



Oregon State Energy Assurance Plan



Oregon Department of Energy
Oregon Public Utility Commission

August 2012

Acknowledgements

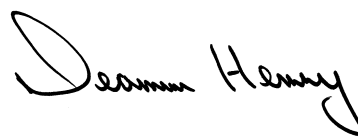
A number of Oregon State agencies work together with industry to help ensure Oregon has an adequate supply of reliable and affordable energy. This Oregon State Energy Assurance Plan reflects our collective efforts towards meeting that goal.

The Oregon Department of Energy (ODOE) maintains this plan as well as the Oregon Petroleum Contingency Plan. The Oregon Public Utility Commission (OPUC) maintains the Electricity and Natural Gas Emergency Response Plans. These responsibilities are explained more fully in Chapter 6 of this plan.

There are three key additions from previous versions of this plan. First, ODOE staff is evaluating the integration of renewable resources into emergency response planning. Second, OPUC staff guided the work of contractors to begin assessing whether smart grid technologies can be integrated into the state's response strategies to energy emergencies. And third, staff from the Oregon Department of Geology and Mineral Industries conducted a seismic vulnerability assessment of the state's critical energy hub located in an eight mile area along the water front in Northwest Portland. This included conducting onsite inspections of fuel terminals, substations, and natural gas facilities and systems. These findings, once complete, will assist ODOE and OPUC to better understand the risk associated with earthquake hazards, modify emergency response plans and procedures for energy emergencies, and determine mitigation measures as appropriate for the energy sectors.



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Executive Summary

OREGON STATE ENERGY ASSURANCE PLAN

In the aftermath of the 1970s fuel crisis, the U.S. Department of Energy (USDOE) began working with state energy offices under the State Energy Program to coordinate and facilitate energy emergency planning activities. As the designated State Energy Office, the Oregon Department of Energy (ODOE) was responsible for developing and maintaining the State Energy Emergency Plan under the State Energy Program. ODOE was required to review and update the State Energy Emergency Plan annually for submission to USDOE as the state energy Plan of Record.

The September 2009 Oregon Energy Emergency Response Plan was revised and renamed the Oregon State Energy Assurance Plan as a result of a grant awarded to ODOE by the USDOE's Office of Electricity Delivery and Energy Reliability (DOE/OE) to enhance state government energy assurance resiliency. As a result, new information was added to the state's 2009 plan. This includes information on seismic vulnerabilities and earthquake impacts on the critical energy infrastructure in Oregon from a magnitude 9 Cascadia Subduction Zone earthquake.

Furthermore, the state is considering the integration of new energy portfolios like alternative fuels as well as smart grid technologies into Oregon's response strategies to energy emergencies to improve energy assurance resiliency.

"Resiliency" is defined as the ability of a critical infrastructure to absorb, adapt to, and/or rapidly recover from a potentially severe and disruptive event. "Critical infrastructure" involves energy lifelines that, if disrupted, could significantly impact public health and safety, the economy, and/or national security. Any prolonged interruption of the supply of basic energy - whether it is petroleum products, electricity, or natural gas - could do considerable harm. As a result, improving energy assurance and resiliency in Oregon's energy infrastructure is intended to help mitigate the impacts of an energy supply interruption and help the state return to normal conditions as quickly as possible, regardless of the cause of the interruption.

Oregon's energy assurance and resiliency planning takes into account four key components. This includes: 1) understanding the energy infrastructure, Oregon's Energy Profile, and system interdependencies, 2) assessing potential risks and hazards threatening the state's critical energy infrastructure and considering short and long-term mitigation measures to reduce risk and vulnerability, 3) developing effective plans and procedures to help minimize the impacts of an energy supply interruption and rapidly restore the energy infrastructure should an emergency occur, and 4) increase public awareness.

The Oregon State Energy Assurance Plan is designed to provide an overview of the first three components to help achieve the fourth component, which is to increase general awareness of the energy infrastructure, risks to the state energy lifelines, and the state's approach to restore fuel, power, and natural gas should an emergency occur.

As mentioned on the “Acknowledgements” page, work on Smart Grid technologies, integrating renewables into emergency response planning, and earthquake vulnerability assessments are not yet completed. In addition, workshops and exercises will be conducted to provide additional insight. It will be through these studies and activities that recommendations for mitigation measures to reduce risk and vulnerability will eventually be developed and then vetted.

The Oregon State Energy Assurance Plan is not an emergency response plan. It is instead an introduction to how Oregon prepares for, responds to, and recovers from energy emergencies. This will eventually include actions and considerations to reduce risk before an emergency occurs. Energy emergency response plans are much more detailed and provide procedures and checklists prescribing how decision-makers and emergency responders are to:

- accomplish pre-identified tasks and objectives to make emergency notifications
- monitor and assess the severity of an energy emergency
- issue protective actions and decisions
- provide situation awareness reports
- provide emergency information to the news media and the public
- activate, staff, and operate an Emergency Operations Center
- other critical tasks to effectively recover from energy emergencies and restore the energy infrastructure.

Energy sector-specific emergency response plans for fuel, natural gas, and electricity are developed and maintained by ODOE and the Oregon Public Utility Commission (OPUC). ODOE developed and maintains the Oregon Petroleum Contingency Plan, which includes the state’s Fuel Allocation Program. OPUC developed and maintains the Natural Gas Emergency Response Plan and the Electricity Emergency Response Plan.

The Oregon State Energy Assurance Plan complies with the National Association of State Energy Officials (NASEO) guidelines, the NASEO Energy Assurance Planning Framework, the National Response Framework, the National Infrastructure Protection Plan, and the National Incident Management System. The Oregon Energy Assurance Plan is also consistent with the Oregon Emergency Management Plan and Oregon Revised Statute (ORS) 401 to "coordinate the activities of all public and private organizations providing emergency services within this state."

ODOE will review and update the Oregon State Energy Assurance Plan annually or as needed to reflect changing response trends and strategies and to incorporate lessons learned from exercises or response to actual energy emergencies.

OREGON STATE ENERGY ASSURANCE PLAN

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CHAPTER 1

Introduction

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

In 2009, Oregon and other states throughout the nation received American Recovery and Reinvestment Act (ARRA) funding from DOE/OE. The purpose of this funding was to enable the states to create or update their energy assurance plans to facilitate recovery from disruptions to the energy supply and enhance reliability.

Energy assurance for state and local governments is a major element of improving the nation's energy sector resiliency. It involves a large array of activities that fall into three main phases: planning and preparedness, mitigation and response, and education and outreach.

Planning and Preparedness involves understanding the energy infrastructure and identifying key assets; designing and updating energy emergency response plans; training personnel; and conducting exercises that test the effectiveness of response plans.

Mitigation and Response includes monitoring events that may affect energy supplies; assessing the severity of disruptions; providing situational awareness; coordinating restoration efforts; and tracking recoveries.

Education and Outreach includes communicating and coordinating with key stakeholders; increasing public awareness; and forming partnerships across sectors and jurisdictions.

OREGON STATE ENERGY ASSURANCE PLAN APPROACH AND FORMAT

Chapter 1: Introduction - This Chapter provides an overview of the format of the plan.

Chapter 2: Energy Infrastructure Overview – This chapter provides a brief overview of the energy infrastructure in the United States. In order to effectively plan, prepare for, respond to, and recover from energy emergencies, it is imperative to first understand how the petroleum, natural gas, and electricity supply and distribution systems work and how they are interdependent.

Chapter 3: Oregon Energy Profile – This chapter describes the conventional energy sources generated, imported, and consumed in Oregon. Understanding Oregon's energy profile can assist emergency planners and decision-makers in identifying vulnerabilities to the state's energy supply and distribution systems.

Chapter 4: Potential Role of Energy Efficiency and Renewable Energy Resources in Energy Assurance Planning in Oregon – This chapter profiles the renewable energy resources within the state. This chapter also examines the possibility of incorporating these resources when more traditional sources of energy are in short supply. This includes bringing new applications such as Smart Grid technology into the state’s energy assurance planning to lower risk and improve energy assurance and resiliency in Oregon.

Chapter 5: Types of Energy Emergencies – This chapter explains the types of hazards in the Pacific Northwest that can impact Oregon’s critical energy infrastructure. Having a clear understanding of the hazards that could impact the state’s energy resources helps emergency planners and decision-makers better identify mitigation measures to reduce the risk and vulnerabilities.

Chapter 6: Overview of Energy Sector-Specific Emergency Response Plans – This chapter provides an overview of how the state prepares for and responds to fuel, electricity, natural gas, and liquefied natural gas emergencies in Oregon. Despite energy assurance efforts, emergencies impacting our energy resources will occur. Understanding roles and responsibilities, what resources are available, what actions are to be taken and how emergency information will be provided is essential to a rapid recovery.

Chapter 7: Ensuring Program Readiness – This chapter provides an overview of the activities ODOE and OPUC conduct to ensure decision-makers and emergency responders are prepared to implement the energy sector-specific emergency response plans.

Appendices – This section provides reference materials and supporting documents to the Oregon State Energy Assurance Plan.

The ARRA initiative cited the State Energy Assurance Guidelines as a model to guide Oregon’s update of the Oregon State Energy Assurance Plan. These Guidelines were developed by NASEO in collaboration with the National Association of Regulatory Utility Commissioners (NARUC) and funded by DOE/OE.

Chapter 2

Energy Infrastructure Overview

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

Energy is the essential force powering business, manufacturing, and the transportation of goods and services to serve the American and world economies. Energy supply and demand plays an increasingly vital role in our national security and the economic output of our nation. It is not surprising that the United States spends over 500 billion dollars annually on energy. Given the importance of their reliable and secure operations, understanding the behavior of energy infrastructures - particularly when stressed - is crucial.

The nation's energy infrastructure consists of thousands of miles of electricity lines and oil and natural gas pipelines and other resources that are geographically dispersed and connected in all 50 states and territories.

- About 204,000 miles of long-distance transmission lines move power from region to region.
- Two million miles of oil pipelines in the United States are the principal mode for transporting oil and petroleum products such as gasoline. They account for about 66 percent of domestic product movement and are an efficient way to move petroleum and petroleum products.
- Virtually all natural gas in the United States is moved via pipeline.

ENERGY SECTOR PROFILE AND ASSETS

The energy sector includes widely dispersed assets related to three key energy resources: petroleum, electric power, and natural gas.

Petroleum	Electricity	Natural Gas
<p>Crude Oil</p> <ul style="list-style-type: none"> Onshore/Offshore Fields Terminals Transport (tanker vessels & pipelines) Storage <p>Petroleum Processing Facilities</p> <ul style="list-style-type: none"> Refineries Terminals Transport (tanker vessels & pipelines) Storage <p>Distribution</p> <ul style="list-style-type: none"> Pipelines Barges and Tanker Vessels Trucks <p>Control Systems</p> <p>Petroleum Markets</p>	<p>Generation</p> <ul style="list-style-type: none"> Fossil Fuel Power Plants (coal – gas – oil) Nuclear Power Plants Hydroelectric Dams Renewable Energy <p>Transmission</p> <ul style="list-style-type: none"> Substations Lines Control Centers <p>Distribution</p> <ul style="list-style-type: none"> Substations Lines Control Centers <p>Control Systems</p> <p>Electricity Markets</p>	<p>Production</p> <ul style="list-style-type: none"> Onshore fields Offshore fields <p>Processing</p> <p>Transport (pipelines)</p> <p>Distribution (pipelines)</p> <p>Storage</p> <p>Liquefied Natural Gas Facilities</p> <p>Control Systems</p> <p>Gas Markets</p>

Petroleum and natural gas share similarities in methods of extraction, fuel cycles, and transport, but the facilities and commodities are separately regulated and have multiple stakeholders and trade associations. Energy assets and critical infrastructure components are owned by private, federal, state and local entities, and by some energy consumers, such as large industries and financial institutions (often for backup power purposes).

PETROLEUM SUPPLY AND DISTRIBUTION SYSTEM

The petroleum portion of the energy sector includes the production, transportation, and storage of crude oil; the processing of crude oil into petroleum products; the distribution and storage of petroleum products; and sophisticated control systems to coordinate storage and transportation.

Pipelines are critical for the gathering, transmission, and distribution of petroleum. The oversight of pipeline security is the responsibility of Department of Homeland Security’s Transportation Security Administration (TSA). The petroleum supply and distribution system include:

Onshore and offshore fields - U.S. crude oil production is concentrated onshore and offshore along the Texas-Louisiana Gulf Coast, extending inland through west Texas, Oklahoma, and eastern Kansas. There are also significant oil fields in Alaska along the central North Slope and the California coastline.

The U.S. also imports nearly 60 percent of the petroleum used in the nation from Canada, Mexico, the Middle East, South America, and Africa.

Crude Oil Drilling, Gathering, and Processing – This sector of the petroleum industry includes a large number of facilities, such as wellheads, gas and oil separation plants, compressor stations, water treatment units, etc., for both onshore and offshore areas.

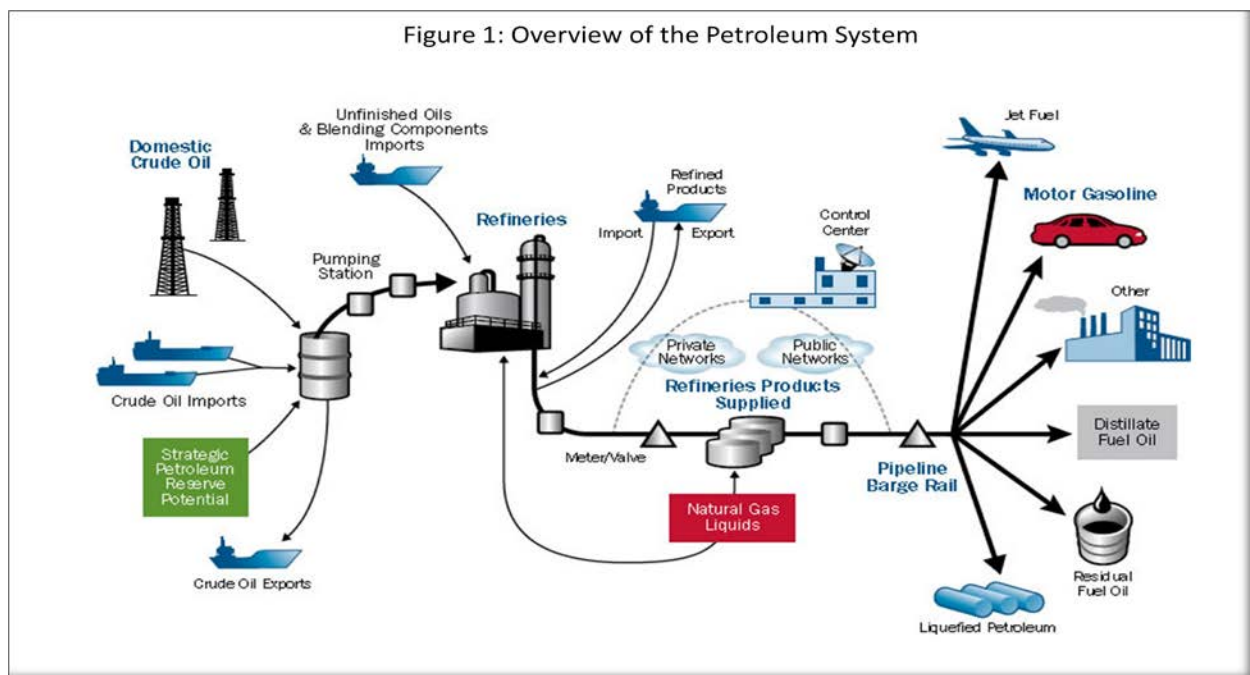
Import Marine Terminals – Crude oil is received into the United States at import terminals, which usually consist of a berth or port facility for the tankers, unloading facilities, storage facilities, and a system of pipelines to move the crude.

Crude Oil Transport – Privately owned pipelines transport most of the crude oil in the United States. Waterborne transportation modes, including ocean tankers and barges, are also used.

Crude Oil Storage – Import terminals always incorporate storage facilities. In addition, the Strategic Petroleum Reserve has huge underground salt caverns along the coastline of the Gulf of Mexico. The reserve has the capacity to hold 727 million barrels and is the world’s largest supply of emergency crude oil.

Refineries – Refineries process crude oil into petroleum products such as gasoline, diesel fuel, jet fuel, and home heating oil. The Gulf Coast has more than twice the crude oil refining capacity of any other U.S. region.

Petroleum Product Transport – Petroleum products are mainly transported by pipeline, tanker, barge, railroad tank cars and trucks. The products are shipped to terminals for temporary storage before transport to smaller petroleum delivery stations in market areas.



Petroleum Product Storage – Petroleum products are stored both above and below ground in tank farms and storage fields to minimize unwanted fluctuations in pipeline throughput and product delivery. As an example, DOE’s Northeast Home Heating Oil Reserve stores two million barrels of home heating oil at commercial terminals in the Northeast. This oil is intended for distribution during severe heating-oil supply disruptions in that part of the country.

Petroleum Control Systems - Control systems like the Supervisory Control and Data Acquisition (SCADA), continuously monitor, transmit, and process pipeline data. This includes flow rate, pressure, and speed. The SCADA systems monitor and control pumping stations and track terminal inventories. SCADA gathers information, such as where a leak on a pipeline has occurred, and transfers the information back to a central site. This alerts the home station that the leak has occurred, analyzes its importance, and displays the information in a logical and organized fashion.

