.
- Keep your systems well tuned with periodic maintenance. At least once a year have a service technician measure the carbon dioxide in your gas burner. The higher the carbon dioxide the greater the efficiency of the unit. 9% is a good level.
- Make sure simultaneous heating and cooling does not occur. Verify proper operation of valves, dampers and controls.
- For commercial and industrial applications, monitor stack temperatures on fossil fuel boilers. If the stack temperature is more than 400 degrees above the boiler room temperature, schedule the boiler for a tune-up.
- Turn off circulation pumps during unoccupied times if no freeze conditions exist.
- Make sure that air handling unit filters are changed every 2 - 3 months, and that coils on the outdoor condensing unit and indoor heating and cooling units are kept clean.
- Check control sequencing for multiple chillers and boilers. For light load operation, use the smallest and most efficient chiller or boiler available and avoid frequent equipment cycling.
- Check the duct work for air leaks about once a year if you have a forced-air heating system. To do this, feel around the duct joints for escaping air when the fan is on. Small leaks can be repaired with duct tape. Larger leaks may require caulking.
- Perform energy audits on all buildings.
- Incorporate energy efficiency guidelines for all new construction.
- Incorporate energy efficiency guidelines for all building retrofits.
- Purchase only “Energy Star” equipment.

- Utilize performance contracting to limit economic impact on building retrofits.
- Retrofit most energy inefficient buildings first.
- We can eliminate bulbs in fixtures as an initial conservation measure, but the long term fix is to replace the T-12 bulbs with T-8 bulbs with electronic ballasts. In doing this, the whole lighting situation should be re-evaluated so we don't over light with the new bulbs since they are not only more energy efficient, but they put out more light.
- Replacement of windows, installing window films and insulating buildings all have to be evaluated to make sure we are getting the most efficiency for the money spent. We will have to rely on the Public Works Board and the Building and Grounds people to provide the necessary over- sight on these projects.
- Water conservation needs to be addressed. Low flow faucets, low flow toilets and an evaluation of hand drying methods should be evaluated in the same contexts as electricity.
- Develop landscaping plans that do not require the present water consumption.
- Variable speed drives on air handlers.
- A central heating and cooling system will use less energy than individual heat-cool units for most work environments.
- Utilize high efficiency motors on electrical equipment.
- Evaluate processes to eliminate or reduce energy resources needed for the process such as eliminating or reducing the forms needed to get permission for an activity, simplify approval chains or modify reporting requirements, etc.
- Installing renewable energy systems in buildings may be cost effective for some buildings and will reduce the demand on the electric energy system.

CONTACTS AND WEBSITES:

Government Contacts

State of Nevada
 Division of Emergency Management
 2525 South Carson Street
 Carson City, Nevada 89711
 (775) 687-4240 Office
 (775) 687-6788 Fax
www.dem.state.nv.us

State of Nevada
 Energy Office
 727 Fairview Drive, Suite F
 Carson City, Nevada 89701
 (775) 687- 5975 Office
 (775) 687-4914 Fax
www.energy.state.nv.us

Boulder City
Boulder City Emergency Management
1101 Elm Street
Boulder City, Nevada 89005
(702) 293-9228 Office
(702) 293-9221 Fax
www.bcnv.org

Elko County
Elko County Emergency Management
571 Idaho Street
Elko, Nevada 89801
(775) 738-8046 Office
(775) 753-8535 Fax

Carson City
Office of Emergency Management
Carson City Fire Department
777 South Stewart Street
Carson City, Nevada 89701
(775) 887-2210 Office
(775) 887-2209 Fax
www.carson-city.nv.us

Esmeralda County
Office of Emergency Management
P.O. Box 457
Goldfield, Nevada 89013
(775) 485-3757 Office
(775) 485-3429 Fax

Churchill County
Office of Emergency Management
155 West Taylor Street, Room 177
Fallon, Nevada 89406
(775) 423-4188 Office
(775) 423-5677 Fax
www.fallononline.com

Eureka County
Office of Emergency Management
P.O. Box 714
Eureka, Nevada 89316
(775) 237-5372 Office
(775) 237-5708 Fax

Clark County
Office of Emergency Management
P.O. Box 551713
500 South Grand Cental Parkway
Las Vegas, Nevada 89155-1713
(702) 455-5710 Office
(702) 455-5718 Fax
www.co.clark.nv.us

Fallon
Fallon Civil Defense
55 West Williams Avenue
Fallon, Nevada 89406
(775) 423-1345 Office
(775) 423-5107 Office
(775) 423-0381 Fax

Douglas County
Douglas County Emergency Operations
P.O. Box 218
Minden, Nevada 89423
(775) 782-9977 Office
(775) 782-6289 Office
(775) 782-9868 Fax
www.co.douglas.nv.us

Henderson
Henderson Emergency Management
223 Lead Street
Henderson, Nevada 89015
(702) 565-2165 Office
(702) 564-8928 Fax

Las Vegas
Las Vegas Emergency Management
500 North Casino Center Boulevard
Las Vegas, Nevada 89101-2986
(702) 383-2888 Office
(702) 229-0444 Fax
www.ci.las-vegas.nv.us

Humboldt County
Office of Emergency Management
904 South Bridge Street
Winnemucca, Nevada 89445
(775) 623-2192 Fax

Lincoln County
Office of Emergency Management
P.O. Box 314
Panaca, Nevada 89042
(775) 728-4431 Office
(775) 728-4257 Fax

Naval Air Station - Fallon
4755 Pasture Road
Fallon, Nevada 89406
(775) 426-2844 Office
(775) 426-3190 Fax

Lyon County
Office of Emergency Management
18 Highway 95A North
Yerington, Nevada 89447
(775) 463-6551 x16 Office
(775) 463-6555 Fax

Reno
Office of Emergency Management
P.O. Box 1900
Reno, Nevada 89505
(775) 334-2323 Office
(775) 334-3826 Fax
www.cityofreno.com

Mesquite
Mesquite Emergency Management
10 East Mesquite Boulevard
Mesquite, Nevada 89027
(702) 346-2690 x248 Office
(702) 346-5242 Fax
www.mesquitenv.com

Sparks
Department of Public Works
P.O. Box 857
Sparks, Nevada 89432-0857
(775) 353-1633 Office
(775) 353-1651 Fax

Mineral County
Office of Emergency Management
P.O. Box 1600
Hawthorne, Nevada 89415
(775) 945-2497 Office
(775) 945-0702 Fax

Storey County
Office of Emergency Management
P.O. Box 976
Virginia City, Nevada 89440
(775) 847-0954 Office
(775) 847-0987 Fax

North Las Vegas
North Las Vegas Emergency Management
2200 Civic Center Drive
North Las Vegas, Nevada 89030
(702) 633-1125 Office
(775) 649-0660 Fax
www.cnlv.onevegas.com

Washoe County
Division of Emergency Management
Press Clewe, Administrator
P.O. Box 11130
Reno, Nevada 89520-0027
(775) 328-2095 Office
(775) 328-6103 Fax

Nye County
Nye County Emergency Services
P.O. Box 153
Tonopah, Nevada 89049
(775) 482-7379 Office
(775) 482-8198 Fax

West Wendover
West Wendover Emergency Management
P.O. Box 3226
West Wendover, Nevada 89883
(775) 664-2274 Office
(775) 664-3599 Fax
www.westwendovercity.org

Pershing County
Office of Emergency Management
Box Drawer E
% County Courthouse
Lovelock, Nevada 89419
(775) 273-3402 Fax
www.lovelocknv.com

White Pine
Office of Emergency Management
P.O. Box 150342
East Ely, Nevada 89315-0342
(775) 289-8406 Office
(775) 289-9696 Fax

Utility Contacts

City of Boulder City, Municiple Co-op
PO Box 61350
Boulder City, NV 89006
(702) 293-9231
www.bcnv.org

Great Basin Electric Cooperative

Harney Electric
PO Box 107
Orovada, NV 89425
(775) 272-3336

Lincoln County Power District #1
HC 74 Box 101
Pioche, NV 89043
(775) 962-5122

Mt. Wheeler Power
PO Box 1110
Ely, NV 89301
(775) 289-8981
www.mwpower.net

Nevada Power Company
Main Office:
6226 West Sahara Avenue
Las Vegas, Nevada 89151
702-367-5000 - Main Number

Sierra Pacific Power Company
Main Office: Reno/Sparks
P O Box 10100 / 6100 Neil Rd.
Reno, NV 89520
775-834-4444 Main Number
800-962-0399 Toll Free
775-834-4100 Emergencies
www.sierrapacific.com

Southwest Gas
Energy Services
(800) 654-2765 (The Energy Specialists)
www.swgas.com

Truckee - Donner PUD

Valley Electric Association
PO Box 237
Paruhmp, NV 89041
(775) 727-5312
www.valleyelectric.org

Wells Rural Electrification Cooperative
PO Box 365
Wells, NV 89835
(775) 752-3328
www.wellsrec.com

800-331-3103 - Toll Free
702-367-5555 - 24 Hour Customer Service
www.nevadapower.com

Overton Power District #5
PO Box 395
Overton, NV 89040
(702) 397-2512

Plumas - Sierra Rual Electric Cooperative
73233 State Route 70 Suite A
Portola, CA 96122
(530) 832-4261
www.psln.com

Williams Gas Pipeline West
2800 East Lone Mountain
North Las Vegas, NV 89031
(702) 399-1612
www.williams.com

Websites

www.state.nv.us

The State of Nevada's home page with links to the Governor's website, the Legislature website, and additional State agencies.

www.sierrapacific.com

Sierra Pacific Resources site. Includes Sierra's "Take Control" program which provides resources relative to energy conservation as well as other energy information.

www.swgas.com

Southwest Gas Corporation site. Includes rate payment options and information on reducing energy bills.

www.dem.state.nv.us

State of Nevada Division of Emergency Management site. Provides information to the preparation for and management of Emergency Situations.

www.energy.state.nv.us

State of Nevada Energy Office site. Describes Federal grant programs and provides links to other energy sites.

www.doe.gov

United States Department of Energy site. Provides national, regional and state energy information. Includes valuable conservation tips that will save energy and money. This site contains free subscriptions, downloads and a Kidz Zone.

www.puc.state.nv.us

State of Nevada Public Utilities Commission site. Provides information on all active dockets before the commission including those addressing conservation and load reduction programs. Includes a report produced by the Governor's Nevada Electric Energy Policy Committee making recommendations regarding conservation and efficiency initiatives.

www.ase.org/checkup/business
www.energyguide.com

These websites allow you to enter the characteristics of your office environment, such as the number of square feet in your building and the type of lighting that you currently have, and then to examine the amount of energy you can save by undertaking specific measures.

APPENDIX II

SUGGESTED CONSERVATION MEASURES BUSINESS AND INDUSTRY

CONSERVATION MEASURES:

General

- Turn off the water cooler during periods of high electrical use, which is from 4 to 8 PM.
- Request employees to shut off non-essential computers, coffee makers, other nonessential equipment and, if feasible, 50 percent of copiers.
- Promote casual wear that is more comfortable when air conditioning is reduced.
- Offer flexible work hours in the summer where practical to allow employees to come in earlier and leave earlier.
- Implement "cool cafe" days when the food service only serves cold items such as sandwiches, salads, fruits and vegetables.
- Raise thermostat settings for your air conditioning systems by a few degrees during working hours, and consider raising the thermostat further when your facilities are unoccupied. Raising the thermostat a degree a day (up to 78 degrees) will make the transition easier.
- Consider moving operations or production schedules away from the first shift, or starting the first shift earlier in the day, to avoid high electricity demands during peak usage periods.
- Turn off machinery not in use rather than letting it idle.
- Use water-cooled equipment whenever possible.
- If you are planning a facility shutdown, consider scheduling it sometime during the hottest months (July or August).
- Investigate the use of mobile air compression or mobile electric generation.
- To conserve energy, reduce water pressure to minimum safety levels before starting any pumping operations. Also, allow sumps at sewerage pumping stations to remain as full as safely possible before pumping.
- If you have water storage tanks at your facilities, fill them before peak electric demand periods in order to maintain sufficient water pressure in the event of a power outage.

- In hospitals, perform flexible operations such as disposal of medical waste, during evening or early morning hours, when the demand for electricity is lowest.
- Pool pumps should only be operated during evening hours. This eases electric demand during peak usage hours. Check water quality frequently.

Computers and Electronic Equipment

- Consider using battery-powered laptop computers in place of docking stations, and charge the batteries at night during off-peak hours.

Elevators and Escalators

- If your elevators are connected to an alternate power supply, verify the maximum number of elevators that can run without overloading the generator.
- When shedding load, make sure that the air conditioning and ventilation systems for the elevator equipment room are not shut off.

Generators

- Check the operation, adequacy and maintenance (e.g., fuel supply, filter, coolant levels) of your emergency generators and battery systems. To identify potential problems before the time of need, test emergency generation under full-load conditions.
- If you decide to obtain on-site backup generation, contact your local Department of Environmental Protection (DEP) for information regarding emissions issues and special provisions.
- Before installing emergency generation, contact your local electric company for interconnection requirements.
- Consider pre-cooling your facility in the early morning hours, prior to peak demand for electricity.
- Verify that all maintenance has been performed on your air conditioning equipment, including changing the filters.
- If you are considering purchasing a new air conditioning system, evaluate high efficiency units and consult your local electric company about cash incentives available for owners of highly efficient systems.
- Use drapes or shades to prevent direct sunlight from entering your building.
- Turn off heat-generating office equipment, such as copiers and computers, when not in use, especially when your facilities are unoccupied.

- Turn off every second or third lighting fixture in order to conserve electricity and reduce the need for air conditioning.
- Lower the temperature of your water heater to 120 degrees Fahrenheit, which is adequate for normal use. Also consider turning off your water heater during periods of high electrical use or public appeals for electric curtailment.

Motors

- Check the nameplate information on your motors and verify that they are rated to operate at your supply voltage. Motors are normally designed to operate between plus-10 percent and minus-10 percent of their normal voltage without shortening life expectancy.
- Consider installing a buck-boost transformer as required to maximize the life expectancy of your motors. This is a worthwhile consideration for normal operating conditions as well as during voltage reductions.
- Ensure that all areas where motors are operating are well ventilated.
- Avoid aiming fans directly at motor starters. This practice may defeat controls designed to protect the motor from possible burnout.
- In the case of a blackout, turn off all your units to prevent large power draws when the power comes back on. Once power is restored, turn on your units one at a time to prevent sudden power surges.