In an energy emergency, Strategic Petroleum Reserve oil could be distributed by competitive sale. Decisions to withdraw crude oil from the reserve are made by the President under the authorities of the Energy Policy and Conservation Act.

ELECTRICITY SUPPLY, GENERATION, TRANSMISSION, AND DISTRIBUTION SYSTEM

The electricity portion of the energy sector includes the generation, transmission, and distribution of electricity. The use of electricity is universal, spanning all sectors of the U.S. economy. Electricity system facilities are dispersed throughout the North American continent. Although most assets are privately owned, no single organization represents the interests of the entire sector.

The North American Electric Reliability Corporation (NERC), through its eight Regional Reliability Councils, provides a platform for ensuring reliable, adequate, and secure supplies of electricity through coordination with many asset owners. NERC develops and enforces mandatory reliability standards for the bulk electric power system in the United States, Canada, and a portion of Baja Mexico.

Electricity generation from the burning of fossil fuels - - coal, natural gas, and oil - - provides more than 70 percent of the electricity generated in the United States. Virtually all coal is mined domestically and then transported to power plants by rail and barge. Natural gas and oil are transported to power plants by pipeline.

Additional sources of electricity generation include nuclear and hydropower. Renewable energy sources including solar, wind, and geothermal account for a small but growing percentage of national electricity generation.

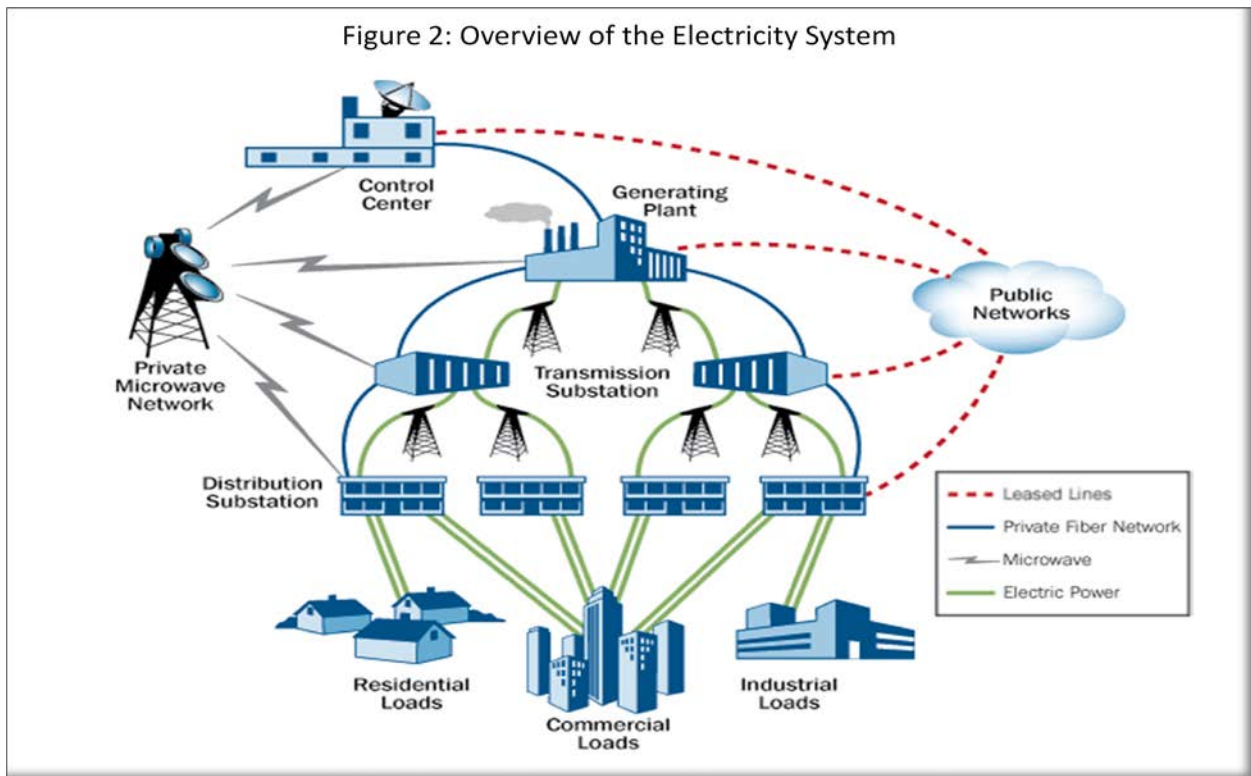
Electricity transmission, distribution, and control systems include:

Transmission Lines - Transmission lines serve two primary purposes: They move electricity from generation sites to customers and they interconnect systems. Voltages in the transmission system are high, which makes it possible to carry electric power efficiently over long distances and deliver it to substations near customers.

Transmission and Distribution Substations - Substations are located at the ends of transmission lines. A transmission substation located near a power plant uses large transformers to increase the voltage to higher levels. At the other end of the transmission line, a substation uses transformers to step transmission voltages back down so the electricity can be distributed to customers.

Control Centers - Control centers have sophisticated monitoring and control systems and are staffed by operators 24 hours per day, 365 days per year. These operators are responsible for several key functions, including balancing power generation and demand; monitoring flows over transmission lines to avoid overloading; planning and configuring the system to operate reliably; maintaining system stability; preparing for emergencies; and placing equipment out of and back into service for maintenance and emergencies.

Distribution Lines - Distribution lines carry electricity from substations to end users. Control Systems like SCADA monitor the flow of electricity from generators through transmission and distribution lines. These electronic systems enable efficient operation and management of electric systems through the use of automated data collection and equipment control.

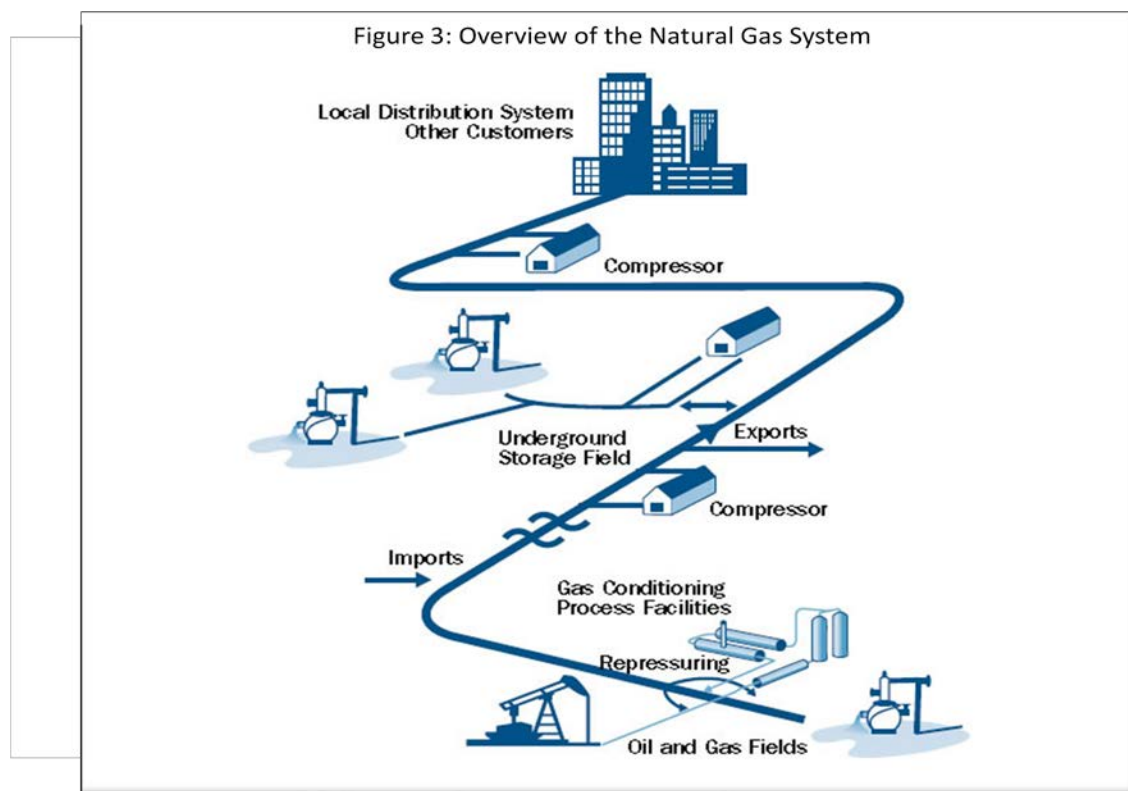


NATURAL GAS PRODUCTION, PROCESSING, TRANSPORT, AND DISTRIBUTION SYSTEM

The natural gas portion of the Energy Sector includes the production, processing, transportation, distribution, and storage of natural gas; liquefied natural gas (LNG) facilities; and gas control systems

Natural Gas Production – The Gulf of Mexico and Texas are the largest gas-producing regions in the United States. The two regions account for almost half of all U.S. natural gas production. Other key sources of natural gas are the Rocky Mountains and New Mexico. The U.S. also imports significant quantities from Canada.

Natural Gas Processing – Natural gas processing consists of separating all of the various hydrocarbons and fluids from the pure natural gas to produce pipeline-quality dry natural gas. Most U.S. natural gas processing plants are located near production facilities in the Southwest and Rocky Mountain States. The natural gas extracted from a well is transported to a processing plant through a network of gathering pipelines.



Natural Gas Transportation – The interstate natural gas pipeline network transports natural gas from processing plants in producing regions to areas with high natural gas demands, particularly large urban areas. Compression stations along the pipeline transmission route keep the gas moving at the desired pressure.

Natural Gas Distribution – Local distribution companies typically transport natural gas from interstate pipeline delivery points to end users through thousands of miles of distribution pipe. Delivery points for local distribution companies are often termed city gates, especially for large municipal areas, and are important market centers for the pricing of natural gas.

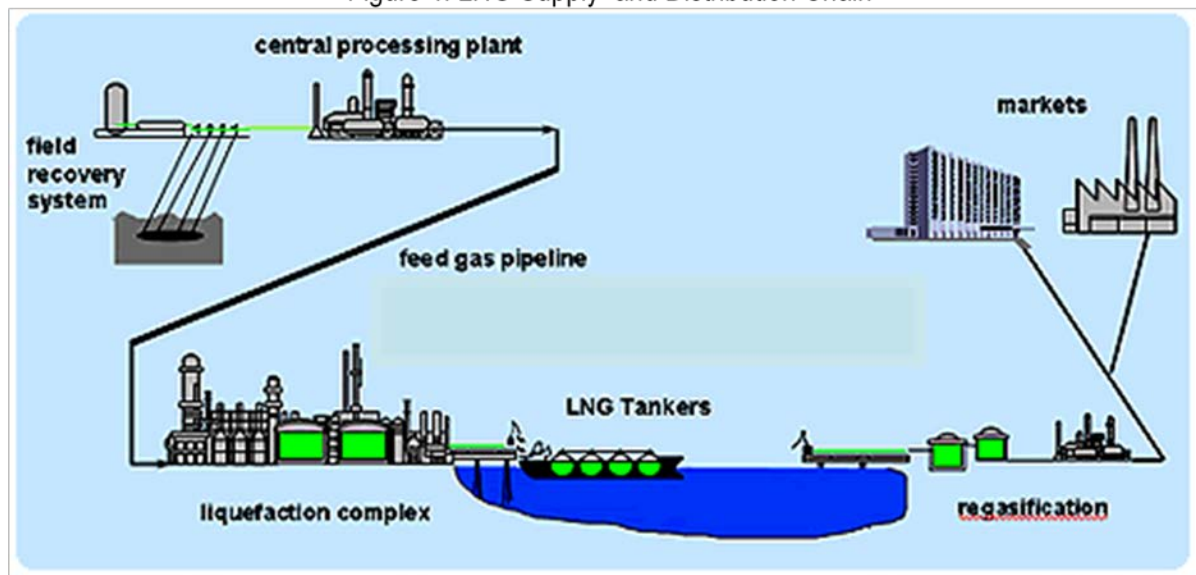
Natural Gas Storage – Gas is typically stored underground and under pressure as an efficient way to balance discrepancies between supply input and market demand. Three types of facilities are used for underground gas storage: depleted reservoirs in oil and/or gas fields, aquifers, and salt caverns. Facilities serving the interstate market are subject to Federal Energy Regulatory Commission (FERC) regulations; otherwise they are State-regulated. Most working gas held in storage facilities is held under lease with shippers, local distribution companies, or end users who own the gas.

Gas Market Centers - Currently, 37 natural gas market centers operate in the United States and Canada. These centers provide gas shippers with many of the physical capabilities and administrative support services formerly handled by interstate pipeline companies as bundled sales services. These centers have developed new and unique Internet-based access to gas trading platforms and capacity release programs; provide title transfer services between parties that buy, sell, or move their gas through the centers; and offer connections with other pipelines and access to storage services. These markets and their information systems are critical components of the natural gas infrastructure.

LIQUEFIED NATURAL GAS SUPPLY AND DISTRIBUTION SYSTEM

LNG is natural gas cooled to approximately -260° Fahrenheit at normal air pressure. It is odorless, non-toxic, non-corrosive and less dense than water. Essentially, it is the same natural gas more than 63 million Americans use to heat and cool their homes, only in a liquid state.

Figure 4: LNG Supply and Distribution Chain



The conversion of natural gas into liquid is called liquefaction and is achieved through refrigeration. Liquefaction reduces the volume of natural gas by approximately 600 times, making it more economical to transport and store. Upon reaching its destination, LNG is stored as a liquid before being warmed back into a gas and sent out via pipelines as natural gas.

LNG is not new. It has been successfully transported and used for almost 100 years. But, LNG is likely to play an increasingly critical role in diversifying the nation's energy mix with our country's changing energy climate. LNG alone cannot meet the growing demand for natural gas. However, LNG is a key component of our nation's three-pronged natural gas supply mix which includes domestic production, Canadian imports, and LNG.

LNG currently accounts for only two percent our natural gas consumption – less than one percent of the energy our nation uses. LNG is predominantly imported from Trinidad and Tobago and from Algeria. Indonesia, Malaysia, and Qatar are also the leading exporters of LNG. Russia and Iran have huge reserves of natural gas.

It does take a long time to invest in and establish a LNG supply chain. This includes building terminals to liquefy the gas, building ships to transport LNG to the United States and building LNG terminals and pipelines to gasify LNG and distribute to domestic markets. There are nine existing LNG import terminals in the United States. Several dozen others are at various stages of the regulatory siting process or have been approved, and are either under construction or waiting for market conditions to change before construction begins.

ENERGY SECTOR INTERDEPENDENCIES

Our national and economic security rest upon a foundation of highly interdependent critical infrastructures. Critical infrastructures are those systems and assets vital to the United States that the destruction of such systems and assets would have a debilitating impact on national security, the economy, public health or safety, or any combination of those conditions.

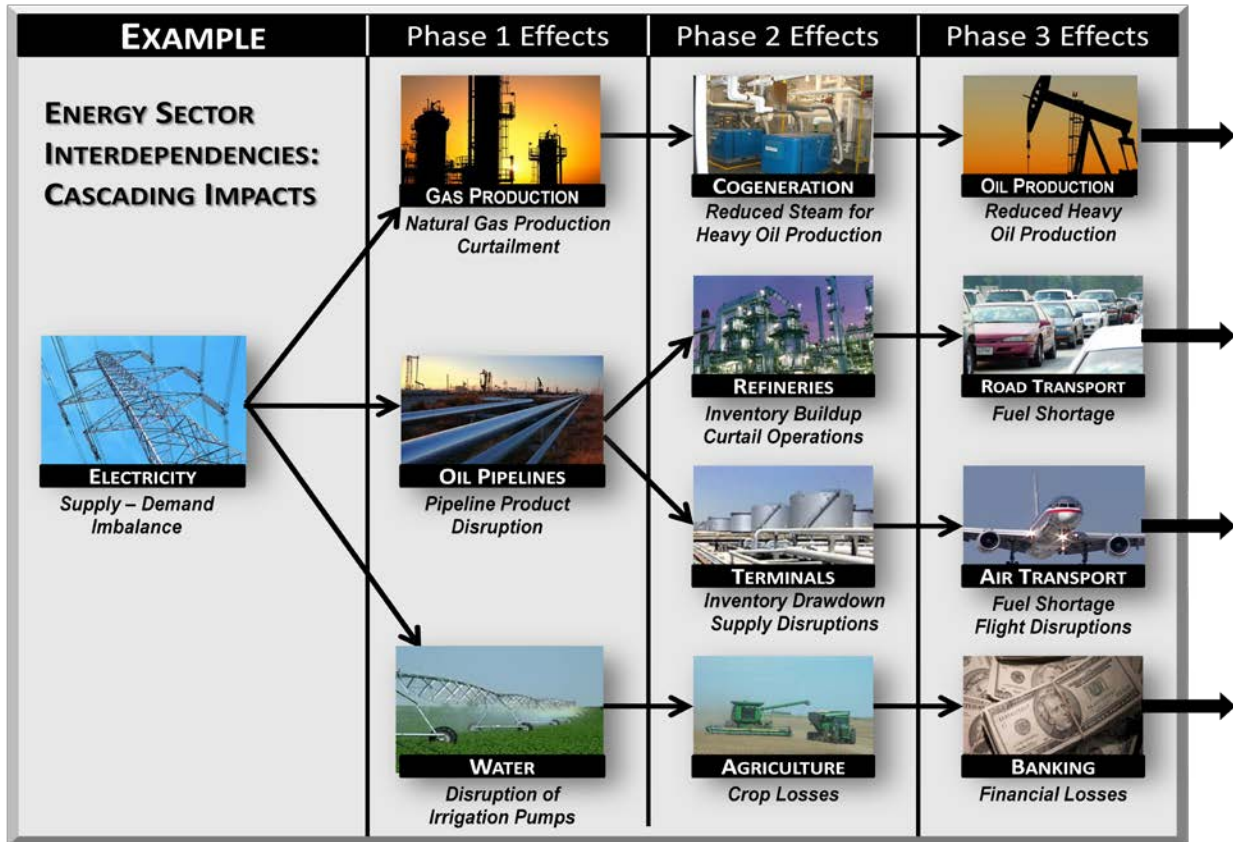
Critical infrastructures cover a large number of sectors. They include the electric power grid; oil and natural gas production, transportation, and distribution systems; telecommunications and information systems; water systems; transportation networks; the banking and finance industry; agriculture and food systems; and public health networks.