Lighting

Your choice of lighting equipment will depend on your application, but certain equipment is commonly found in effective lighting systems.

- Energy-efficient fluorescents save about 35% of the wattage used by standard fluorescents and last just as long. Although the energy-efficient lamps are more expensive than standard fluorescents, the energy savings more than compensates for the extra cost. Efficient lighting systems that replace standard fluorescents also provide more accurate color rendering, which may improve marketability of products such as food or clothing.
- When replacing standard fluorescents with energy-efficient lamps, it's necessary to replace the existing ballasts. When doing so, be sure to specify electronic ballasts. They operate 75% more quietly than conventional ballasts, eliminating the familiar flicker and hum of older fluorescent lights. Simple payback periods on these improvements can be as short as 1 to 2 years.
- Task lighting is simple—uniformly light the areas where you actually need the light, rather than an entire area. In other words, use smaller, more efficient lights that bring the light source closer to the work area requiring illumination. This concept applies to such areas as offices, workrooms, and garages.

- Reflectors can increase the effectiveness of a fluorescent lighting fixture by about 10% in some situations by reflecting additional light on the work space. Reflectors installed with energy-efficient fluorescent lamps and electronic ballasts can reduce lighting energy costs by as much as 70%.
- Compact fluorescents can be a good alternative to incandescent light bulbs. Compact fluorescents last about 10 times longer than incandescent lamps. Lights that operate much of the time, such as in hallways or stairwells, are popular applications for compact fluorescent lamps.
- Manual controls can be used in spaces that accommodate different tasks or that have access to daylight. In this way, occupants can manually shut lights off when they aren't needed. Automatic controls such as occupancy sensors are convenient for turning lights off when certain areas—such as conference rooms, storage rooms, and restrooms—are unoccupied. Autodimming controls are available that automatically adjust light levels according to existing daylight.
- Many utilities are helping their customers buy and install efficient lighting equipment. A rebate from your utility can further cut the already short payback periods for investing in energy-efficient lighting. Your local utility can also be a good source of information on designing and purchasing lighting retrofits.

Buildings

When you evaluate how your building is using energy, you may find many opportunities for efficiency improvements. Consider the following areas.

- Isolate unused spaces - Often, your building contains space that isn't used by people and may not require space conditioning. Isolate these areas by closing heating and cooling vents and covering exterior windows. Sealing unused exterior windows and doors can represent a valuable security benefit, too.
- Stop leaks - One of the easiest and quickest dollar-saving techniques is caulking leaks in your building. Heat always flows from a warmer environment to a cooler one—when it's cold outside, heat tends to leak outward. Eliminating leaks in your building exterior (like walls, windows, doors, ceilings, and floors) works to your advantage for both heating and cooling. When it's windy outside, your ears or sense of touch may guide you to substantial leaks.
- Check doors, windows, and other openings - A few simple measures can really help prevent leakage. For example, replace any broken or cracked glass. Use automatic door closers, be sure they're adjusted for proper operation, and replace them when necessary. Use an exterior insulating cover on window-mounted or above-door air conditioners during winter. Finally, make certain the space around your air conditioner is thoroughly sealed.

Heating, Ventilation, and Air Conditioning (HVAC)

Businesses have found that the following basic steps can save energy, increase comfort, and enhance equipment operation.

- Programmable thermostats - These simple microprocessor-based products offer as much as a 50% rate of return on energy dollars. In addition, these devices will maintain system start-up and set-back schedules for optimum comfort. They can also eliminate unnecessary HVAC use during unoccupied hours.
- Furnace maintenance and cleaning - In easy first step is to replace dirty air filters. It's often well worth the expense to have a trained specialist inspect and perform needed maintenance on your furnace and cooling system. Also, simple maintenance such as cleaning intake screens, condenser coils, supply registers, and return grills can make a difference in your energy bills.
- Duct maintenance and repair - Typical duct systems lose energy from your heating and air-conditioning equipment. Use duct tape to seal duct joints and elbows where accessible. Insulate any duct work in unconditioned space, such as roofs, attics, crawl spaces, and basements. Identify and repair damaged or disconnected ducts while you check the system.
- Boilers - If your building uses a boiler for heating, follow the factory maintenance schedule and procedures. If you're using a fuel other than natural gas, consider switching to natural gas, which is less expensive. If maintenance costs for your existing boiler have become excessive or you need to replace your boiler, replace it with a high-efficiency model.
- Ventilation rate - Building ventilation is necessary so that your building has a reasonable supply of fresh air. However, excessive ventilation rates increase your heating and cooling costs dramatically. Have a professional engineer or trained specialist optimize your system's ventilation rate.
- Hot water supply - Your hot water temperature is often set higher than you really need. Gradually set the temperature downward until you reach an optimum. You can also install flow restrictors and self-closing faucets; they'll reduce your hot water use. Finally, check your entire system for leaks and repair them.
- Water heater - One of the most effective measures you can use is an insulating jacket for the water heater. These jackets are easily found at large convenience, building, and hardware supply stores. A simple electronic time-of-use controller will ensure that your electric water heater is off when not needed.

Equipment and Machines

- Turn off equipment - About 30% to 40% of personal computers and printers are left running at night and on weekends, and these machines are idle as much as 90% of their workday ontime.
- Don't be confused by so-called "screen savers"—they don't save electricity in computer monitors; they are meant to prevent phosphor "burn-in" on the screen.
- Cycling power on and off to your computer will not harm late-model machines. Energy Star computers, monitors, and printers can automatically power down to save electricity when not being used. Don't forget to consider sharing printers and copiers; this will decrease their idle time and provide for more cost-effective use of the equipment.

- Buy energy-efficient equipment - Specify energy efficiency as a purchasing criteria to help you select equipment in a sometimes confusing marketplace.
- Also, check your other appliances for energy-saving opportunities. For example, businesses such as restaurants and other food service providers rely heavily on refrigeration equipment and freezers. Refrigeration equipment can include such efficiency options as hot-gas defrost and evaporative condensers. These options can easily yield a return-on-investment of as much as 50%. High-efficiency, cost-effective equipment is now readily available, so be sure to ask for it when you're shopping.

Vehicles

- Each year the U.S. Department of Energy (DOE) publishes a Fuel Economy Guide, which lists the miles per gallon (mpg) ratings for all vehicles available for the new model year. If you are planning to buy new vehicles this year, you may want to review the Guide to help you determine which vehicles are likely to save your company money through lower fuel costs.
- Your drivers can also be made more aware of ways in which they can drive more effectively to save on fuel. Combining errands into one trip, turning an engine off rather than letting it idle for more than a minute, getting a tune-up regularly, avoiding jackrabbit starts, and not carrying unnecessary weight in vehicles are all ways to save on gasoline. The Guide provides these and other driving hints.
- The Fuel Economy Guide is available through your automobile dealer, or it can be ordered free of charge from the Energy Efficiency and Renewable Energy Clearinghouse.
- If you have a fleet of 10 or more vehicles, it is possible that you may be required to comply with either the Clean Air Act or the Energy Policy Act requirements for fleets. These requirements have been put in place to help increase U.S. energy security through increased use of alternative fuels, or to improve our country's air quality.
- The Energy Policy Act requires the use of alternative fuels such as natural gas, electricity, methanol, ethanol, or propane in certain percentages for some fleets. The Clean Air Act requires that your vehicles meet certain emissions standards through the use of alternative fuels or reformulated gasoline and clean diesel fuel.
- To find out more about these fuels and to determine whether your fleet must comply, you can call the DOE Alternative Fuels Hotline.
- Other transportation options may be worth evaluating for use in your business. Helping employees take advantage of mass transit, ride sharing, and alternative work schedules often increases employee morale and loyalty. These options may also translate to good community relations because you're supporting efforts to reduce pollution, dependence on foreign oil, and traffic congestion.
- Mass transit - Encouraging your employees to use rail and bus mass transit is the most effective means of alleviating urban gridlock and air pollution from private vehicles.