An interdependency is a two-way relationship between infrastructures where the operation of each infrastructure is influenced by the other. For example, the electricity infrastructure includes a nationwide power grid of long-distance transmission lines that move electricity from region to region, as well as the local distribution lines that carry electricity to homes and businesses. Much of our electricity originates at coal-fired power plants. These power plants require a dependable transportation infrastructure to deliver the coal necessary for the production of electricity.

Electricity is also required for petroleum refinery and distribution terminal operations. A power failure can shut-down the movement of fuel through pipelines. Gasoline and diesel are required by utility vehicles which are often needed to get workers to the field to restore power to the electrical grid. Telecommunication networks often use sophisticated computerized control and information systems, which rely on electricity.

Figure 5 gives an example of the interdependencies within the three energy sectors and potential cascading effects should one energy sector experience problems.

FIGURE 5



Cascading impacts continue past Phase 3.

Understanding the operational characteristics, complexity, magnitude, and scope of the nation’s critical infrastructure will assist emergency managers and decision-makers to better protect the nation’s critical infrastructures. Also, should an emergency occur, they will be better prepared to respond to, and recover from energy emergencies.

Chapter 3

Oregon Energy Profile

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

Energy consumption in Oregon continues to increase according to DOE's Energy Information Agency (EIA). The most current EIA data (2008) shows that total Oregon energy use (petroleum, electricity, natural gas) was 1,105 trillion British thermal units (Btu), up from 707 trillion Btu in 2003. That ranks Oregon, on a per capita basis, 38th in the country in energy consumption.

Oregon only produces about one-third of the energy it uses. Of Oregon's 414.8 trillion Btu produced, most of that is classified as renewable energy, with the majority of that being hydroelectricity.

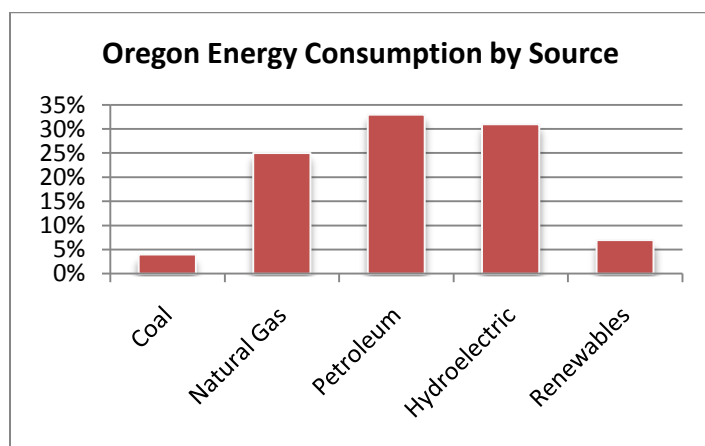


Figure 6: Illustrates the source of energy consumed in Oregon in 2008. About one-third of the energy used is petroleum.

The transportation sector uses the most energy in Oregon, followed by the industrial, residential and commercial sectors. Within the transportation sector, gasoline use made up 57 percent of that transportation energy in 2008.

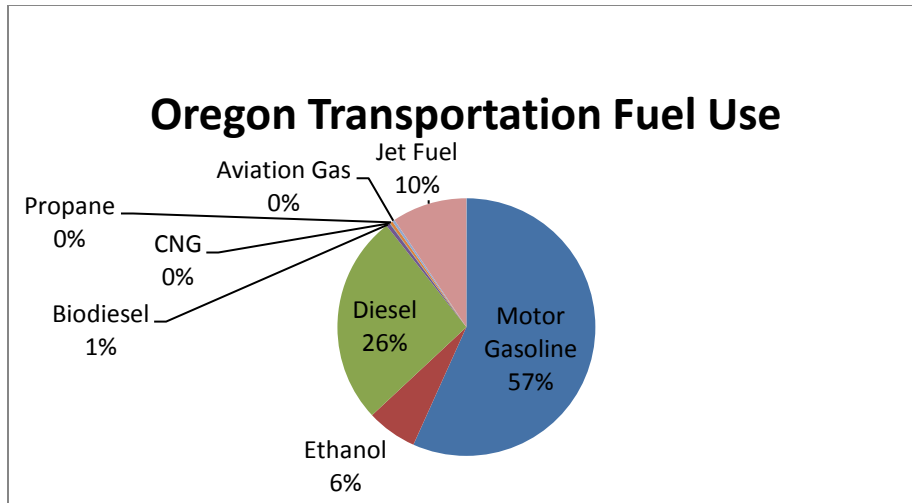


Figure 7: Gasoline makes up the bulk of Oregon’s transportation fuel use.

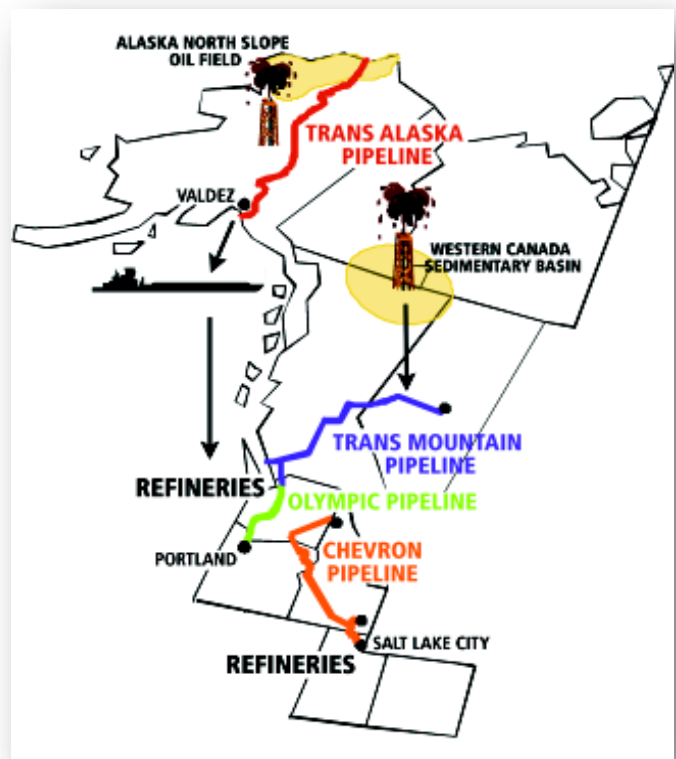
OREGON ENERGY SUPPLY AND DEMAND

PETROLEUM

Unlike other Western states, Oregon does not have crude oil resources or refineries. Oregon imports 100 percent of its petroleum. Oregon, along with Alaska, Arizona, California, Hawaii, Nevada, and Washington form a nearly self-contained system of petroleum production and consumption, referred to by the federal government as Petroleum Administration Defense District Five (PADD V). Although the system is relatively stable, a major disruption in any part of the supply and distribution chain could create a severe and prolonged petroleum shortage, and/or significant price volatility.

Figure 8: Illustrates Oregon’s petroleum supply system. The majority of the crude oil comes from Alaska and Canada.

Figure 8 shows the major sources of Oregon’s petroleum products. More than 80 percent of the crude oil eventually used in Oregon originates in the Alaska North Slope oil fields. The Trans Alaska Pipeline transports crude oil 800 miles from the oil fields on the state’s northern coast to the Valdez terminal on its southern coast. From there, barges and tankers ship the crude oil to four refineries in the Puget Sound area of Washington and other destinations.



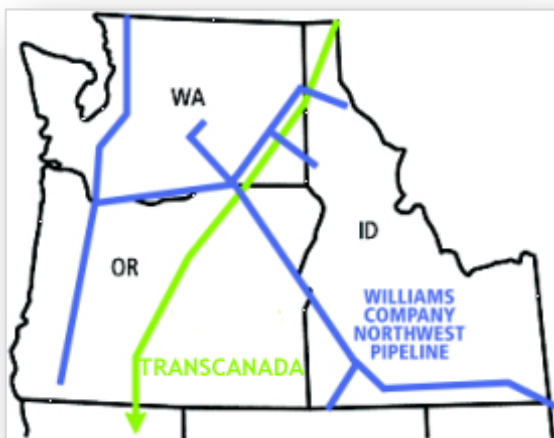
The Western Canada Sedimentary Basin is another significant source of crude oil for the refineries and for Oregon. The remaining crude, less than five percent, comes from the continental U.S., Mexico, Indonesia or the Middle East.

The Puget Sound refineries provide more than 90 percent of Oregon’s refined petroleum products. The Washington refineries transport their products to Oregon and Washington markets via the Olympic Pipeline and barges.

Refineries in Salt Lake City and British Columbia provide remaining refined petroleum products to Oregon. Under normal conditions, only minor amounts arrive on tanker ships from California and the Pacific Rim countries of Indonesia, South Korea and Japan.

The bulk of Oregon’s oil enters through the Port of Portland and is distributed statewide by tanker trucks, Columbia River barge service and the Kinder Morgan pipeline, which extends to Eugene. Some specialty petroleum products (jet fuel, lubricants, ultra-low sulfur diesel) enter Oregon on tankers from California Bay Area refineries.

In northeastern Oregon, petroleum products enter by truck or rail from Pasco, Washington. The Pasco delivery station receives refined product from a pipeline that starts in Salt Lake City, travels through southern Idaho and crosses through northeastern Oregon along Interstate 84. Pasco also receives petroleum product from barges that travel up the Columbia River from Portland. In southeastern and southern Oregon, a portion of petroleum products is trucked from Idaho and northern California respectively.



NATURAL GAS

Oregon imports 100 percent of its natural gas. Oregon receives natural gas from British Columbia, Alberta, Wyoming, Colorado and New Mexico. Two connected interstate pipelines deliver the natural gas.

Figure 9: Two natural gas pipelines currently serve Oregon customers. The Williams Company pipeline and the Gas Transmission Northwest (GTN) pipeline owned by the TransCanada Corporation bring product from the Rocky Mountains and Canada.

The Williams Company’s Northwest Pipeline brings natural gas to Portland from British Columbia and the Rocky Mountain region of the U.S. British Columbia gas enters the U.S. near Sumas, Washington and roughly follows Interstate 5. Gas from the Rockies comes into Oregon near Ontario. One lateral pipeline transports gas from Washougal, Washington to the Portland area and another from the Willamette Valley to Grants Pass (not shown in Figure 9).

Natural gas from Alberta arrives in a Gas Transmission Northwest (GTN) pipeline. It enters the U.S. near Kingsgate, Idaho, and moves through eastern Oregon, leaving the state near Malin, before traveling on to California and Nevada. A lateral line (also not shown in Figure 9) transports natural gas from Klamath Falls to Medford. The GTN pipeline is owned by TransCanada and connects with the Williams Northwest pipeline at Stanfield, Oregon.

Three natural gas utilities serve Oregon:

- Northwest Natural serves about 80 percent of Oregon's retail customers, including Portland, the Willamette Valley and the coast.
- Avista Corporation serves parts of southern Oregon and La Grande.
- Cascade Natural Gas serves parts of central and eastern Oregon.

Northwest Natural receives natural gas from the Williams' pipeline. Northwest Natural owns underground gas storage facilities in Mist, Oregon and LNG storage facilities in Newport and Portland. Northwest Natural also has contracts to use LNG storage at Plymouth, Washington and underground storage at Jackson Prairie, Washington.

Avista obtains natural gas from the Williams Company's Grants Pass lateral as well as TransCanada's GTN pipeline and the Medford lateral. Cascade customers from Madras to Chemult receive natural gas from TransCanada's GTN pipeline. The Williams Northwest pipeline serves Cascade customers from Umatilla to Ontario. Cascade and Avista either own or have contracts to use natural gas storage facilities.

ADDITIONAL NATURAL GAS PIPELINES

The Ruby Pipeline, approved by FERC and currently under construction, will transport domestic natural gas 675 miles across four states from Opal, Wyoming to the existing Gas Transmission Northwest (GTN) pipeline near Malin, Oregon.

The Palomar Pipeline was proposed to link the GTN Pipeline near Madras, Oregon to the Williams Northwest Pipeline near Molalla, Oregon and a second phase from Molalla to a previously proposed LNG terminal called Bradwood Landing. Due to the bankruptcy of Bradwood Landing LNG along with changing market forces, the Palomar Pipeline is on hold.

According to the Northwest Gas Association (NGWA), the Pacific Northwest is home to more than 48,000 miles of natural gas transmission and distribution pipelines. NGWA expects natural gas demand to grow an average of about one percent per year.

PIPELINE REGULATION

The Federal Energy Regulatory Commission regulates siting of interstate natural gas pipelines as well as prices for the use of pipelines. The Oregon Energy Facility Siting Council (EFSC) sites large in-state pipelines.

OPUC regulates the rates Oregon's natural gas utilities charge their retail customers. Wholesale natural gas prices are not regulated. Many industrial customers buy directly from the wholesale market.

Retail natural gas rates generally include pass-through of the wholesale cost of natural gas to retail customers. OPUC sets retail rates so utility companies have the opportunity to earn a fair rate of return on their investments.

Natural gas utilities must prepare integrated resource plans for OPUC. These plans outline contracts to meet natural gas demand, proposed pipeline expansions, new storage facilities, and energy conservation budgets and programs.

LNG

As part of the current and future energy mix, the U.S. is looking to import natural gas, which when produced overseas, must be super-cooled and liquefied for ocean transport. It is expensive to liquefy, transport, and then convert to a gas again (regasify). Shipments of foreign LNG are currently being received at terminals along the eastern seaboard and in the Gulf of Mexico.



Figure 10: Northwest Natural Gas LNG Facility in Portland

In Oregon, there are two existing LNG storage facilities, owned and operated by Northwest Natural Gas. The above-ground facilities are located at the Port of Portland and Newport. Both facilities receive their supply through transmission pipelines and natural gas resources in Canada.

These facilities are used during peak load hours to ensure consistent delivery of power to customers.

There are also two proposals to build LNG import terminals in Oregon. Jordan Cove, located near Coos Bay, received FERC approval in December 2009. Oregon LNG proposed near Warrenton is currently making its way through the FERC process. Either or both projects, if built, would receive LNG from ocean going vessels, temporarily store it, and then regasify it before sending it out by pipeline to homes, businesses, electrical generating plants and industries in the Pacific Northwest as well as other parts of the Western United States. The earliest either terminal could be in operation is 2014.

JORDAN COVE ENERGY PROJECT

Jordan Cove Energy Project (JCEP) has proposed an LNG export terminal on an approximately 400 acre site located on the bay side of the North Spit of Coos Bay, Oregon. JCEP would include a marine receiving terminal, two full containment 160,000 cubic meter LNG storage tanks, and facilities to support ship berthing and cargo loading. Also proposed onsite is the South Dunes Power Plant. The 340 megawatt natural gas fired power plant's primary purpose is to provide power to the JCEP facility. However, the plant does have the capacity to provide power to the local electric grid.

Figure 11: Illustration of the Jordan Cove LNG export terminal upon completion.

JCEP could export up to one billion cubic feet per day of natural gas. The LNG terminal would be capable of loading LNG ships up to 148,000 cubic meters (m³). The natural gas pipelines would consist of the existing NW Natural/Coos County Pipeline and a new, approximately 223-mile-long natural gas pipeline. The Pacific Connector Gas Pipeline is proposed by Williams' Northwest Pipeline Corporation, Pacific Gas and Electric Company, and Fort Chicago Energy Partners LP.



OREGON LNG

Oregon LNG proposed an LNG peak-shaving, liquefaction, and export facility located on the Skipanon Peninsula in Warrenton, Oregon. The approximately 96 acre site is owned by Oregon Department of State Lands and leased to the Port of Astoria. The Port has in turn leased the land to Oregon LNG for 65 years.

The Oregon LNG Project would include a marine receiving terminal, two full containment 160,000 cubic meter LNG storage tanks, and facilities to support ship berthing and cargo loading.

Oregon LNG's peak-shaving capacity is projected at 0.5 billion cubic feet of natural gas per day with an export capacity at 1.3 billion cubic feet of natural gas per day.