- Ride sharing - Car or van pooling can be an effective transportation measure. Check with your local mass transit agency, or your local or state energy office, for information about ride-sharing programs in your area.
- Alternative work schedules - Continuing to grow in popularity, alternative work schedules shift work hours away from peak traffic-flow times, which decreases traffic congestion, commuting time, and driver anxiety. Depending on your type of business, this measure may be appropriate for you.

CONTACTS AND WEBSITES:

Government Contacts

State of Nevada
 Division of Emergency Management
 2525 South Carson Street
 Carson City, Nevada 89711
 (775) 687-4240 Office
 (775) 687-6788 Fax
www.dem.state.nv.us

State of Nevada
 Energy Office
 727 Fairview Drive, Suite F
 Carson City, Nevada 89701
 (775) 687- 5975 Office
 (775) 687-4914 Fax
www.energy.state.nv.us

Boulder City
 Boulder City Emergency Management
 1101 Elm Street
 Boulder City, Nevada 89005
 (702) 293-9228 Office
 (702) 293-9221 Fax
www.bcnv.org

Elko County
 Elko County Emergency Management
 571 Idaho Street
 Elko, Nevada 89801
 (775) 738-8046 Office
 (775) 753-8535 Fax

Carson City
 Office of Emergency Management
 Carson City Fire Department
 777 South Stewart Street
 Carson City, Nevada 89701
 (775) 887-2210 Office
 (775) 887-2209 Fax
www.carson-city.nv.us

Esmeralda County
 Office of Emergency Management
 P.O. Box 457
 Goldfield, Nevada 89013
 (775) 485-3757 Office
 (775) 485-3429 Fax

Churchill County
 Office of Emergency Management
 155 West Taylor Street, Room 177
 Fallon, Nevada 89406
 (775) 423-4188 Office
 (775) 423-5677 Fax
www.fallononline.com

Eureka County
 Office of Emergency Management
 P.O. Box 714
 Eureka, Nevada 89316
 (775) 237-5372 Office
 (775) 237-5708 Fax

Clark County
Office of Emergency Management
P.O. Box 551713
500 South Grand Cental Parkway
Las Vegas, Nevada 89155-1713
(702) 455-5710 Office
(702) 455-5718 Fax
www.co.clark.nv.us

Douglas County
Douglas County Emergency Operations
P.O. Box 218
Minden, Nevada 89423
(775) 782-9977 Office
(775) 782-6289 Office
(775) 782-9868 Fax
www.co.douglas.nv.us

Las Vegas
Las Vegas Emergency Management
500 North Casino Center Boulevard
Las Vegas, Nevada 89101-2986
(702) 383-2888 Office
(702) 229-0444 Fax
www.ci.las-vegas.nv.us

Lincoln County
Office of Emergency Management
P.O. Box 314
Panaca, Nevada 89042
(775) 728-4431 Office
(775) 728-4257 Fax

Lyon County
Office of Emergency Management
18 Highway 95A North
Yerington, Nevada 89447
(775) 463-6551 x16 Office
(775) 463-6555 Fax

Fallon
Fallon Civil Defense
55 West Williams Avenue
Fallon, Nevada 89406
(775) 423-1345 Office
(775) 423-5107 Office
(775) 423-0381 Fax

Henderson
Henderson Emergency Management
223 Lead Street
Henderson, Nevada 89015
(702) 565-2165 Office
(702) 564-8928 Fax

Humboldt County
Office of Emergency Management
904 South Bridge Street
Winnemucca, Nevada 89445
(775) 623-2192 Fax

Naval Air Station - Fallon
4755 Pasture Road
Fallon, Nevada 89406
(775) 426-2844 Office
(775) 426-3190 Fax

Reno
Office of Emergency Management
P.O. Box 1900
Reno, Nevada 89505
(775) 334-2323 Office
(775) 334-3826 Fax
www.cityofreno.com

Mesquite
Mesquite Emergency Management
10 East Mesquite Boulevard
Mesquite, Nevada 89027
(702) 346-2690 x248 Office
(702) 346-5242 Fax
www.mesquitenv.com

Sparks
Department of Public Works
P.O. Box 857
Sparks, Nevada 89432-0857
(775) 353-1633 Office
(775) 353-1651 Fax

Mineral County
Office of Emergency Management
P.O. Box 1600
Hawthorne, Nevada 89415
(775) 945-2497 Office
(775) 945-0702 Fax

Storey County
Office of Emergency Management
P.O. Box 976
Virginia City, Nevada 89440
(775) 847-0954 Office
(775) 847-0987 Fax

North Las Vegas
North Las Vegas Emergency Management
2200 Civic Center Drive
North Las Vegas, Nevada 89030
(702) 633-1125 Office
(775) 649-0660 Fax
www.cnlv.onevegas.com

Washoe County
Division of Emergency Management
Press Clewe, Administrator
P.O. Box 11130
Reno, Nevada 89520-0027
(775) 328-2095 Office
(775) 328-6103 Fax

Nye County
Nye County Emergency Services
P.O. Box 153
Tonopah, Nevada 89049
(775) 482-7379 Office
(775) 482-8198 Fax

West Wendover
West Wendover Emergency Management
P.O. Box 3226
West Wendover, Nevada 89883
(775) 664-2274 Office
(775) 664-3599 Fax
www.westwendovercity.org

Pershing County
Office of Emergency Management
Box Drawer E
% County Courthouse
Lovelock, Nevada 89419
(775) 273-3402 Fax
www.lovelocknv.com

White Pine
Office of Emergency Management
P.O. Box 150342
East Ely, Nevada 89315-0342
(775) 289-8406 Office
(775) 289-9696 Fax

Utility Contacts

City of Boulder City, Municiple Co-op
PO Box 61350
Boulder City, NV 89006
(702) 293-9231
www.bcnv.org

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Harney Electric
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Orovada, NV 89425
(775) 272-3336

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(775) 962-5122

Mt. Wheeler Power
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(775) 289-8981
www.mwpower.net

Nevada Power Company
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Las Vegas, Nevada 89151
702-367-5000 - Main Number
800-331-3103 - Toll Free
702-367-5555 - 24 Hour Customer Service
www.nevadapower.com

Overton Power District #5
PO Box 395
Overton, NV 89040
(702) 397-2512

Plumas - Sierra Rual Electric Cooperative
73233 State Route 70 Suite A
Portola, CA 96122
(530) 832-4261
www.psln.com

Sierra Pacific Power Company
Main Office: Reno/Sparks
P O Box 10100 / 6100 Neil Rd.
Reno, NV 89520
775-834-4444 Main Number
800-962-0399 Toll Free
775-834-4100 Emergencies
www.sierrapacific.com

Southwest Gas
Energy Services
(800) 654-2765 (The Energy Specialists)
www.swgas.com