Figure 12: Illustration of the Oregon LNG import-export terminal upon completion

Product could also be transported from an 86-mile pipeline that would connect the terminal to the existing Williams Northwest interstate natural gas pipeline in Woodland,

Washington. The LNG terminal would be capable of loading LNG ships up to 260,000 m³.

ELECTRICITY

Oregon's fuel mix varies based on hydroelectric conditions, with natural gas typically filling the void in years when hydroelectric conditions are poor. Still, hydro and coal make up the bulk of Oregon's electricity supply. Natural gas provides between seven and 15 percent of Oregon's electricity.

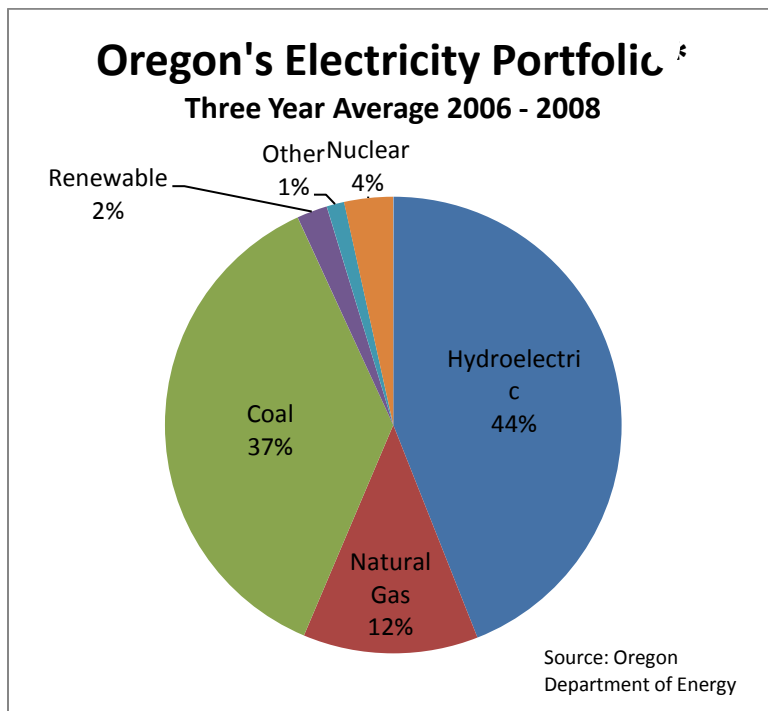


Figure 13: Where Oregon gets its electricity. Oregon's 2006-2008 fuel mix shows that electricity comes mainly from hydropower plus instate and out-of-state coal.

Hydropower comes primarily from large dams on the Columbia and Snake River systems.

Coal power comes from Portland General Electric's (PGE) Boardman plant in northeast Oregon and from plants in Utah, Wyoming, and Montana.

A number of natural gas-fired power plants in Oregon are located in the northeast part of the state near Hermiston and Boardman. Other plants are located in Clatskanie and Klamath Falls.

The implementation of Renewable Portfolio Standards, which require a certain percentage of electricity generation from renewable resources – both in Oregon and other states – has helped spur the development of wind energy. Northeast Oregon has seen the addition of several thousand wind turbines in the past decade, with more being added. Despite this growth, it still provides only a small amount of Oregon's electricity.

Nuclear power comes to Oregon's consumer-owned utilities through the Bonneville Power Administration (BPA) from the Columbia Generating Station near Richland, Washington.

ELECTRICITY TRANSMISSION

Nationwide, new construction to increase electrical energy transmission has lagged over the past 25 years, while the demand for energy has continued to increase. The American Society of Civil Engineers reports that, "The transmission and distribution system of the United States has become congested because growth in electricity demand and investment in new generation facilities have not been matched by investment in new transmission facilities."

Regionally, a number of studies indicate that the electric transmission system in the western United States is inadequate to meet future energy demands and load allocations. There is already a lack of capacity in the existing electric transmission grid and energy generation from renewable sources - - geothermal, wind, solar, wave, biomass - - is increasing the need to expand transmission capacity.

Since many of these renewable energy sources are located in remote areas far away from existing transmission grids and are often located away from high-use, urban and industrial areas where demand is greatest, pressure to develop new transmission capacity is mounting.

Forecasts of future energy demands in Oregon over the next 20 years range from an increase of as much as 45 percent over current demands according to PGE to approximately a 30 percent increase over current demand by the Northwest Power and Conservation Council. While the rate of demand is variable from different sources, there is agreement that demand for energy will increase in the region. Demand is expected to increase for a variety of reasons including home electronics, the development of electric vehicles, and in some areas, the expansion of health care facilities for the elderly.

ORS 469.470 authorizes EFSC to oversee the development of electric transmission lines that are equal to, or greater than, 230 kV; longer than 10 miles in length; and routed across more than one political subdivision in the state.

There are three electric transmission projects currently proposed in Oregon that are making their way through the regulatory processes.

- Big Eddy-Knight Transmission Line, proposed by BPA is a 500-kilovolt line from The Dalles, Oregon to a proposed new substation four miles northwest of Goldendale, Washington.
- Boardman to Hemingway would bring a single circuit 500-kilovolt (kV) transmission line approximately 298 miles to connect the power plant near Boardman, Oregon and the planned Hemingway substation near Murphy, Idaho.
- PGE proposed to construct Cascade Crossing, a single and double circuit 500-kilovolt (kV) transmission line 210 miles from Boardman to Salem. The proposal includes three new substations, and potential upgrade of portions of the transmission system in the Willamette Valley.

Another BPA project, which would have run a 70 mile-long 500-kilovolt transmission line from Castle Rock, Washington to a new substation near BPA's existing Troutdale Substation, is on hold.

U.S. ENERGY INFORMATION ADMINISTRATION

The U.S. Energy Information Administration (EIA) website includes information on Oregon's energy supply and demand from 1960 through 2010. The State Energy Data Systems (SEDS) can be accessed at www.eia.gov. EIA is the statistical and analytical agency within the U.S. Department of Energy (USDOE). EIA collects, analyzes, and disseminates independent energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.

The USDOE Organization Act of 1977 established EIA as the primary federal government authority on energy statistics and analysis. EIA conducts a comprehensive data collection program that covers the full spectrum of energy sources, end users, and energy flows; generates short- and long-term domestic and international energy projections; and performs informative energy analyses. EIA disseminates its data products, analyses, reports, and services to customers and stakeholders primarily through its website and the customer contact center. EIA programs cover data on coal, petroleum, natural gas, electric, renewable and nuclear energy.

Information on electricity consumption can also be found on ODOE's website at http://cms.oregon.gov/energy/pages/oregons_electric_power_mix.aspx.

Chapter 4

Potential Role of Renewable Resources in Energy Assurance Planning in Oregon

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

Oregon has significant renewable energy resources. For decades, Oregonians have benefited from hydropower generated by dams on the Columbia River and elsewhere in the state. In recent years, we have seen tremendous growth primarily in northeast Oregon in harnessing wind energy – although it still generates only a small percentage of our electricity.

Across the state, other opportunities exist for developing renewable energy resources, such as solar, geothermal, wave and biomass. The production and use of alternative fuels is also increasing. The state is actively recruiting these industries and encouraging technology innovation, manufacturing, and installation.

Renewable energy resources will not replace conventional energy resources, such as coal, oil and natural gas – at least not in the near future. But renewable energy resources may provide some assistance in the event of an energy shortage or emergency.

The most promising of the renewable energy resources to assist emergency responders are alternative fuels such as biofuels. These could potentially be used to fuel emergency vehicles when conventional gasoline and diesel are unavailable or in short supply.

Also promising is not a resource – but a technology – to make more efficient use of both conventional and renewable energy resources, called Smart Grid.

These are explained in greater detail later in this chapter.

OREGON RENEWABLE RESOURCE PORTFOLIO

Oregon's abundant supply of renewable energy resources can reduce the state's dependence on conventional energy. This includes hydropower, wind, solar, geothermal, wave, biomass and alternative fuels. All renewable energy sources can be used to generate electricity. Solar, geothermal and biomass also can supply heat. In addition, biomass can be used to fuel vehicles.

HYDROPOWER

As mentioned in Chapter 3, hydropower provides more than 40 percent of Oregon’s electricity. BPA markets power from 31 hydropower facilities in the Northwest, 14 of which are located in Oregon. These facilities account for 82 percent of all power marketed by BPA.



Figure 14: The Dalles Dam in the Columbia River Gorge

Hydropower also provides 26 percent and five percent of the electricity for Oregon’s two major investor-owned power providers, PGE and Pacific Power, respectively.

WIND ENERGY

Most of Oregon’s wind development takes place primarily in the central and eastern Columbia River area and in northeastern Oregon, which includes Sherman, Gilliam, Morrow and Umatilla counties.

Oregon added the most wind capacity - 175 megawatt (MW) - of any state in the country during the third quarter of 2010, according to a report issued by the American Wind Energy

Association. Current operational wind projects offer a total capacity of nearly 2,100 MW.

Projects approved and awaiting construction make up about another 3,000 MW. Oregon is also home to the North American headquarters of wind turbine manufacturer Vestas and wind farm developer and operator Iberdrola Renewables.



Figure 15: Wind turbines in Eastern Oregon

Wind farm proposals of 105 MW and above go through Oregon’s EFSC process. Developers of less than 105 MW may also choose to go through

EFSC, or through the local county land-use process.

SOLAR ENERGY

Solar energy is Oregon’s largest potential renewable energy resource. There are three primary ways in which this energy is harvested: as direct light into buildings for light and heat; to heat water using roof-mounted collectors; and to convert sunlight to electricity using photovoltaics (PV). Each solar harvesting approach is unique with its own technology and market constraints.

The residential Solar Electricity PV market experienced significant growth in Oregon in 2010 with more than 1,000 tax credits issued compared to 400 credits in 2009.

Figure 16: Solar panels on the roof of the Oregon State Capitol



Many factors are attributed to the expansion in the residential PV market in Oregon. The combination of state and federal tax credits with cash incentives offered by the Energy Trust of Oregon has greatly reduced the expense of these systems. Long-term support for PV installations within the state has allowed the local industry to expand, mature and streamline costs. The presence of large PV manufacturing facilities in the state, such as SolarWorld, has also raised the profile of the technology.

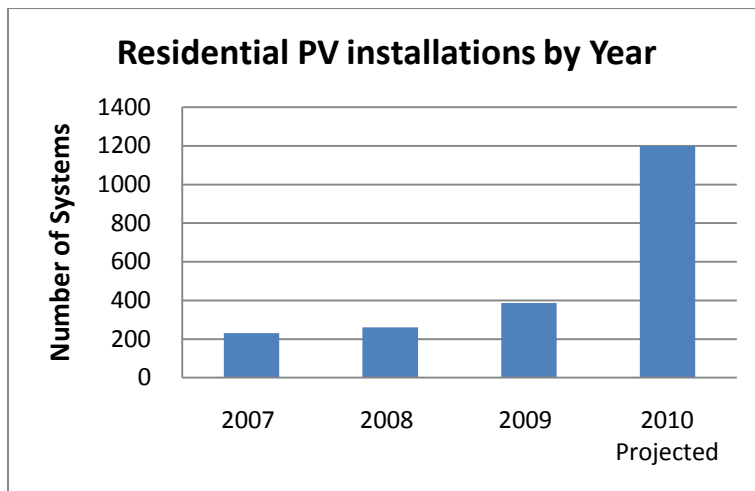


Figure 17: Installation of residential solar electric systems has increased in Oregon.

However, the primary factor increasing the number of PV systems installed in the state is declining system cost. Another factor increasing the number of residential PV systems installed in Oregon have been bulk purchasing agreements organized by cities and neighborhood associations. These efforts commonly known as “solarize” programs have been organized in Portland, Beaverton, Salem and Pendleton. Many more communities throughout the state are considering similar programs that are likely to be launched in 2011.

GEOHERMAL ENERGY

Geothermal energy comes from the heat of the earth. It has a small environmental footprint, the ability to produce energy consistently around the clock, and emits little or no greenhouse gases. Geothermal energy is used in Oregon to dry agricultural products, for aquaculture

(raising fish), for space heating, to heat greenhouses, and to heat swimming pools at a number of spas and resorts.

Figure 18: Oregon hot spring near Alvord Desert

Oregon homes and businesses use geothermal energy for heat. The first commercial electric facility came online in 2012. The main barrier for development of geothermal electricity generation in Oregon is the cost and risk of drilling. The state Department of Geology and Mineral Industries (DOGAMI) is conducting a detailed survey of the Great Basin (southeastern) part of the state to fine-tune knowledge of sub-surface opportunities and relieve some of the risk of “dry holes.”



ARRA awards will assist Oregon to research technology to extract energy from geothermal systems that may not have enough water; test innovative exploration and drilling techniques in south central Oregon; and develop technologies to identify fault lines. ARRA funding will also assist Oregon in developing a national geothermal data system focusing on high heat flow areas in the Cascades, central Oregon, southeast Oregon and parts of northeast Oregon. These are the locations where geothermal resources are most likely to be found.

WAVE ENERGY

Oregon’s coastline has steady winds, strong waves and access to transmission networks—the three key ingredients for a successful ocean wave energy program. Wave power is the transport of energy by ocean waves, and the capture of that energy for electricity generation, water desalination, or the pumping of water into reservoirs.

The non-profit Oregon Wave Energy Trust funds independent research and development under the state’s Oregon Innovation Council, fostering growth and evaluation of wave energy development potential on Oregon’s shores.

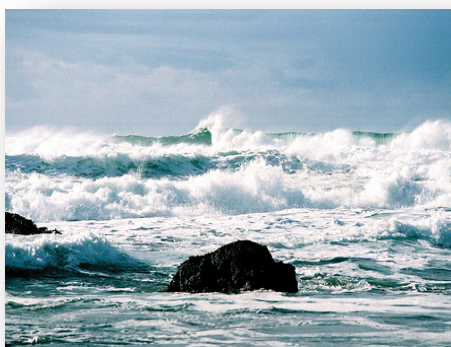


Figure 19: Strong winds and waves on the Oregon Coast

Ocean Power Technologies recently selected Oregon for the first commercial-scale facility of its type in North America, which will generate approximately 1.5 MW of electricity off the Oregon coastal community of Reedsport.

As recognition of the state’s leading position in this industry, Oregon was recently chosen by DOE/OE to host one of only two National Marine Renewable Energy Centers in the country to facilitate technology development, inform regulatory and policy decisions, and close key knowledge gaps.

BIOMASS FOR ELECTRICITY AND HEAT GENERATION

Biomass has long been a significant contributor to Oregon’s energy mix. For decades, Oregon has been using these resources to provide fuel for the generation of electricity, production of heat, and manufacturing of fuels. Oregon has large amounts of biomass resources, which includes agricultural residues and waste, forest slash and mill residuals.

Biomass is used in Oregon to produce thermal heat for the forest products industry, heat and electricity at wastewater treatment facilities, and wood pellets that heat homes, schools and



hospitals. The Oregon pellet manufacturing industry is a national leader in producing high quality engineered fuels.

Figure 20: Biomass in the form of wood chips

There are currently more than 45 industrial facilities that use woody biomass for energy production. These include electricity and heat produced at forest products industries such as lumber and paper mills. The energy is used to generate electricity, provide heat for drying kilns, or generate steam used for industrial

process applications. Lower value materials are used as chipped fuel in industrial boilers to generate heat and electricity throughout the state.

A growing area of the bioenergy sector is in the production and use of biogas. Biogas is produced through the breakdown of biomass into methane that is used to produce electricity. Methane produced in the wastewater treatment process is captured and used to produce heat and electricity in at least 29 wastewater treatment facilities around the state.

Figure 21: Dairy operation in Oregon

Building on the early work by the Port of Tillamook Bay and various dairy operations, a number of projects are under construction and development to use manure and other agricultural wastes to generate electricity. These facilities address a waste management challenge while also generating renewable energy and reducing greenhouse gas emissions.



Landfills are another source of renewable energy from biogas. Landfills in Oregon have installed methane capture systems and use the gas to produce electricity and where possible, capture the heat for thermal applications such as food processing or heating greenhouses.

Biofuels

INTRODUCTION

Not only can plant and waste products be used to produce heat and electricity, biomass can also be used to produce alternative fuels or “biofuels.” Biofuels provide opportunities for Oregon to become less dependent on fossil fuels.

Biofuels account for a growing part of the United States’ and Oregon’s transportation fuel mix. As a result of the 2007 Renewable Fuel Standard legislation passed in Oregon, more than one hundred retail stations in Oregon offer alternative fuels. Approximately 150 million gallons of biofuels are consumed each year in Oregon. Currently, about 40 million gallons per year are produced in Oregon.

TYPES OF BIOFUELS

Ethanol and biodiesel are the only two biofuels used in Oregon and in the Pacific Northwest, because both have defined product standards for modern motors.

ETHANOL

Ethanol is the most widely used biofuel in the United States. Nearly all of the current domestic ethanol production involves fermenting the starch fraction of corn, with 1 bushel of corn producing at least 2.8 gallons of ethanol.

Figure 22: Midwest Ethanol production facility

Ethanol is an alcohol that burns cleanly, producing fewer smog-forming carbon monoxide, nitrogen oxide, and greenhouse gas emissions than gasoline. Ethanol can also be produced locally.