Truckee - Donner PUD

Valley Electric Association
PO Box 237
Paruhmp, NV 89041
(775) 727-5312
www.valleyelectric.org

Wells Rural Electrification Cooperative
PO Box 365
Wells, NV 89835
(775) 752-3328
www.wellsrec.com

Williams Gas Pipeline West
2800 East Lone Mountain
North Las Vegas, NV 89031
(702) 399-1612
www.williams.com

Websites

www.doe.gov	United States Department of Energy site. Provides national, regional and state energy information.
http://www.eren.doe.gov/rso.html	The main gateways to DOE energy efficiency programs are the DOE regional support offices, which provide both information and assistance.
www.state.nv.us	The State of Nevada's home page with links to the Governor's website, the Legislature website, and additional State agencies.
www.dem.state.nv.us	State of Nevada Division of Emergency Management site. Provides information to the preparation for and management of Emergency Situations.
www.energy.state.nv.us	State of Nevada Energy Office site. Describes Federal grant programs and provides links to other energy sites.
www.puc.state.nv.us	State of Nevada Public Utilities Commission site. Provides information on all active dockets before the commission including those addressing conservation and load reduction programs. Includes a report produced by the Governor's Nevada Electric Energy Policy Committee making recommendations regarding conservation and efficiency initiatives.
www.sierrapacific.com	Sierra Pacific Resources site. Includes Sierra's "Take Control" program which provides resources relative to energy conservation as well as other energy information.
www.swgas.com	Southwest Gas Corporation site. Includes rate payment options and information on reducing energy bills.
www.ase.org/checkup/business www.energyguide.com	These websites allow you to enter the characteristics of your office environment, such as the number of square feet in your building and the type of lighting that you currently have, and then to examine the amount of energy you can save by undertaking specific measures.
www.oit.doe.gov/bestpractices	This website is produced by the U.S. Department of Energy's Office of Industrial Technology and offers energy efficiency guidance to manufacturers.

APPENDIX III

SUGGESTED CONSERVATION MEASURES

RESIDENTIAL

CONSERVATION MEASURES:

Indoor Lighting Tips

- Turn off the lights in any room you're not using, or consider installing timers, photo cells, or occupancy sensors to reduce the amount of time your lights are on.
- Use task lighting; instead of brightly lighting an entire room, focus the light where you need it. For example, use fluorescent under-cabinet lighting for kitchen sinks and countertops under cabinets.
- Consider three-way lamps; they make it easier to keep lighting levels low when brighter light is not necessary.
- Use 4-foot fluorescent fixtures with reflective backing and electronic ballasts for your workroom, garage, and laundry areas.
- Consider using 4-watt mini-fluorescent or electro-luminescent night lights. Both lights are much more efficient than their incandescent counterparts. The luminescent lights are cool to the touch.
- Compact fluorescent light (CFL) bulbs are four times more energy efficient than incandescent bulbs and provide the same lighting. Use CFLs in all the portable table and floor lamps in your home. Consider carefully the size and fit of these systems when you select them. Some home fixtures may not accommodate some of the larger CFLs.
- When shopping for new light fixtures, consider buying dedicated compact fluorescent fixtures with built-in ballasts that use pin-based replacement bulbs.
- For spot lighting, consider CFLs with reflectors. The lamps range in wattage from 13-watt to 32-watt and provide a very directed light using a reflector and lens system.
- Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy. Also, decorate with lighter colors that reflect daylight.
- Torchiere Lamp. If you have torchiere fixtures with halogen lamps, consider replacing them with compact fluorescent torchieres. Compact fluorescent torchieres use 60% to 80% less energy and can produce more light (lumens) than the halogen torchieres.

Outdoor Lighting Tips

- Use outdoor lights with a photocell unit or a timer so they will turn off during the day.

- Turn off decorative outdoor gas lamps; just eight gas lamps burning year round use as much natural gas as it takes to heat an average-size home during an entire winter.
- Exterior lighting is one of the best places to use CFLs because of their long life. If you live in a cold climate, be sure to buy a lamp with a cold-weather ballast.

Heating and Cooling Tips

- Set your thermostat as low as is comfortable in the winter and as high as is comfortable in the summer.
- Clean or replace filters on furnaces once a month or as needed.
- Clean warm-air registers, baseboard heaters, and radiators as needed; make sure they're not blocked by furniture, carpeting, or drapes.
- Bleed trapped air from hot-water radiators once or twice a season; if in doubt about how to perform this task, call a professional.
- Place heat-resistant radiator reflectors between exterior walls and the radiators.
- Use kitchen, bath, and other ventilating fans wisely; in just 1 hour, these fans can pull out a houseful of warmed or cooled air. Turn fans off as soon as they have done the job.
- During the heating season, keep the draperies and shades on your south-facing windows open during the day to allow sunlight to enter your home and closed at night to reduce the chill you may feel from cold windows. During the cooling season, keep the window coverings closed during the day to prevent solar gain.
- Close an unoccupied room that is isolated from the rest of the house, such as in a corner, and turn down the thermostat or turn off the heating for that room or zone. However, do not turn the heating off if it adversely affects the rest of your system. For example, if you heat your house with a heat pump, do not close the vents—closing the vents could harm the heat pump.
- Select energy-efficient equipment when you buy new heating and cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage. Look for high Annual Fuel Utilization Efficiency (AFUE) ratings and the Seasonal Energy Efficiency Ratio (SEER). The national minimums are 78% AFUE and 10 SEER.
- Look for the ENERGY STAR® and EnergyGuide labels. ENERGY STAR® is a program of the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA) designed to help consumers identify energy-efficient appliances and products.

Water Heating Tips

- Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period.

- Insulate your electric hot-water storage tank and pipes, but be careful not to cover the thermostat.
- Insulate your gas or oil hot-water storage tank and pipes, but be careful not to cover the water heater's top, bottom, thermostat, or burner compartment; when in doubt, get professional help.
- Install nonaerating low-flow faucets and showerheads.
- Buy a new water heater. While it may cost more initially than a standard water heater, the energy savings will continue during the lifetime of the appliance.
- Although most water heaters last 10–15 years, it's best to start shopping for a new one if yours is more than 7 years old. Doing some research before your heater fails will enable you to select one that most appropriately meets your needs.
- Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings, but a setting of 115°F provides comfortable hot water for most uses.
- Drain a quart of water from your water tank every 3 months to remove sediment that impedes heat transfer and lowers the efficiency of your heater. The type of water tank you have determines the steps to take, so follow the manufacturer's advice.
- If you heat with electricity and live in a warm and sunny climate, consider installing a solar water heater. The solar units are environmentally friendly and can now be installed on your roof to blend with the architecture of your house.
- Take more showers than baths. Bathing uses the most hot water in the average household. You use 15–25 gallons of hot water for a bath, but less than 10 gallons during a 5-minute shower.
- Consider the installation of a drain water waste heat recovery system.

Cold-Climate Window Tips

- Double-pane windows with low-e coating on the glass reflect heat back into the room during the winter months.
- Install exterior or interior storm windows; storm windows can reduce your heat loss through the windows by 25% to 50%. Storm windows should have weatherstripping at all moveable joints; be made of strong, durable materials; and have interlocking or overlapping joints. Low-e storm windows save even more energy.
- Repair and weatherize your current storm windows, if necessary.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.