Unfortunately, ethanol has only two-thirds of the energy of gasoline per gallon. This results in lower gas mileage. Ethanol cannot be transported through conventional oil pipelines along with gasoline, because it picks up excess water and impurities. As a result, ethanol needs to be transported by rail, trucks, or barges, which is more expensive and complicated than sending it down a pipeline. The greatest limit on ethanol is the availability of sugar and starch feedstocks.

ETHANOL AVAILABILITY IN OREGON

The state's first ethanol facility is located in Boardman. Pacific Ethanol began operations in October 2007 and produces 40 million gallons per year. Pacific Ethanol relies on corn imported by rail from the Midwest for producing Ethanol. Currently in Oregon, only blends of up to 10 percent (E-10) and 85 percent (E-85) ethanol can be sold. These are the only blends that meet Oregon-required American Society for Testing and Materials standards.

Ethanol is usually blended with gasoline and any gasoline engine can burn blends that contain low percentages of ethanol. However engines need some modifications to use fuel blends containing more than E10. The auto industry is making "flex-fuel" vehicles, which are capable of burning both regular gasoline and gasoline ethanol blends of up to E85.

OREGON ETHANOL FUELING LOCATIONS

There are a limited number of ethanol fueling locations in the state. Currently, motorists can fuel up with E10 and E85 in Aurora, Eugene, Milwaukie, Portland, and Salem.

BIODIESEL

Biodiesel is an alternative or additive to standard diesel fuel that is made from biological ingredients instead of petroleum (or crude oil). Biodiesel can be produced by combining any kind of oil or fat, including waste vegetable oils, virgin vegetable oils and animal fats with an alcohol (commonly methanol). It is non-toxic, renewable, and biodegradable. Because



biodiesel essentially comes from plants and animals, the sources can be replenished through farming and recycling.

Figure 23: Oregon retail biodiesel fueling station

One of the great advantages of biodiesel is that it can be used in existing engines, vehicles and infrastructure with practically no changes. Biodiesel can be pumped, stored and burned just like petroleum diesel fuel, and can be used pure (B100) or in blends with petroleum diesel fuel in any proportion.

Blends are indicated by B##, which correspond to the percentage of biodiesel in the blended fuel. For example, a 20 percent blend of biodiesel with 80 percent diesel fuel is called B20. When biodiesel is first used in a vehicle, it may release fuel tank deposits which can lead to fuel filter plugging. After this initial period, a user can switch between biodiesel and petroleum diesel whenever needed or desired, without modification. Certain older vehicles built before 1993 may require replacement of fuel lines which contain natural rubber, as biodiesel can cause these lines to swell or crack.

Also, in some engines, there can be slight decrease in fuel economy and power. On average, there is about a 10 percent reduction in power - it takes about 1.1 gallons of biodiesel to equal 1 gallon of standard diesel. Other drawbacks include availability and cost.

BIODIESEL AVAILABILITY IN OREGON

Oregon uses 720 million gallons of diesel annually and about 11 million gallons per year of biodiesel. The state’s largest producer of biodiesel, SeSequential Pacific Biodiesel, which is located in Salem, is capable of producing five million gallons annually. SeSequential opened at the end of 2008. In March 2010, the plant reached 82 percent capacity. At near capacity SeSequential still produces less than half of the biodiesel consumed in Oregon. The state imports more than 50 percent of its soy-based biodiesel from large producers from the Midwest. About 90 percent of the biodiesel produced in Oregon is processed from waste vegetable oil from restaurants.

OREGON BIODIESEL FUELING LOCATIONS

Figure 24: Biodiesel sold at the pump

There are certainly more fueling options for biodiesel in Oregon. Currently, motorists can fuel up with B5, B20, B99, and B99.9 blends at fueling locations in the cities of Astoria, Bend, Central Point, Coburg, Corvallis, Eugene, Gresham, Hillsboro, McMinnville, Medford, Mt. Angel, Lakeview, Phoenix, Portland, Salem, The Dalles, Terrebonne, Tigard, and Woodburn.



PROJECTED BIOMASS PRODUCTION CAPABILITY IN OREGON

Even though Oregon’s biomass industry is a diverse and growing industry, the industry's future will rely on crop production. The average acre used for wheat or grass seed production can yield about 100 gallons of biodiesel if planted with canola or camelina.

Biodiesel or ethanol facilities that produce more than six billion British Thermal Units (BTUs) per day are subject to the State of Oregon siting process managed by EFSC. Six billion BTUs is equivalent to 18.6 million gallons per year of biodiesel or 28.8 million gallons per year of ethanol.

Table 4:1 summarizes the current known bioenergy facilities in the state. There are other facilities in Oregon that are small in scale and production or are not included in the data set. This information was gathered using surveys administered by ODOE.

**TABLE 4:1
OREGON BIOENERGY FACILITIES**

TYPE OF FACILITY	# OF FACILITIES	ANNUAL PRODUCTION	BIOMASS UTILIZED
WOODY BIOMASS: Electric generating stations, steam plants, and co-generation facilities	>45	Electric Capacity of 238 MW plus unknown steam use for process and heat energy	>3.4 million tons of forest slash, mill residuals, pulping liquor, urban wood and yard debris
PELLET MANUFACTURERS	9	Approximately 550,000 tons of pellets capacity	802,000 tons of sawdust and wood residuals
ETHANOL & BIODIESEL	9	Approximately 36 million gallons of ethanol and over 4 million gallons of biodiesel	Current feedstock include corn, agricultural wastes, canola, and yellow grease
BIOGAS: Anaerobic digestion, not including wastewater treatment	3	Approximately 1.8 MW	>17 million gallons of manure and other wastes
BIOMASS HEATING: Schools, public buildings, other facilities	>5	Heat for buildings	Approx. 400 tons of wood chips or pellets
LANDFILL GAS	>4	>14 MW	Methane collection from landfill

There are also a number of facilities in the planning or construction phase. Table 4:2 contains a summary of planned facilities in Oregon.

**TABLE 4:2
BIOENERGY FACILITIES PROPOSED IN OREGON**

TYPE OF FACILITY	# OF FACILITIES	ANNUAL PRODUCTION	BIOMASS UTILIZED
WOODY BIOMASS : Electric generating stations, steam plants, and co-generation facilities	~12	Electric Capacity of over 150 MW plus unknown steam use for process and heat energy	>1 million tons of forest slash, mill residuals, pulping liquor, urban wood and yard debris
PELLET MANUFACTURERS	2-3	Over 100,000 tons of pellets capacity	100,000 tons of sawdust and wood residuals
ETHANOL & BIODIESEL	2-3	Approximately 30 million gallons of ethanol and over 4 million gallons of biodiesel	Current feedstock include corn, agricultural wastes, canola, and yellow grease
BIOGAS: Anaerobic digestion, not including wastewater treatment	6	>6 MWh	>1 million gallons of manure and other wastes
BIOMASS HEATING: Schools, public buildings, other facilities	~8	Heat for buildings	Approximately 1,200 tons of wood chips or pellets

These numbers are estimates based on projects that have begun construction or permitting, have applied for state incentives or have expressed an interest in moving forward. These estimates will change as new projects will emerge and current projects may be postponed.

OREGON BIOMASS FEEDSTOCK GROWTH POTENTIAL

Based on estimates from biomass inventory and assessment studies conducted during the past decade, a range of 424-to-524 million gallons of gasoline-equivalent biofuel and other alternative transportation fuels could be produced each year from Oregon biomass feedstocks. This represents approximately 20-to-24.6 percent of Oregon’s consumption of gasoline and diesel (2.172 billion gallons as of 2008).

If only waste sources of biomass were used, and no crops, 182-to-282 million gallons of gasoline-equivalent biofuels and compressed natural gas could be made from biomass waste in Oregon. This represents approximately 8-to-13 percent of Oregon’s current consumption of gasoline and diesel.

TABLE 4:3 FUEL PRODUCTION FROM AVAILABLE OREGON BIOMASS	
SOURCE	POTENTIAL FUEL VOLUME PRODUCED (millions of gallons of gasoline equivalent/yr)
FUEL FROM WASTE	
1. Forest residue	58 to 132 <i>(dependent on price paid)</i>
2. Agricultural residue (corn and wheat only)	13 to 32 <i>(dependent on price paid)</i>
3. Urban wood waste	11 to 19 <i>(dependent on price paid)</i>
4. Mill residues	1
5. Orchard and vineyard prunings	6
6. Grass straw residue	33
7. Greenwaste	18
8. Mixed Waste Paper	41
9. Biogas	0 ¹
Total Fuel from Waste	182 to 282
FUEL FROM CROPS	
Expiring Conservation Reserve Program planted to biofuel feedstock	239
Existing crops	13
Total Fuel from Crops	252
TOTAL	424 to 524

INTEGRATING BIOFUELS INTO ENERGY EMERGENCY RESPONSE STRATEGIES

Both ethanol and biodiesel are renewable source of energy. Both can be produced domestically and can contribute to the lowering of U.S. and Oregon dependence on imported oil, increasing our energy security.

ODOE is in the process of inventorying all ethanol and biodiesel production facilities in the state. This includes information on the volume and storage capacities. While ODOE has information on larger biodiesel and ethanol producers in the state (producing more than 18.6 million gallons per year of biodiesel or 28.8 million gallons per year of ethanol), because of the state energy facility siting process, little is known about the small and seasonal biofuel producers in Oregon.

The goal of this data collection is to assist ODOE emergency planners and decision-makers in determining whether adequate resources are available in state to rely on ethanol and biodiesel for fueling emergency vehicles during fuel disruptions when conventional gasoline and diesel are unavailable.

Also, many critical facilities (hospitals) use diesel powered generators on-site for backup power in case normal electric service is interrupted. The ability of these facilities to continue operations depends on the capacity of the on-site generators and the available fuel supply. If adequate biofuels are accessible, diesel powered generators may be supplemented with alternative fuels to provide additional capacity and/or extend the fuel supply. This enables critical facilities equipped with backup generators to maintain normal or near normal operations for longer periods in case of a serious or extended power outage.

Renewable energy resources can add value to the entire emergency response effort by providing additional reliability and resiliency.

LOW CARBON FUEL STANDARD

The Oregon Legislature's adoption of House Bill 2186 in 2009 provides industry the incentive to build the necessary infrastructure to support an increase in biofuels production or at the very least increase imports into Oregon to meet demand. The Oregon Department of Environmental Quality (DEQ) is responsible for implementing the carbon fuel standard for transportation fuels. Oregon's standard would reduce the average amount of greenhouse gas emissions per unit of fuel energy by 10 percent from 2010 to 2020.

DEQ is in the process of setting up a registration system to start collecting data on biofuels in the first half of 2013. This includes collecting information on: 1) companies importing biofuels to Oregon; 2) types and volumes of biofuels imported into Oregon; 3) where the biofuels originate and end users; 4) how biofuels are transported; and 5) carbon intensity. This data collection will allow DEQ to establish a biofuels baseline before it develop a reduction program

and allows ODOE to determine if adequate alternative fuels exist to supplement emergency response strategies.

ESTABLISHED BIOFUEL FLEETS IN OREGON

Many large government fleets in Oregon already use alternative fuels. This includes the City of Portland, Multnomah County, and the State of Oregon. The City of Portland has used B-20 in many of their diesel vehicles since 2004.

In 2006, the Portland Water Bureau (PWB) began using B99 (99 percent biodiesel, 1 percent diesel) in its city-owned, diesel-powered vehicles and equipment from spring through fall and B50 (50 percent biodiesel, 50 percent diesel) in the winter. The biodiesel used by PWB is locally produced. The city's partners in the effort, Oregon-based Star Oil and SeQuential Pacific Biodiesel, blend and distribute the fuel, while regional farmers (from Oregon, Washington, Idaho, and Montana) grow the seed crops that eventually become the feedstock for B99. PWB's approximately 144 vehicles, ranging from backhoes and forklifts to dump trucks and tractors, run on B99.

Since 2002, Multnomah County has used biodiesel for its fleet. Multnomah County reported no capital costs, engine modifications, or changes to infrastructure have been required. Also, no significant performance issues have been experienced. Continued use is expected.

In 2003, the Oregon Department of Administrative Services (DAS) began replacing the state's fleet vehicles with flex cars, compressed natural gas vehicles, and hybrids. DAS currently uses B20 for diesel vehicles at state motor pools and E85 for flex cars.

Since 2004, the Oregon Department of Transportation (ODOT) committed to replacing its older fleet with hybrid vehicles in their sedans and dump and bucket trucks. ODOT also replaced its older light fleet with diesel engine vehicles using biodiesel. ODOT's fleet currently has 59 E85 vehicles and added two plug in hybrid electric vehicles. In addition, 24 percent of the ODOT fleet currently uses B-20 bio diesel and plans to reach 30 percent use by 2012. The department is also continuing to expand its use of ethanol with E10 and E85.

Smart Grid Technologies

INTRODUCTION

The term “smart grid” refers to a modernization of the electricity infrastructure to maintain a reliable and secure system that can meet future growth. It is characterized by a two-way flow of electricity and information that creates an automated, widely-distributed electricity network. It will monitor, protect, and automatically optimize the operation of its interconnected elements. This includes energy generators; the high-voltage transmission network and distribution system; industrial users and commercial building automation systems; energy storage installations; and residential consumers with their thermostats, electric vehicles, appliances, and other household devices.

Smart grid will incorporate information technology, sensors, and distributed computing to collect and analyze data to deliver real-time information. This information will be used to instantly match electricity demand with supply from all available sources, incorporating both traditional generation and wind, solar and electricity storage. The smart grid will enable a “just in time” balance of supply and demand at the device level.

SMART GRID BENEFITS

Potential smart grid benefits are numerous and are summarized below.

POWER RELIABILITY AND QUALITY – The smart grid provides a reliable power supply with fewer and briefer outages and higher quality power through the use of digital information, automated control, and autonomous systems. The smart grid is resilient, but when an outage does occur, it recovers faster in emergencies and limits the extent of outages.

SAFETY AND CYBER SECURITY BENEFITS - The smart grid continuously monitors itself to detect unsafe or vulnerable situations that could detract from its high reliability and safe operation. Cyber security features would need to be built into all systems and operations, including physical plant monitoring, and access control for confidentiality, integrity, and privacy protection of customer data.

ENERGY EFFICIENCY BENEFITS - The smart grid is more efficient, reducing energy consumption, peak demand, and energy losses in transmission and distribution systems. Such efficiencies can help to defer the construction of new centralized generation plants to meet electricity demand.

ENVIRONMENTAL AND CONSERVATION BENEFITS - A smart grid will aid in reducing greenhouse gases and other emissions by managing the network to access efficient and low-emission energy sources, reliably integrating variable renewable energy sources, and enabling the replacement of gasoline-powered vehicles with plug-in electric vehicles.

DIRECT FINANCIAL BENEFITS - While smart grid developments require capital investment, programs would be designed so that benefits outweigh costs over a suitable time period. Customers will have pricing choices and access to energy information to manage energy use for financial benefit. Entrepreneurs will accelerate technology introduction into the energy generation, distribution, and storage markets.

INTEGRATION OF RENEWABLE ENERGY RESOURCES - Smart grid enables the integration of variable renewable energy resources, such as wind, hydro, and solar energy, to supply power to the grid when the energy is available. Traditionally, the problem with some sources of renewable energy, particularly wind and solar energy, has been that they may supply power intermittently causing rapid power fluctuations on the grid. When the variable energy resource is not available, other sources must be ready to meet demand. Alternatively, to maintain system reliability, demand must be reduced to match the available supply.

The smart grid will enable a variable energy supply and maintain system reliability by monitoring and predicting variable supply resources. It will be able to automatically bring in other power supply resources to meet demand, or reduce load to match the supply. The smart grid will use sensors and dynamic line rating systems to enhance the visibility and monitoring of the transmission grid, and to maintain and potentially improve its reliability in the presence of large variable sources of electricity. Modern computing applications will receive and analyze real time information and perform modeling, decision-making, and control actions. Instead of control devices operating independently based on local measurements, networked smart grid applications will analyze data from multiple devices, allowing broader and more coordinated operations that adapt to actual situations and stabilize the grid.

The smart grid also enables the ability to address transmission congestion created by insufficient transmission capacity. By managing congestion, the smart grid can ensure that remotely located wind generation is not constrained from reaching load centers.

SELF-HEALING POWER GRID - “self-healing” means that the grid detects problems in real time, isolates the problem, and keeps the grid operating. Currently, power grids may experience cascading failures in emergency situations where outages are poorly contained. The technologies for containing cascading failures continue to dramatically improve. The smart grid may improve the evaluation of power system behavior in real time; prepare the power system to withstand credible combinations of contingencies; prevent wide-area blackouts; and accommodate fast recovery from emergency to normal conditions. The smart grid will utilize fast-simulation and modeling tools to gather information, make decisions and control actions. The tools will be located in a combination of central and widely distributed positions.

In an emergency outage situation, the self-healing smart grid provides the capability to isolate the problem areas while keeping the rest of the grid operating and avoiding cascading failures. The problem areas can be repaired and restored with minimal impact on the wider area.