- Close your curtains and shades at night; open them during the day.
- Keep windows on the south side of your house clean to maximize solar gain.

Warm-Climate Window Tips

- In the summertime, the sun shining through your windows heats up the room. Windows with spectrally selective coatings on the glass reflect some of the sunlight, keeping your rooms cooler.
- Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows.
- Apply sun-control or other reflective films on south-facing windows to reduce solar gain.

Insulation Tips

- Consider factors such as your climate, building design, and budget when selecting insulation R-value for your home.
- Use higher density insulation, such as rigid foam boards, in cathedral ceilings and on exterior walls.
- Ventilation plays a large role in providing moisture control and reducing summer cooling bills. Attic vents can be installed along the entire ceiling cavity to help ensure proper airflow from the soffit to the attic, helping to make a home more comfortable and energy efficient.
- Recessed light fixtures can be a major source of heat loss, but you need to be careful how close you place insulation next to a fixture unless it is marked. "I.C."—designed for direct insulation contact. Check your local building codes for recommendations.
- As specified on the product packaging, follow the product instructions on installation and wear the proper protective gear when installing insulation.

Dishwasher Tips

- Check the manual that came with your dishwasher for the manufacturer's recommendations on water temperature; many have internal heating elements that allow you to set the water heater to a lower temperature.
- Scrape, don't rinse, off large food pieces and bones. Soaking or prewashing is generally only recommended in cases of burned-on or dried-on food.
- Be sure your dishwasher is full, but not overloaded.

- Don't use the "rinse hold" on your machine for just a few soiled dishes. It uses 3 to 7 gallons of hot water each time you use it.
- Let your dishes air dry; if you don't have an automatic air-dry switch, turn off the control knob after the final rinse and prop the door open a little so the dishes will dry faster.

Refrigerator/Freezer Energy Tips

- Look for a refrigerator with automatic moisture control. Models with this feature have been engineered to prevent moisture accumulation on the cabinet exterior without the addition of a heater. This is not the same thing as an "anti-sweat" heater. Models with an anti-sweat heater will consume 5% to 10% more energy than models without this feature.
- Don't keep your refrigerator or freezer too cold. Recommended temperatures are 37° to 40°F for the fresh food compartment of the refrigerator and 5°F for the freezer section. If you have a separate freezer for long-term storage, it should be kept at 0°F.
- To check refrigerator temperature, place an appliance thermometer in a glass of water in the center of the refrigerator. Read it after 24 hours. To check the freezer temperature, place a thermometer between frozen packages. Read it after 24 hours.
- Regularly defrost manual-defrost refrigerators and freezers; frost buildup increases the amount of energy needed to keep the motor running. Don't allow frost to build up more than one-quarter of an inch.
- Make sure your refrigerator door seals are airtight. Test them by closing the door over a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment or the seal may need replacing.
- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Move your refrigerator out from the wall and vacuum its condenser coils once a year unless you have a no-clean condenser model. Your refrigerator will run for shorter periods with clean coils.

Other Energy-Saving Kitchen Tips

- Be sure to place the faucet lever on the kitchen sink in the cold position when using small amounts of water; placing the lever in the hot position uses energy to heat the water even though it never reaches the faucet.
- If you need to purchase a gas oven or range, look for one with an automatic, electric ignition system. An electric ignition saves gas—because a pilot light is not burning continuously.
- In gas appliances, look for blue flames; yellow flames indicate the gas is burning inefficiently and an adjustment may be needed. Consult your manufacturer or your local utility.

- Keep range-top burners and reflectors clean; they will reflect the heat better, and you will save energy.
- Use a covered kettle or pan to boil water; it's faster and it uses less energy.
- Match the size of the pan to the heating element.
- If you cook with electricity, turn the stovetop burners off several minutes before the allotted cooking time. The heating element will stay hot long enough to finish the cooking without using more electricity. The same principle applies to oven cooking.
- Use small electric pans or toaster ovens for small meals rather than your large stove or oven. A toaster oven uses a third to half as much energy as a full-sized oven.
- Use pressure cookers and microwave ovens whenever it is convenient to do so. They can save energy by significantly reducing cooking time.

Laundry Tips

- Wash your clothes in cold water using cold-water detergents when-ever possible.
- Wash and dry full loads. If you are washing a small load, use the appropriate water-level setting.
- Dry towels and heavier cottons in a separate load from lighter-weight clothes.
- Don't over-dry your clothes. If your machine has a moisture sensor, use it.
- Clean the lint filter in the dryer after every load to improve air circulation.
- Use the cool-down cycle to allow the clothes to finish drying with the residual heat in the dryer.
- Periodically inspect your dryer vent to ensure it is not blocked. This will save energy and may prevent a fire. Manufacturers recommend using rigid venting material, not plastic vents that may collapse and cause blockages.
- Look for the ENERGY STAR® and EnergyGuide labels.

CONTACTS AND WEBSITES:

Government Contacts

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2525 South Carson Street
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(775) 687-4240 Office
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www.dem.state.nv.us

State of Nevada
Energy Office
727 Fairview Drive, Suite F
Carson City, Nevada 89701
(775) 687- 5975 Office
(775) 687-4914 Fax
www.energy.state.nv.us

Boulder City
Boulder City Emergency Management
1101 Elm Street
Boulder City, Nevada 89005
(702) 293-9228 Office
(702) 293-9221 Fax
www.bcnv.org

Elko County
Elko County Emergency Management
571 Idaho Street
Elko, Nevada 89801
(775) 738-8046 Office
(775) 753-8535 Fax

Carson City
Office of Emergency Management
Carson City Fire Department
777 South Stewart Street
Carson City, Nevada 89701
(775) 887-2210 Office
(775) 887-2209 Fax
www.carson-city.nv.us

Esmeralda County
Office of Emergency Management
P.O. Box 457
Goldfield, Nevada 89013
(775) 485-3757 Office
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Churchill County
Office of Emergency Management
155 West Taylor Street, Room 177
Fallon, Nevada 89406
(775) 423-4188 Office
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www.fallononline.com

Eureka County
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P.O. Box 714
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Clark County
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P.O. Box 551713
500 South Grand Cental Parkway
Las Vegas, Nevada 89155-1713
(702) 455-5710 Office
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Douglas County
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www.co.douglas.nv.us

Las Vegas
Las Vegas Emergency Management
500 North Casino Center Boulevard
Las Vegas, Nevada 89101-2986
(702) 383-2888 Office
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www.ci.las-vegas.nv.us

Lincoln County
Office of Emergency Management
P.O. Box 314
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904 South Bridge Street
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4755 Pasture Road
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Reno
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P.O. Box 1900
Reno, Nevada 89505
(775) 334-2323 Office
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www.cityofreno.com

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Mesquite Emergency Management
10 East Mesquite Boulevard
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(702) 346-2690 x248 Office
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Mineral County
Office of Emergency Management
P.O. Box 1600
Hawthorne, Nevada 89415
(775) 945-2497 Office
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Storey County
Office of Emergency Management
P.O. Box 976
Virginia City, Nevada 89440
(775) 847-0954 Office
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North Las Vegas
North Las Vegas Emergency Management
2200 Civic Center Drive
North Las Vegas, Nevada 89030
(702) 633-1125 Office
(775) 649-0660 Fax
www.cnlv.onevegas.com