SMART GRID APPLICATIONS

The following applications of smart grid are examples of how smart grid technology can be used. A smart grid must be *designed* to run desired applications. Potential smart grid deployments include:

DISTRIBUTION GRID MANAGEMENT: Distribution power systems consist of hundreds of distribution feeders and thousands of distribution transformers that supply millions of customers. They also contain a large number of locally and remotely controllable devices. Distribution power systems are large and complex systems to control. Basic modernization that includes distribution automation and control systems as well as smart grid technologies will enable distribution systems to be more fully automated, capable of self-healing, and optimized to reduce losses.

OUTAGE MANAGEMENT AND RECOVERY: Smart grid technologies can significantly enhance outage detection, providing near instantaneous detection, a capability not currently available to distribution system operators. Information will be available on when and where outages have occurred, and will contribute to determining causes of outages. Recovery time will be minimized and outages will have reduced impacts on consumers.

VOLTAGE OPTIMIZATION-CONSERVATION: Many loads operate more efficiently at lower voltage. With voltage optimization, voltages are optimized to loads, so that they operate as efficiently as possible with minimal disruptions. Smart grid equipment on the system, such as distributed sensors, control capacitors, and regulators will provide capabilities to optimize voltage. Advanced metering will provide voltage information on the consumer premises.

DEMAND RESPONSE: With peak demand pricing, advanced metering infrastructure, energy management capability, and smart appliances, consumers can take advantage of “prices to devices.” This concept enables consumers to take control of their electricity use when prices rise during peak demand periods. Consumers will pre-program their energy management systems or smart appliances to operate within selected price and performance levels. When high prices arrive, the system reacts automatically as directed by the consumer, by turning equipment down, stopping operation of certain functions or not operating at all.

SMART GRID TECHNOLOGIES RESEARCH IN OREGON

Oregon recognizes that the use of smart grid applications can enable a more rapid restoration of power after outages and help build resiliency, enhance reliability and security, and reduce risk and vulnerability. Applying smart grid technologies into the energy infrastructure in Oregon is in the initial planning stages.

Oregon is researching a variety of smart grid technologies that could possibly be used to improve the resiliency of its electric delivery infrastructure and support the deployment and penetration of renewable resources. The goal is that during power outages, Oregon’s electric utilities could implement smart grid applications to accomplish the intelligent routing of electricity to serve customers in a prioritized manner.

Oregon's electric distribution feeders provide service in only one direction, from the substation (source) to the customer (load). Most feeders also contain switches that allow certain customers or segments of feeders to be transferred to a different feeder during outage conditions. This switching process is manual and causes customers to be "dropped" momentarily and then "picked up" by the second feeder. Traditionally, such operations are often limited since there is usually insufficient time to analyze whether the second feeder has the capacity to serve additional electric demand. Since the number of protective devices on any given feeder has been historically limited by economic considerations, the strategy often results in the curtailment of service to customers that are served by unaffected equipment.

Smart grid can augment the manual process that is in use in Oregon today with one that is high-speed and to some degree, automatic (Distribution Automation or DA). DA provides an automated response to feeder line faults by using an analytical assessment, direct automatic feeder sectionalizing and restoration. After the system detects a line fault, it determines its location, and opens the nearest available switches during a tripped state of the fault-clearing recloser or breaker. This automatically isolates the faulted segment from the rest of the feeder. Afterward, the system automatically closes switches to restore power to unfaulted distribution feeder segments. This sequence of events is considered to be self-healing since it occurs automatically. The validation process, which confirms the faulted distribution feeder segment, is a critical step and must precede any automatic restoration.

NEXT STEPS FOR SMART GRID INTEGRATION

It is clear that smart grid technologies could improve electric reliability, reduce customers' cost of outages, reduce electric production costs, reduce system losses and associated financial benefits to utilities and consumers. However, it will take time and is not without its costs.

Oregon is in the process of developing uniform integration standards and policies for smart grid considerations. OPUC first consulted with the states of California, Colorado, Illinois, New York, Texas, and the District of Columbia, to research different approaches to applying smart grid technologies around the country. In the fall of 2010, OPUC drafted a Smart Grid Straw Proposal and initiated discussions with the utilities in the state. Based on feedback from the utilities as well as input received at public meetings and workshops, OPUC established guidelines for developing "Utility Smart Grid Plans." OPUC guidelines recommend utilities address the following issues in their respective Smart Grid Plans.

- Access, Control, and Use of Customer Information
- Opt in, Opt out, or Mandatory Program Participation
- Treatment of Obsolescence Risk
- Utility Energy Management in Customer's Home or Business

On May 25, 2011, commissioners issued an interim Order to develop a process for staff and utilities to gather necessary information to establish planning guidelines and make policy decisions on smart grid. For copies of the guidelines and to track smart grid progress in Oregon, go to OPUC's website at www.oregon.gov/PUC/.

OPUC and state utility operators actively support current standards and guidelines of the North American Electrical Reliability Corporation involving Critical Infrastructure Protection and Cyber Security Safeguards. OPUC also conducts annual audits of investor owned energy utilities to ensure cyber security issues and concerns are addressed and resolved.

NEXT STEPS FOR INTEGRATING RENEWABLE RESOURCES

The role of renewable resources in emergency planning is not yet clear. Renewable resources provide significant benefits by reducing the environmental footprint of electricity and fuel production. Renewable energy developments are also considered a sustainable long-term investment in a naturally-replenished resource rather than a finite one. Of particular interest in emergency planning, renewable resources may be scalable. They may be available as small-scale distributed generation rather than central power developments far from communities in need. Also, the fuel (the renewable resource) would continue to be available when roads and traditional supply routes are not. In these roles, renewable energy generators may provide energy emergency managers with an opportunity to provide power to emergency services when needed during an event.

The first step to support the integration of renewable resources into the electrical grid is to ensure that transmission capacity exists and balancing can be managed. BPA, which owns and operates three-quarters of the Pacific Northwest's high-voltage transmission, plays a vital role in facilitating the integration of renewable resources into the region's transmission system. With wind generation reaching an all-time peak of 3,006 megawatts in February 2011 and anticipated 5,000 to 6,000 megawatts by 2013, BPA and other utilities have project proposals underway to increase load capacity. Not only will there be an increasing volume of new renewable generation dispersed across the state, but the variability of the energy production requires significant attention to balancing – unlike conventional power developments where dispatchable power is predictable and controlled.

RW Beck completed the Oregon Distributed Energy Resiliency Study to assist the state to identify opportunities to improve energy resilience through the design and integration of distributed renewable energy investments into the existing energy network. This study considers how new technologies, including renewable energy resources, could provide local energy generation to communities and emergency service providers during energy emergencies when their energy network supply may possibly be disrupted. See Appendix K in this plan to review the executive summary. The complete study is posted on ODOE's webpage at www.oregon.gov/ENERGY.

CYBER SECURITY

As Oregon's smart grid investments and initiatives increase, cyber security, a key component of energy assurance, will become more crucial. Because smart grid relies on information communication, cyber vulnerabilities can equate to smart grid vulnerabilities, which in turn lead to vulnerabilities in the entire energy supply system.

Cyber security falls under Emergency Support Function (ESF) 2, the communications sector. In Oregon, OPUC and Oregon Emergency Management are the primary state agencies responsible for planning, preparedness, response, and recovery from cyber security breaches in the state.

Cyber security includes preventing damage to, unauthorized use of, or exploitation of electronic information and communications systems and the information contained therein to ensure confidentiality, integrity, and availability. Cyber security also includes restoring electronic information and communications systems in the event of a terrorist attack or natural disaster.

Oregon will consider a cyber security strategy that takes into account information on impacts, vulnerabilities, and threats to produce a risk assessment. This includes addressing deliberate attacks, such as those launched by disgruntled employees, industrial espionage, and terrorists as well as preventing inadvertent compromises of the information infrastructure due to user errors, equipment failures, and natural disasters.

Chapter 5

Types of Energy Emergencies

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

During any given year, Oregon faces a variety of energy supply disruptions. When these disruptions are limited in scope, and addressed quickly by energy providers, they are barely newsworthy. If, however, these disruptions extend over wide areas and last more than several hours they may become “energy emergencies” requiring the intervention of government agencies.

The term "energy" includes producing, refining, transporting, generating, transmitting, conserving, building, distributing, and maintaining energy systems and system components. "Energy resources" includes electricity, natural gas, gasoline and middle distillates, coal, wood fuels, geothermal sources, and any other resource yielding energy.

CHARACTERISTICS OF ENERGY EMERGENCIES

In general, an energy emergency exists whenever supplies of fuels or electricity are inadequate to meet demand. Shortages and disruptions can result from many factors. Threats to the energy infrastructure include:

- **SEVERE WEATHER CONDITIONS:** Winter storms, wind storms, drought, and heat waves could stress the energy system as sudden or unexpected surges in demand cannot be met by actual or expected supply levels. Wind storms and freezing rain can also disrupt electrical supply and distribution and hamper transportation.
- **NATURAL DISASTERS:** Floods, earthquakes, and tsunami conditions could reduce supply, disrupt distribution, and cause physical destruction of energy systems and/or components. A severe earthquake is likely the Pacific Northwest’s most catastrophic event and is examined more fully in this chapter.
- **ENERGY INFRASTRUCTURE EVENTS** —Spikes in demand during peak energy use, unanticipated power plant or refinery shutdowns, transmission system congestion, and equipment and system failures could result in the reduction of supply and disrupt distribution.
- **NATIONAL SECURITY EVENTS:** Acts of terrorism, cyber attacks, and sabotage could result in the physical destruction of energy systems and/or components, increase demand for fuels, and also reduce the fuel supplies available to the United States.

- **POLITICAL FACTORS** — Oil embargos, war, and the mobilization of defense resources could create a sudden surge in demand. These events could also reduce the fuel supplies available to the United States.
- **MARKET RELATED EVENTS** — A sharp, sudden escalation in the price of energy products could result from a curtailment of supplies and stocks. These conditions could reduce demand for conventional energy resources.

ENERGY INFRASTRUCTURE PROTECTION

Protecting the critical energy infrastructure is the shared responsibility of the private sector and local, state, and the federal government. “Critical” infrastructure is infrastructure that, if disrupted, would significantly impact public health and safety, the economy, and/or national security. Any prolonged interruption of the supply of basic energy - whether it is petroleum, electricity, or natural gas products - could pose considerable harm to Oregonians, our environment, and the state’s economy.

FEDERAL, STATE, LOCAL, AND PRIVATE INDUSTRY PARTNERSHIPS

No single government agency, industry group, or company can secure the entire energy infrastructure from every hazard or threat. Collaboration at all levels is essential to securing an interdependent infrastructure that is owned, operated, hosted, and regulated by many entities.

The state is partnering with DOE/OE and the private sector to coordinate critical energy infrastructure protection and resiliency efforts. This includes mitigating energy emergencies, identifying Oregon’s critical energy infrastructure, and protecting the state’s energy assets. USDOE recognizes the major role Oregon and other states play in developing policy and practices to protect energy assets within and beyond their borders as well as a states’ central role in preparing for and responding to energy shortages, disruptions, and emergencies.

As the lead federal agency, USDOE has established liaisons with state agencies in each state responsible for preventing and responding to energy disruptions. The overall goal is to have a robust, resilient energy infrastructure in which continuity of business and services is maintained through secure and reliable information sharing, effective risk management programs, coordinated response capabilities, and trusted relationships between public and private partners at all levels of industry and government.

Earthquakes

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

The Portland metropolitan area and surrounding vicinity has been the most seismically active region in Oregon. Six earthquakes of magnitude 5 or higher have occurred within the greater Portland area within the last 150 years, including a 5.6 magnitude earthquake near Scotts Mills in 1993 and two 6.0 magnitude earthquakes near Klamath Falls later that same year. These occurrences and an extensive geologic record of seismic activity indicate that Oregon will someday experience a catastrophic earthquake. Oregon Department of Geology and Mineral Industries (DOGAMI) is collaborating with ODOE and OPUC on earthquake risk studies to the energy sector and various reports on this topic will be available in the future.

OREGON CRITICAL ENERGY INFRASTRUCTURE HUB

A concentration of Oregon's critical energy infrastructure is located in the heart of the high seismic hazard area along an eight mile stretch of the lower reach of the Willamette River in northwest Portland. This includes marine oil terminals, fuel tank farms, liquefied natural gas, natural gas, and power transmission systems. This Critical Energy Infrastructure Hub (CEI Hub) for the state sits on top of very poor soils that are highly susceptible to earthquake-induced permanent ground deformation.

More than 90 percent of Oregon's refined petroleum products come from four refineries located in the Puget Sound area of Washington State. The refineries transport product to Oregon by pipeline and marine vessels. Product enters the state at the CEI Hub before this fuel is distributed throughout Oregon to the end user, which includes the Portland International Airport. In addition, critical high voltage transmission lines and distribution substations sit at the river crossing in the CEI Hub. Liquid fuel and natural gas pipelines and transfer stations are also located at the CEI Hub.

TYPES OF EARTHQUAKES

DOGAMI confirms that Oregon and the city of Portland face danger from two types of earthquakes. They include Crustal earthquakes and the Cascadia Subduction Zone earthquakes. Both types could produce widespread damage and have potentially significant consequences.

CRUSTAL EARTHQUAKES

Crustal earthquakes are produced by shallow faults as deep as 15 miles below the surface. The Portland Hills Fault falls under this category of crustal earthquakes. The Portland Hills Fault runs from north of Forest Park, goes along the foot of Portland's West Hills and beneath Portland State University, then crosses the Willamette River and heads southeast to Milwaukie. The Portland Hills Fault can result in an earthquake of magnitude 7 and intense shaking.

Figure 25: Portland Hills Fault runs from north of Forest Park and along the Portland West Hills and crosses the Willamette River

The duration of the event would be 20-30 seconds, but the ground shaking and damage can be intense because of the fault's proximity and local soil conditions.



CASCADIA SUBDUCTION ZONE

The Pacific Northwest's extreme disaster is a magnitude 9 earthquake on the Cascadia Subduction Zone, which would produce minutes of strong ground shaking, coastal subsidence, landslides, liquefaction, lateral spreads, and a coastal tsunami. Much of Oregon's infrastructure has not been designed to tolerate these extreme conditions.

The Pacific Northwest sits on a convergent continental boundary, where two tectonic plates are colliding. This boundary is called the Cascadia Subduction Zone. The Cascadia Subduction Zone is a 600 mile-long fault where the Juan de Fuca and North American plates converge and the heavier Juan de Fuca Plate plunges, or subducts, beneath the as it heads eastward. The two

plates are converging at a rate of about one to two inches per year, which causes stress to accumulate. Earthquakes are caused by the abrupt release of this slowly accumulated stress.

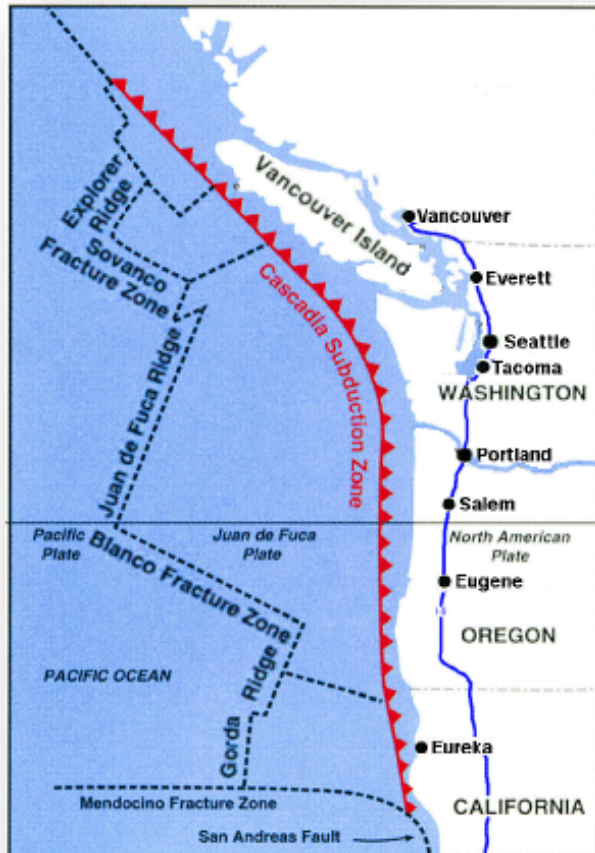


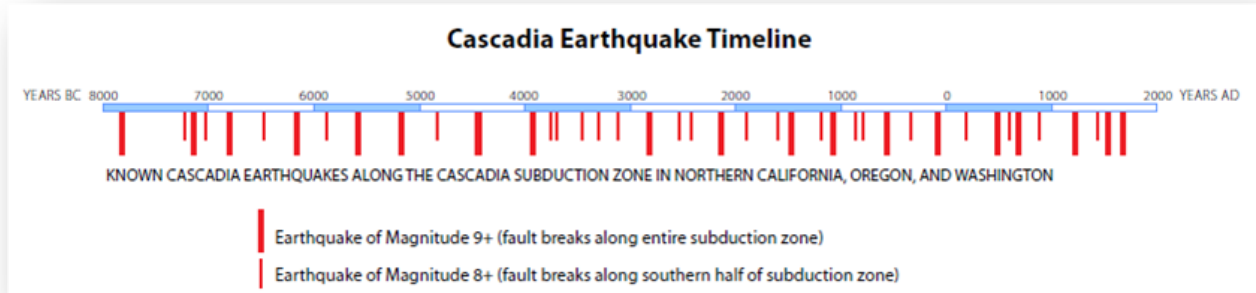
Figure 26: 600 mile-long Cascadia Subduction Zone Fault

The fault runs parallel to the coasts of British Columbia, Washington, Oregon and northern California. Evidence shows that the plates are sticking as they pass each other, building up tremendous pressure that could be unleashed in a magnitude 9 earthquake.