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(775) 328-2095 Office
(775) 328-6103 Fax

Nye County
Nye County Emergency Services
P.O. Box 153
Tonopah, Nevada 89049
(775) 482-7379 Office
(775) 482-8198 Fax

West Wendover
West Wendover Emergency Management
P.O. Box 3226
West Wendover, Nevada 89883
(775) 664-2274 Office
(775) 664-3599 Fax
www.westwendovercity.org

Pershing County
Office of Emergency Management
Box Drawer E
% County Courthouse
Lovelock, Nevada 89419
(775) 273-3402 Fax
www.lovelocknv.com

White Pine
Office of Emergency Management
P.O. Box 150342
East Ely, Nevada 89315-0342
(775) 289-8406 Office
(775) 289-9696 Fax

Utility Contacts

City of Boulder City, Municiple Co-op
PO Box 61350
Boulder City, NV 89006
(702) 293-9231
www.bcnv.org

Great Basin Electric Cooperative

Harney Electric
PO Box 107
Orovada, NV 89425
(775) 272-3336

Lincoln County Power District #1
HC 74 Box 101
Pioche, NV 89043
(775) 962-5122

Mt. Wheeler Power
PO Box 1110
Ely, NV 89301
(775) 289-8981
www.mwpower.net

Nevada Power Company
Main Office:
6226 West Sahara Avenue
Las Vegas, Nevada 89151
702-367-5000 - Main Number
800-331-3103 - Toll Free
702-367-5555 - 24 Hour Customer Service
www.nevadapower.com

Overton Power District #5
PO Box 395
Overton, NV 89040
(702) 397-2512

Plumas - Sierra Rual Electric Cooperative
73233 State Route 70 Suite A
Portola, CA 96122
(530) 832-4261
www.psln.com

Sierra Pacific Power Company
Main Office: Reno/Sparks
P O Box 10100 / 6100 Neil Rd.
Reno, NV 89520
775-834-4444 Main Number
800-962-0399 Toll Free
775-834-4100 Emergencies
www.sierrapacific.com

Southwest Gas
Energy Services
(800) 654-2765 (The Energy Specialists)
www.swgas.com

Truckee - Donner PUD

Valley Electric Association
PO Box 237
Paruhmp, NV 89041
(775) 727-5312
www.valleyelectric.org

Wells Rural Electrification Cooperative
PO Box 365
Wells, NV 89835
(775) 752-3328
www.wellsrec.com

Williams Gas Pipeline West
2800 East Lone Mountain
North Las Vegas, NV 89031
(702) 399-1612
www.williams.com

Websites

www.doe.gov	United States Department of Energy site. Provides national, regional and state energy information.
www.state.nv.us	The State of Nevada's home page with links to the Governor's website, the Legislature website, and additional State agencies.
www.dem.state.nv.us	State of Nevada Division of Emergency Management site. Provides information to the preparation for and management of Emergency Situations.
www.energy.state.nv.us	State of Nevada Energy Office site. Describes Federal grant programs and provides links to other energy sites.
www.puc.state.nv.us	State of Nevada Public Utilities Commission site. Provides information on all active dockets before the commission including those addressing conservation and load reduction programs. Includes a report produced by the Governor's Nevada Electric Energy Policy Committee making recommendations regarding conservation and efficiency initiatives.
www.sierrapacific.com	Sierra Pacific Resources site. Includes Sierra's "Take Control" program which provides resources relative to energy conservation as well as other energy information.
www.swgas.com	Southwest Gas Corporation site. Includes rate payment options and information on reducing energy bills.
www.ase.org/checkup/home	These websites allow you to enter the characteristics of your office environment, such as the number of square feet in your building and the type of lighting that you currently have, and then to examine the amount of energy you can save by undertaking specific measures. www.energyguide.com
www.homeenergysaver.lbl.gov	Developed by the Environmental Energy Technologies Division at the Lawrence Berkeley National Laboratory. Provides information on finding resources for energy conservation.
www.energystar.gov	Energy Star is a dynamic government/industry partnership that helps businesses and consumers save money and protects the environment.
www.homepower.com	The hands-on journal of home-made power. Has free downloads.
www.energyguide.com	Contains information on where to buy energy efficient products. This site also provides recommendations on ways to save energy, and offers a free newsletter.

APPENDIX IV
ESTABLISHING AN ENERGY CONSERVATION PROGRAM
(PUBLIC SECTOR, BUSINESS AND INDUSTRY)

Conservation Program Analysis

Before implementation, it is suggested that all potential energy conservation projects be evaluated on the following criteria:

- Identify and define the projects.
- Calculate annual energy savings for each project.
- Project future energy costs and calculate annual dollar savings.
- Estimate project costs.
- Evaluate the merit of each project.
- Assign priorities to projects.
- Monitor and evaluate the performance.

Equipment and Facility Operation and Maintenance

An intensive maintenance program will enable equipment to operate at design efficiency. It also increases the life of the equipment. An operation and maintenance manual should provide information such as equipment specifications, start/stop/shutdown/standby procedures, operating logs, preventive and routine maintenance procedures and performance details.

Significant reductions in energy usage can be attained by better maintenance and housekeeping and by education on the optimization of energy usage. Insight into the production processes, schedules, and operating practices can result in more efficient utilization of equipment.

Other improvements in plant efficiency can be achieved through:

- Proper sequencing of process operations.
- Rearranging schedules to utilize process equipment for continuous periods of operations in order to avoid numerous short cycles and minimize preheat losses.
- Scheduling process operations during off-peak periods in order to avoid peak demand charges.

Energy Audits

The energy audit is an accounting tool used to determine the energy status of a facility. Recording all the energy that enters the facility and the energy consumed during a given period is the starting point for an energy conservation program. This process identifies and quantifies how energy is being utilized and distributed.

An audit should include historic energy data, energy usage data, and energy efficiency data. The first two will provide information on past energy purchases and usage; commodity and transportation costs; local weather

conditions; level of activity, and contract details. This information is used against the energy efficiency or the energy per unit to deduce the magnitude of energy losses or savings.

By defining the energy intensity of a particular activity and by comparing the results of the audit with baseline data for that activity, management can determine the potential for greater energy savings. Additional engineering and economic analyses can be performed based on the facility's investment criteria and objectives. This provides an opportunity to undertake extended measures such as the addition of automatic controls, or the installation of retrofit or new equipment.

Energy Monitoring

Performance monitoring is essential for the control and evaluation of an energy conservation program. Potential conservation can be monitored from the results by comparison, by design energy savings report, and by the anticipated energy saved in relation to the amount of energy purchased. Also, emphasis should be made on energy rate changes, changes in ambient temperatures, changes in plant heat balance, and changes in the equipment or process.

Dynamic trending or historic trends can be a method for monitoring changes in conservation and energy usage and identifying potential problem areas. It is an obvious fact that measurement and control of energy at the point of application ensures the efficient use of energy. Manual reporting or feedback from the meters enhance the performance of the energy conservation program. However, effective measuring methods are necessary to control, to evaluate, and to manage efforts to conserve energy.

Energy Analysis

Most energy-saving proposals require the investment of capital to accomplish them. Energy conservation programs that generate benefits greater than first costs are generally profitable and therefore attractive.