Similar subduction zones have produced the two largest recorded earthquakes in the world. This includes a magnitude 9.5 quake on the coast of Chile in 1960 and a magnitude 9.2 quake in southern Alaska in 1964.

No quakes of that size have been measured in Oregon's brief recorded history, but many lines of evidence, such as buried coastal marshes, indicate that such events occurred 41 times in the past 10,000 years (*see timeline*). They strike, on average, about every 250 years -- occurring as close as 30 years apart and as far as 580 years apart according to recent data. The last megaquake hit the Pacific Northwest in January 26, 1700.

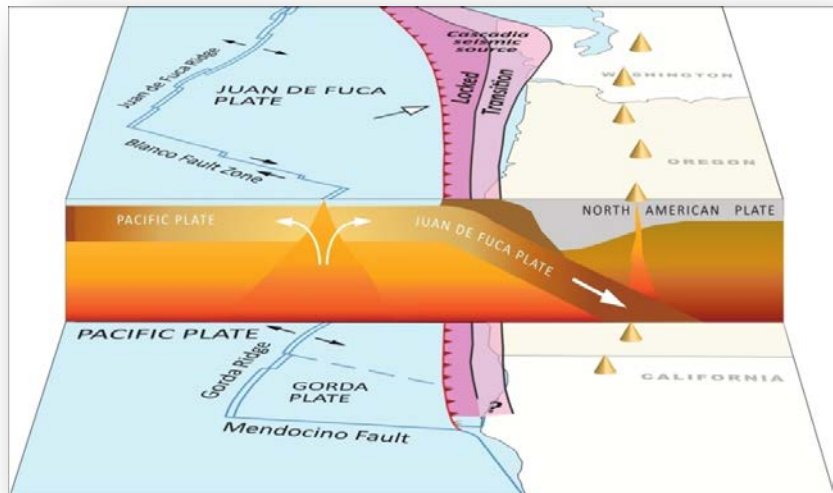
Figure 27: Cascadia Earthquake Timeline



Unlike the crustal earthquakes that produce shaking for a minute or less, subduction-zone quakes produce shaking that can last four or five minutes and deadly tsunamis as high as 30 to 50 feet. The 1964 Alaska quake generated a tsunami that killed four children at Oregon's Beverly Beach and 11 people in Crescent City, California.

Figure 28: Cascadia Subduction Zone Fault

Not only would coastal communities be severely impacted, but towns and cities as far inland as the Willamette Valley and the Puget Sound area would feel the effects of such lengthy shaking. In Oregon alone, researchers have estimated that such a quake could cause billions in damages and kill 5,000 people.



Earthquake Risk Study

It is clear that earthquake impacts to the CEI Hub could adversely affect energy lifelines. Consequently, it is critical for emergency planners and decision-makers to gain a better understanding of the seismic hazards, vulnerabilities, and consequences if the CEI Hub was compromised. The goal is to minimize direct earthquake damage to the CEI Hub and ensure a rapid recovery of the state's energy supply and distribution systems.

As a result, DOGAMI is conducting an earthquake risk study for Oregon's CEI Hub in Portland. The study assesses the seismic hazards, vulnerabilities and potential impacts to the energy sector facilities and systems, and possible impacts to the State of Oregon.

SEISMIC HAZARDS

DOGAMI's study confirms that the Portland Hills Fault and the Cascadia Subduction Zone earthquakes can trigger the following seismic hazards.

- **GROUND SHAKING** - The U.S. Geological Survey reports that extensive ground shaking is expected for western Oregon from the Cascadia fault. The figure below shows Oregon's ground shaking seismic hazards with higher expected shaking levels represented by the red colors (darker, if viewed in black and white). For the CEI Hub, strong ground shaking is expected to last for one to two minutes from a Cascadia earthquake. This prolonged duration of shaking would produce significant damage, particularly in areas of weak soils and weak infrastructure.

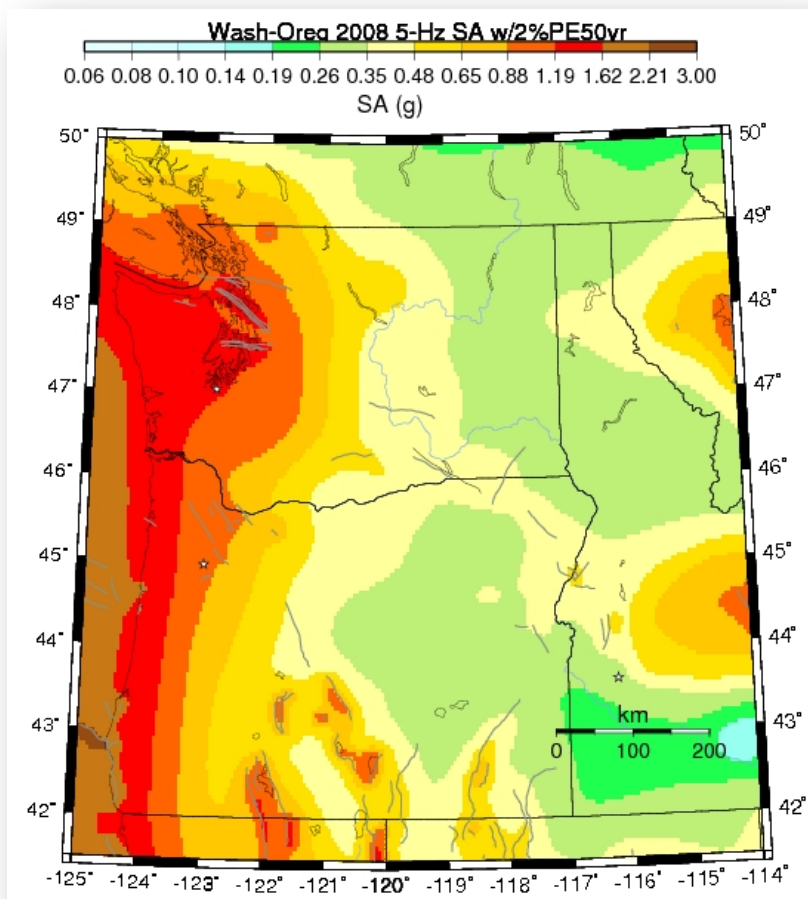


Figure 29: Ground shaking map

<http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps/wus/pacnw/3hzSA.OrWa.jpg>

LIQUEFACTION - Liquefaction occurs when ground shaking agitates loose, water-saturated, sandy soils and results in liquefied soils. As a result, buildings can sink several feet into the ground and buried pipes can float to the ground surface. The CEI Hub is adjacent to the Willamette River and has extensive deposits of highly liquefiable soils. These soils have been naturally deposited by river activity as well as from manmade activities such as from river dredging.

LATERAL SPREADING - Lateral spreading occurs when the ground permanently moves laterally due to earthquake shaking. Lateral spreading is common along river fronts because river deposited soils are often weak and water-saturated. Lateral spreading can occur on gentle slopes and even on flat ground. The CEI Hub has extensive deposits of soils highly susceptible to lateral spreads.

LANDSLIDES - Landslides are land masses that move down hill and result in permanent ground deformation. Earthquakes can trigger landslides due to the ground shaking over a wide region and cause extensive damage. The CEI Hub area has several mapped landslides. This includes debris flows from the West Hills and rock falls and slumps along Highway 30. These mapped landslides are assumed to be triggered from rainfall events and not by earthquake activity.

CO-SEISMIC SETTLEMENT - Co-seismic settlement is where the ground surface is permanently lowered due to seismic shaking and occurs in certain types of soft, loose soils. The CEI Hub area has soils that are generally susceptible to co-seismic settlement. In some places, settlement could be on the order of a few inches or more. When soils experience uniform settlement, structures are often unharmed. However, when soils experience differential settlement, structures can incur damage.

BEARING CAPACITY FAILURES - Bearing capacity failures can occur when, during shaking, the foundation soils cannot support the structure that they are intended to support. This occurs when the subgrade soils have not been engineered and constructed adequately. The CEI Hub area has soils that are generally susceptible to co-seismic bearing capacity failures. When soils experience differential settlement, structures can tilt and incur damage.

SLOSHING - Sloshing occurs when liquid becomes agitated by ground shaking. Sloshing in tanks has produced damage from distant earthquakes. The CEI Hub has numerous tanks with liquid fuel and other products that are susceptible to sloshing. Waves and splashing of liquids can overtop and/or damage tanks.

SEICHES - Seiches are waves that oscillate in water bodies and can be initiated by ground shaking. Seiches can vary from minor (inches in height) to over ten feet and last up to hours. The Willamette River in the CEI Hub area could experience a seismically-induced seiche.

FIRES - Fires are often triggered as secondary effects from earthquakes. Numerous potential ignition sources are available in the CEI Hub area. Certain types of fires, such as fires with predominately petroleum fuel or transformer PCBs require advanced fire specialists to contain.

HAZARDOUS MATERIAL RELEASES - Hazardous materials are often released during earthquakes. Numerous potential sources for possible uncontrolled hazardous material releases exist in the proximity of the CEI Hub both onsite and at nearby energy facilities. These materials can pose different types of hazards. This includes corrosive, explosive, combustible, poisonous, and/or toxic risks. A few examples are: petrochemicals, liquefied natural gas, chlorine gas, and anhydrous ammonia.

ENERGY FACILITY AND SYSTEM VULNERABILITIES

Onsite meetings and tours were conducted at all relevant energy facilities in the CEI Hub to evaluate seismic vulnerabilities. The petroleum companies visited include: BP Terminal, Chevron Terminal, Conoco Phillips Terminal, KinderMorgan Terminal and Pipeline Company, McCall Oil Terminal, NuStar Terminal, and Shell Terminal. Key components evaluated include tank farms, marine docks, interconnecting pipelines, tank truck loading/off-loading racks, rail car loading/unloading racks, containment and drainage control areas, control rooms, and lube oil and additive blending facilities.

Onsite visits were also made to natural gas and utility companies in the CEI Hub. They include: Northwest Natural, Williams Northwest Pipeline, PGE, and BPA. No PacifiCorp facilities reside in the CEI Hub so no visits were made. Key components evaluated at the electrical facilities include electric substations that feed into the region's power grid. Substations include control buildings with control equipment and back-up batteries, transformers, circuit breakers, and bus structures. The power system also includes transmission lines and transmission towers. The natural gas system includes gate stations, transmission and distribution pipes, and an LNG terminal, which includes tanks, liquification and gasification processing equipment, and control equipment.

The study showed that the energy facilities and systems across the petroleum, electricity, and natural gas sectors vary to a great extent. Some facilities have infrastructure that range from about 100 years old and were built to no or very antiquated standards to new and built to the current state-of-practice standards. Because of the wide range of ages and associated construction practices, the seismic vulnerability of the facilities also spans a wide range.

Based on visual observations, engineering judgment and limited information from the facility operators, DOGAMI's study confirmed that major seismic vulnerabilities exist in the CEI Hub. Some critically important structures appear to be highly susceptible to significant damage in a major earthquake. In contrast, some structures are expected to have adequate seismic performance. All of the facilities in the CEI Hub are vulnerable to the seismic hazards described above.

SECTOR SPECIFIC FINDINGS

PETROLEUM

The CEI Hub petroleum facilities receive liquid fuel by pipeline and marine vessels. In general, 75 percent of the refined petroleum product is transported by pipeline and the remainder by tankers or barges. The transportation method and amounts do vary depending on product need, transportation costs, weather and other conditions. The liquid fuel pipeline was largely constructed in the 1960s when the regional seismic hazards were unknown and state-of-practice construction techniques at that time did not include any reference to seismic standards. The regional seismic hazards are now known to be significant and the soils at the river crossings are susceptible to liquefaction and lateral spreading. The 1960s vintage pipeline design did not consider ground movements from lateral spreading at river crossings or the stresses to the pipelines induced by earthquakes that may cause pipe damage and multiple breaks. A pipe break would have a significant impact on all of the petroleum facilities in the CEI Hub and could result in a statewide fuel shortage.

The navigational shipping channel from the Columbia River mouth to the lower Willamette River is used to transport fuel by marine vessels. The Columbia River mouth is expected to have tsunami damage and the channel is expected to experience slope failure, which would close the channel to traffic. It is possible that bridges and other river crossings, such as buried gas pipelines and electrical crossings, would be damaged and temporarily block the waterway. Closure of the shipping channel would prevent marine vessels from delivering liquid fuel and emergency response and recovery equipment.

All of the port facilities in the CEI Hub have significant seismic risks due to liquefaction, lateral spreading, and seiches. Some older piers were constructed without any seismic protection, have deteriorated, and are likely to fail in even a moderate earthquake. If oil products are released and contaminate the navigable waterway, the waterway may be closed to river traffic, thus impeding emergency response activities as well as the supply chain. The local capacity to fight fires and clean hazardous material spills is limited.

Only three existing tanks are known to have addressed liquefaction vulnerabilities. The fuel terminals in the CEI Hub on average have a three to five day supply in the tank farms for regular unleaded gasoline and diesel fuel. Premium gasoline is subject to the daily delivery and heavily dependent on whether the intercompany pipeline on Front Avenue is operational. If the supply chain is disrupted by pipe breaks north of the CEI Hub and closure of the shipping channel to the west, fuel would quickly become scarce. Options to transport fuel from the east and south and by air are limited.

Portland International Airport (PDX) receives 100 percent of its liquid fuels from a terminal in the CEI Hub. PDX has a limited onsite fuel supply. If the pipeline between the CEI Hub and PDX fails, then PDX would likely experience a shortfall and operations would be impacted.

NATURAL GAS

Oregon's largest natural gas service provider receives the majority of their natural gas from pipelines that cross under the Columbia River between Washougal, Washington and Troutdale, Oregon. One of the natural gas pipelines crosses under the Willamette River at Multnomah Channel near their gate station at the southern end of Sauvie Island. The soils at these river crossings are subject to liquefaction and lateral spreading. The pipes are 1960s vintage and constructed without seismic design. The consequences of potential pipe failures could be major for natural gas service territories and Oregon. The natural gas company's storage capacity is limited and pipe breaks could lead to a natural gas shortfall in the state as well as explosions or fires.

ELECTRICITY

Electrical facilities and systems have significant seismic risk due to ground shaking and ground failure, including liquefaction and lateral spreading. Seismically vulnerable facilities include substations and transmission towers in the CEI Hub as well as facilities outside of the CEI Hub, including power plants, substations and transmission lines, all which are important for distribution.

Major vulnerabilities in the CEI Hub include the control buildings, transformers and other electrical equipment in yards at the substations, and transmission towers near the Willamette River. Damage is likely to occur to both the transmission system and the distribution system in the CEI Hub. Damage to the electrical grid will likely result in a blackout in the CEI Hub and elsewhere.

Bonneville Power Administration (BPA) has conducted a comprehensive seismic vulnerability study and implemented a long-term seismic mitigation program. This includes seismic strengthening of substation yards, including anchoring and bracing high-voltage equipment to withstand earthquake motions. These mitigation techniques will improve the reliability of seismic performance.

BPA studies also indicate that transmission system failure due to a magnitude 9 Cascadia earthquake would require between 7 and 51 days to make emergency damage repairs to the transmission system in Oregon and Washington. This scenario assumed many ideal conditions, which includes BPA employees and contractor resources are immediately available to make repairs as well as all roads and bridges are passable and adequate fuel is available to support recovery operations.

BPA has conducted subsurface, liquefaction and lateral spreading analyses at one of the transmission tower sites at the Willamette River crossing. The analysis concluded that severe ground movement up to 25 feet towards the river channel is possible resulting in extensive damage to transmission towers. As a result, power lines could temporarily block river traffic, including the pathway to the oil terminals. BPA anticipates mitigation on these transmission towers to be completed by 2014.

RECOMMENDATIONS

DOGAMI makes four recommendations to both private and public energy sector stakeholders to improve energy sector resiliency in Oregon.

1. Energy sector companies should conduct Seismic Vulnerability Assessments on all of their systems or facilities, and should work with the appropriate local, state, tribal and federal government agencies and stakeholders to achieve timely completion of the assessments to understand existing vulnerabilities.
2. Energy sector companies should institutionalize long-term seismic mitigation programs, and should work with the appropriate local, state, tribal and federal government agencies and stakeholders to achieve timely and effective mitigation to ensure facility resilience and operational reliability.
3. The State of Oregon's Homeland Security Council should review the vulnerability and resilience of the energy sector to earthquakes and other natural disasters within the scope of their mission. This could involve partnering with ODOE, OPUC, DOGAMI, ODOT, Building Codes Division, and the Oregon Seismic Safety Policy Advisory Commission (OSSPAC).
4. Energy sector companies and the State of Oregon should build Oregon's seismic resilience to a Cascadia earthquake. Adopting pro-active practices and a risk management approach will help achieve seismic resilience. Encouraging a culture of awareness and preparedness concerning the seismic vulnerability of the energy sector including long range energy planning should be conducted.