Sound, consistent economic criteria for evaluating energy conservation opportunities are quite important. Before any investment is made, some quantitative measure of profitability is needed to enable the investor to compare his expected return with the return from alternative investment opportunities. Conservation should be considered to be profitable only when the expected rate of return is greater than that which could be realized from alternative investment opportunities, whether in energy conservation or elsewhere.

Several methods can be used to find the best alternative investment. These are payback period, return on investment (ROI), break-even analysis, cost-benefit analysis, and rate of return (ROR).

Equipment and Process Modification

Replacement or retrofitting of an existing equipment, or making changes to the process will always result in energy savings. Modifications can be made as a result of equipment life, equipment reliability, building load changes, building expansion, building occupancy changes, new quality control measures, innovative design concepts, availability of energy efficient components or changes in the building codes and standards.

Motors and Drives

Replacing standard efficiency motors with premium or high efficiency motors is a valuable energy conservation program. The total energy required to operate the motor is equal to the mechanical load on the motor and the mechanical and electrical losses in the motor. In order to control the losses and conserve energy, the following factors should be considered:

- Calculate the actual mechanical load to be served by the motor.
- Determine the partload efficiencies, if required.
- Select the most efficient motor available for the application and the calculated load.
- If it is a replacement, match the load with the motor used.
- Start and stop the motor instead of running it idle.
- Provide proper ventilation for motor cooling.
- Check alignment and mounting and correct any imbalances.
- Implement a bearing lubrication program.

Electrical Services and Distribution System

Significant dollar savings can be realized by reducing the peak demand. Operations should be planned properly to avoid using maximum energy during the peak hours. Several options are available, including shifting the operations to off-peak hours, distribution of loads and carrying loads from the on-site power generator.

Consider changing from primary service voltage to secondary service voltage, as most utility rate schedules offer a cost incentive to customers who accept services at the highest voltage that is available at the site. However, a cost analysis should be performed as it is required to purchase and maintain all high-voltage switchgear and transformers.

Because utility companies will charge for power factor corrections, operating at a lower power factor than the utility power factor will increase the demand charges. The proper selection and loading of motors will help to maintain a higher power factor.

De-energizing the transformers during the no-load conditions is the best option available to reduce the transformer losses. However, when system changes or additions are designed, the rating of any proposed transformer replacement or addition should be carefully selected, so that the system can operate most efficiently with the lowest overall energy loss at the load levels. No-load losses are constant for a given transformer, regardless of whether that transformer is carrying a load. Load losses constitute the losses that are caused by secondary current flow under load conditions.

Building Envelope

Energy efficient materials should be selected for the walls, roofs, and windows of the buildings. In addition, careful siting and orientation of the building can result in large savings at zero or very low cost. The physical orientation of a building can influence energy consumption significantly. If the building is rectangular, it should be sited with the long axis east-west, because east and west walls receive more direct sunlight than south walls, and for longer periods of time.

If the building requires cooling, however, wall and glass exposures should be minimized on the west and southwest. The impact of solar heat gain on the buildings can be reduced substantially by locating unconditioned spaces on this

side. Plantings near the walls and below the window can anchor a layer of air near the wall and help insulate the building.

Much can be done to limit the heating and cooling loads transmitted to the interior of a building. Exterior insulation may be cost-effective if the roof needs repair. In some cases insulation can be applied to the underside of the roof, but the practicality of this depends on the accessibility of that area and on the presence of other structures, such as ductwork.

In slab-on-grade buildings significant heat loss or gain occurs at the perimeters of the floor. To counteract this situation, insulation can be added to the outside walls, extended down the sides of the foundation and into the ground. From the standpoint of energy-efficient building operation, windows with very low thermal loss should be selected. Windows should allow both the visible sunlight and the invisible infrared rays that comprise over half of the sunlight to enter the building whenever heating is needed. During the summer, when no heating is needed while providing a view of the outside, the window would admit only visible light, and only in the quantities needed for lighting a room.

Lighting

Lighting is an item common in all building energy use. The impact of lighting has an effect on the energy charge, electric demand charge and on the air-conditioning systems. Lighting levels should be reduced and should be tailored to the individual requirements of the task to be performed.

Occupancy sensors should be installed anywhere possible. In addition, lights should be wired so that they can only be turned on over part of a floor. This reduces waste after hours, when buildings are cleaned, or on weekends, when only a few people are present. Timed switches can be installed to turn lights out automatically in infrequently used areas.

Finally, maintenance is very important for avoiding waste in lighting. Lighting reflectors must be cleaned regularly. Lamp efficiency degenerates over the life of a lamp, so lamps must be replaced before their efficiency falls too low.

Heating, Ventilation and Air Conditioning

The purpose of a heating, ventilating, and air conditioning (HVAC) system is to provide and maintain a comfortable and safe environment within a space for the occupants or for the process being conducted. Services provided by HVAC systems as part of the production process are inevitable and the yield is directly related to the quality of the service provided. The same is true with the ventilation equipment providing safety.

However, HVAC systems installed to provide comfort cooling or heating are the ideal candidates for energy savings. The definition for the word “comfort” changes from person to person and is also weather dependent. Heating is required when it is cold outside and cooling is required when it is hot outside. How much cooling or heating and how efficiently it is achieved is the question.

The following factors should be considered to realize energy savings from HVAC systems.

- Using correct and reliable weather data.
- Understanding the application properly.
- Choosing the right design approach.
- Performing true load calculations.
- Following the local energy codes and standards.
- Performing a cost analysis.
- Selecting energy efficient equipment.
- Conducting factory performance testing.
- Developing the sequence of operations.
- Implementing good maintenance program.

Insulation and Distribution Losses

Energy conservation is dependent upon the amount of heat lost due to conduction, convection, and radiation. Combustion losses due to heat lost up the stack and transmission losses through the pipes make up the total additional energy used by the system. Piping losses can be reduced through more insulation or by eliminating losses needlessly occurring because of unnecessary piping in the overhead. Thus, the optimum size and length of the pipe should be selected.

Boiler controls should be updated, as automation can increase the efficiency of the system. The boiler blowdown cycle should be automated. The automatic blowdown device continuously monitors the conductivity of the blowdown and controls the blowdown valve automatically. This will avoid operator errors and dumping out excessive hot water and steam.

Steam Trap Maintenance

Improper selection, installation and maintenance of steam traps leads to the loss of energy. Surprisingly, a well-maintained steam trap enhances the system thermal efficiency thereby saving energy. A good steam trap maintenance program is essential to the lifecycle costs of the steam systems. Based on the type, each trap should be tested for performance.

Energy Management System

The most popular type of building energy management system is the direct digital controls (DDC). This system utilizes microprocessors that perform control logic functions. Some of the major advantages of DDC system in terms of energy savings are:

- Eliminates manual error.
- Precise controls of setpoint values.
- Optimized equipment start/stop and speed control.
- Interlocking between equipment.
- Reset controls.
- Occupancy schedules.
- Time of day schedules.

- Individual zone controls.
- Staging, multiple start-up, and ramping control.
- Dynamic and historic trending.
- Seasonal change over control.

Water Treatment Program

Finally, the most important task in the operation of heating, refrigerating, process cooling and power plant equipment is the water treatment. Basically, cooling involves the transfer of heat (BTUs) from one component to another. Inefficient transfer of heat from one medium to another medium results in the loss of energy. The four main causes for this inefficiency are corrosion, scale, fouling, and microbiological growth. A good water treatment program should include control of conductivity, pH, alkalinity and hardness.