The Earthquake Risk Study will assist emergency planners to design realistic earthquake drill scenarios to test plans and procedures in response to energy emergencies to ensure program readiness. The findings in this report will also assist the state to develop long-term risk management strategies for improved energy assurance and resiliency. A copy of the Earthquake Risk Study is available on OPUC's website at www.oregon.gov/PUC.

Chapter 6

Overview of Energy Sector-Specific Emergency Response Plans

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

Despite efforts to reduce risk and implement mitigation measures to limit vulnerabilities to Oregon's energy lifelines, emergency planners and decision-makers recognize that it is impossible to plan for every contingency. Emergencies will occur. ODOE and OPUC developed and maintain sector-specific energy emergency response plans to prepare for, respond to, and recover from fuel, natural gas, and electricity emergencies. The goal is to protect public health and safety, the environment, and the region's economy.

AUTHORITY

In the event of an energy emergency, the Governor directs the state's overall response effort to protect public health and safety, the environment, and the region's economy. ORS Chapter 401, Section 035 states "the Governor is responsible for the emergency services system within the State of Oregon."

ORS Chapter 176, Section 785 authorizes the Governor to declare a state of emergency when he determines there is an existing or imminent severe disruption in the supply of one or more energy resources. The severe disruption can originate in Oregon or elsewhere. The Governor may by proclamation declare a state of emergency exists with regard to such resources only after consultation with the President and majority and minority leaders of the Oregon State Senate and the Speaker and majority and minority leaders of the Oregon State House of Representatives. In the proclamation, the Governor will cite with specificity the nature of the severe disruption in the supply of one or more energy resources.

OREGON DEPARTMENT OF ENERGY

ORS Chapter 176, Section 809 authorizes ODOE to develop and maintain the Oregon Petroleum Contingency Plan to maintain emergency services, continue productivity and reduce hardship during a severe fuel oil shortage or any other emergency threatening the availability of any energy oil resource necessary to maintain essential services and transportation. ODOE could implement a Fuel Allocation Program to ensure adequate fuel is provided to the state's emergency and essential service providers.

OREGON PUBLIC UTILITY COMMISSION

ORS Chapter 757, Sections 710-730 authorizes OPUC to regulate utility rates, safety, and reliability standards for individuals, firms, partnerships, corporations, associations, cooperatives, and municipalities who sell and distribute electricity and natural gas in Oregon. In an emergency, OPUC will respond to the Oregon State Emergency Coordination Center (ECC) to serve as the principal liaison between the state and utilities to ensure rapid recovery of the power and/or natural gas systems.

OREGON EMERGENCY MANAGEMENT

ORS Chapter 401, Section 270 authorizes Oregon Emergency Management (OEM) to develop, revise, publish, and distribute the State of Oregon Emergency Management Plan to coordinate the activities of all public and private organizations providing emergency services within the state. The Statutes also require OEM to provide for and staff the state ECC to aid the Governor and state agencies in responding to major emergencies and disasters.

CONCEPT OF OPERATIONS

ODOE and OPUC energy sector-specific emergency response plans establish a concept of operations that models the Emergency Support Functions (ESF) structure as outlined in the National Response Framework (NRF) and incorporates the National Incident Management System (NIMS). This concept of operations enables emergency responders at all levels of government and private industry across jurisdictional boundaries to work together more effectively to manage energy emergencies no matter the cause, size or complexity of the event.

Also, ODOE and OPUC's energy sector-specific emergency response plans are consistent with the State of Oregon Emergency Management Plan. State agency activities in this plan are organized as "Emergency Support Functions" (ESF) to coincide with the federal ESFs to:

- Establish fundamental disaster roles and responsibilities that enable close state/federal cooperation necessary to support the emergency management efforts of local jurisdictions involved in energy disaster operations during a State or Presidential declared disaster.
- Identify lines of cooperation and communications between state agencies and their corresponding federal response agencies as outlined in the NRF.
- Establish a concept of operations, which incorporates NIMS that provides a state level interagency mechanism to facilitate the delivery of state and/or federal response assistance.

Consistent with the federal ESFs, the state ESFs are mechanisms for grouping functions most frequently used to provide state-to-state and state-to-local support and to coordinate with federal ESFs for declared disasters and emergencies. There are 13 Emergency Support Functions.

EMERGENCY SUPPORT FUNCTIONS (ESFs)		
ESF	SECTOR	PRIMARY AGENCY
1	Transportation	Oregon Department of Transportation
2	Communications	Oregon Emergency Management Oregon Public Utility Commission
3	Public Works and Engineering	Oregon Department of Transportation
4	Firefighting	Oregon State Fire Marshal
5	Information and Planning	Oregon Emergency Management Lead State Agency for Declared Disaster
6	Mass Care	Oregon State Department of Human Resources
7	Resource Support	Oregon Department of Administrative Services
8	Health and Medical Services	Oregon State Department of Human Resources
9	Search and Rescue	Oregon Emergency Management
10	Hazardous Materials	Oregon State Fire Marshal Oregon Department of Environmental Quality
11	Food	Oregon Department of Agriculture
12	Energy	Oregon Department of Energy Oregon Public Utility Commission
13	Public Safety	Oregon State Police

SEE APPENDIX A

MEMORANDUM OF UNDERSTANDING

As primary agencies for ESF 12, ODOE and OPUC entered into a Memorandum of Understanding (MOU) to establish a framework for cooperation for preparedness and response to energy emergencies that impact the state. The MOU provides guidance on ODOE and OPUC roles and responsibilities for issuing emergency notifications; assessing the severity of events; issuing protective action decisions; providing emergency information; activating and responding to emergency operation centers; ensuring program readiness; as well as developing and maintaining emergency response plans for fuel, natural gas, and electricity shortages and disruptions. *SEE APPENDIX B.*

ENERGY SECTOR-SPECIFIC EMERGENCY RESPONSE PLANS

While no plan can replace the common sense and good judgment of emergency responders and decision-makers, energy sector-specific emergency response plans provide a framework to guide the efforts of ODOE and OPUC to prepare for, respond to, and recover from energy emergencies.

Overview of the Oregon Petroleum Contingency Plan

INTRODUCTION

Because Oregon has virtually no refining capacity and no crude oil reserves, the state faces unique challenges in the event of a petroleum emergency. Preparing for a fuel shortage and anticipating the impacts of a prolonged supply disruption are critically important due to the lack of easily accessible alternative sources for refined petroleum products.

To mitigate the effects of a petroleum supply or distribution emergency, ODOE developed and maintains the Oregon Petroleum Contingency Plan. This Oregon Petroleum Contingency Plan specifies alert and notification procedures as well as actions to assure the protection of public health and safety during severe and long-term fuel disruptions or shortages, regardless of the cause.

The Oregon Petroleum Contingency Plan includes a fuel allocation program to provide gasoline and diesel to the state's emergency services (law enforcement, fire, and medical services) and essential service providers (utilities, telecommunications, public works, public transit, sanitation services and more).

The plan identifies the state's emergency and essential service providers along with pre-designated fueling locations in each county to ensure fuel allocation can proceed in a timely and orderly manner in times of petroleum supply and distribution system constraints.

EMERGENCY RESPONSE ACTIONS

The Oregon Petroleum Contingency Plan identifies emergency preparedness and response actions to monitor and track fuel disruptions. Tracking fuel disruptions allows ODOE decision-makers to assess the severity of supply shortages, determine appropriate mitigation measures, advise state policy makers, prioritize allocation of resources, keep state and local emergency organizations informed, and provide timely and accurate information to the public.

For planning purposes, the Oregon Petroleum Contingency Plan identifies four levels of fuel supply conditions to prepare for, respond to, and recover from. These four levels are consistent with NASEO's State Energy Assurance Guidelines.

Normal Conditions – Level 1 Monitor and Alert	
CONDITIONS	ODOE PREPAREDNESS ACTIONS
<ul style="list-style-type: none"> ➤ No discernable shortage ➤ Possible shortages elsewhere 	Review and update Petroleum Emergency Contact List (Quarterly)
	Review and update Oregon State Energy Assurance Plan (Annually or as needed)
	Update the Oregon Petroleum Contingency Plan (Annually or as needed)
	Conduct Petroleum Exercises and Training (As Needed)
	Serve as Liaison to Petroleum Industry Partners
	Participate in Regional and National Energy Infrastructure Events (As Needed and as Resources Allow)
	Monitor Petroleum Markets
	Monitor Petroleum Supply & Demand <ol style="list-style-type: none"> 1. Gasoline Consumption 2. Petroleum Product Demand 3. Wholesale and Retail Prices 4. Inventories and Production 5. Infrastructure Information 6. Source of Crude Oil
Shortage – Level 2 Mild Fuel Shortage	
CONDITIONS	STATE RESPONSE ACTIONS
<ul style="list-style-type: none"> ➤ 5-10% reduction in petroleum supply for a week or more ➤ Isolated shortages could also trigger a Level 2 event. 	Activate ODOE Emergency Operations Center (EOC) - Begin a limited activation of the ODOE EOC to monitor the event.
	Assess Severity of Petroleum Disruption - Contact petroleum industry partners to determine the nature, extent, and duration of a potential, impending, or actual fuel disruption. Assess potential impacts to the supply and distribution system. <i>APPENDIX C – FUEL SUPPLY TRACKING FORM</i>
	Issue Notifications - Alert and notify the governor's office, federal, state and local emergency response agencies as needed. <i>APPENDIX D – PETROLEUM CALL TREE</i> <i>APPENDIX E – PETROLEUM NOTIFICATION TABLE</i>
	Draft Situation Reports - Provide situation reports to keep the governor's office, legislative branch, federal, state, and local emergency response organizations informed about developing conditions in the event. <i>APPENDIX F – SAMPLE SITREP</i>

	<p>Implement a Public Information Campaign - Issue news releases, conduct news conferences, compile media kits to provide information on Oregon's fuel supply and distribution system to promote voluntary conservation activities, and to prevent or limit panic buying and hoarding of fuel. Warn against price gouging as appropriate.</p> <p>Monitor Petroleum Energy Resiliency - The Infrastructure Security and Energy Restoration Division within DOE/OE provides information and critical updates during energy emergencies.</p>
Shortage – Level 3 Intermediate Fuel Shortage	
CONDITIONS	STATE RESPONSE ACTIONS
<p>➤ 10-15% reduction in petroleum products for three weeks or more</p> <p>➤ Moderate to severe isolated shortages could also trigger a Level 3 event.</p>	<i>Continue Response Actions from a Level 2 Shortage</i>
	<p>Full Activation of ODOE EOC - Fully activate ODOE EOC to monitor the event. Procedures for ODOE EOC response positions are located in the Oregon Petroleum Contingency Plan.</p>
	<i>APPENDIX G – ODOE EOC OPERATIONS CHART</i>
	<p>Convene Petroleum Advisory Group - The ODOE Director chairs this group, which meets as needed. The Petroleum Advisory Group's role during a crisis is to assist ODOE in determining:</p> <ol style="list-style-type: none"> 1. Appropriate voluntary conservation measures for the public to encourage less consumption. 2. The need for mandatory conservation measures if voluntary measures fail to mitigate the expected impacts of a shortage or disruption.
	<p>Implement Fuel Allocation, as appropriate - Consider the need for and implement the Fuel Allocation Procedures as appropriate to ensure fuel for the state's emergency and essential services sectors. Emergency service providers include law enforcement, fire services, and medical services. Essential service providers include utilities, telecommunications, public works, transportation, public transit systems, sanitation, and other services as needed.</p>
	<p>Advise Governor - Recommend precautionary measures needed to end an existing shortage or to reduce the chances for or prevent a long-term disruption from occurring. ODOE will implement voluntary conservation measures directed by the Governor.</p>
Shortage – Level 4 Severe Fuel Shortage	
CONDITIONS	STATE RESPONSE ACTIONS
<p>➤ Greater than 15% reduction in availability of petroleum products</p>	<i>Continue Response Actions from a Levels 2 and 3 Shortage</i>
	<p>ODOE EOC Operation - Maintain full activation of the ODOE EOC to direct and control Oregon's response throughout the duration of the event.</p>
	<p>Declare State of Emergency, if appropriate - Advise the Governor to declare a state of emergency so mandatory conservation measures and fuel allocation procedures can be implemented if needed.</p>

<p>➤ Severe or long-term isolated or widespread shortages could also trigger a Level 4 event.</p>	<p>Issue Mandatory Conservation Measures, as appropriate - Consider and implement mandatory measures and recommend additional voluntary conservation measures as appropriate to mitigate a severe and/or long-term shortage or disruption.</p>
	<p>Implement Fuel Allocation, as appropriate - Consider the need for and implement the Fuel Allocation Procedures as appropriate to ensure fuel for the state's emergency and essential services sectors. Emergency service providers include law enforcement, fire services, and medical services. Essential service providers include utilities, telecommunications, public works, transportation, public transit systems, sanitation, and other services as needed.</p>
	<p>Implement Odd/Even Fuel Allocation, as appropriate - Consider the need for and implement the Odd/Even Fuel Allocation Procedures as appropriate to allocate fuel for the public.</p>
	<p>Issue Fuel Waivers, as appropriate - Consider waiving fuel or fuel additive requirements temporarily if doing so will alleviate the fuel supply emergency. Work with the Oregon Department of Environmental Quality and the U.S. Environmental Protection Agency to issue fuel waivers.</p>
	<p>Request Federal Assistance, as appropriate - Consider requesting federal assistance when severe petroleum events exhaust state resources and Oregon's ability to recover rapidly from supply and distribution problems.</p>

VOLUNTARY AND MANDATORY CONSERVATION MEASURES

During petroleum shortages or disruptions, ODOE will recommend and implement various approaches to encourage the public to reduce fuel consumption depending on the severity of the event conditions. The goal of fuel conservation measures is two-fold. One is to reduce panic, prevent hoarding of fuel, and prevent price gouging at the gasoline pumps. The second is to reassure Oregon citizens that the state is taking the necessary steps to mitigate the impending or actual supply shortage situation.

Fuel conservation measures are designed to alleviate supply shortages or disruptions and hopefully prevent a crisis and the need to implement Oregon's Fuel Allocation Program. The state of Oregon's initial response to a forecasted supply problem is to implement a public information campaign to provide fuel saving tips to its citizens. If the supply shortage or disruption worsens, the plan establishes two broad types of efforts to reduce energy consumption. The first response is a public appeal for voluntary fuel conservation. If the voluntary conservation measures are ineffective in mitigating the fuel shortage situation, the second response is to issue a series of mandatory conservation measures to reduce petroleum consumption by all governmental agencies and political subdivisions in the state. Mandatory conservation measures require an Emergency Declaration by the Governor.

VOLUNTARY CONSERVATION MEASURES

PUBLIC INFORMATION CAMPAIGN - Launch public information campaign to encourage commuters to practice responsible driving and vehicle maintenance to save on fuel. This includes the following fuel saving tips:

- Slow Down and Watch Speed
- Consolidate Trips
- Accelerate and Brake Smoothly
- Reduce Idling
- Check Tire Pressure
- Travel Light
- Minimize Use of Heater and Air Conditioning
- Close Windows at High Speeds
- Choose the Right Oil
- Be Kind to Your Vehicle
- Other fuel saving tips as appropriate.

GAS PRICE REPORTER WEBSITE - Establish and manage the “Gas Price Reporter Website.” The website enables Oregonians to report evidence suggesting unlawful conduct in gasoline pricing at www.doj.state.or.us. The Attorney General investigates and prosecutes individuals and companies that unlawfully fix the price of gasoline in Oregon.

RIDE SHARE PROGRAM - Initiate emergency rideshare program to save fuel by improving the attractiveness of car and vanpools.

MASS TRANSIT PROGRAM - Assist local agencies in expanding new transit service, reducing transit fare and instituting or expanding free transit fare zones.

BICYCLE PROGRAM - Encourage commuters who live within bicycling distance of their places of employment to use their bicycles. For this program to be successful, local governments and employers may need to provide more bicycle racks or secured parking areas for employees. Temporary bicycle lanes may be created to encourage cycling and to accommodate increases in the number of cyclists.

FLEXIBLE WORK HOURS - Encourage the use of flexible work hours for both short and long-term demand reduction, improvement in fuel efficiency, and reduction in traffic congestion.

THERMOSTAT SETTINGS - Set thermostats higher in the summer and lower in the winter to reduce the amount of fuel used for heating or air conditioning.

MANDATORY CONSERVATION MEASURES

ELIMINATE NON-ESSENTIAL DRIVING - Reduce or eliminate all non-essential government and commercial vehicle use.

STRICTLY ENFORCING SPEED LIMITS - Intensified speed limit enforcement by eliminating the use of warning tickets.

INTENSIFY FLEXIBLE WORK HOUR PROGRAMS - Programs include, but are not limited to the following:

- Staggered Work Hours
- Flextime
- Four-Day Work Week
- Parking Facility Limitations

MANDATORY VEHICLE TIRE PRESSURE INSPECTION

ONE DAY CLOSING OF RETAIL STORES

OREGON FUEL ALLOCATION PROGRAM

ODOE will implement the state's Fuel Allocation Program as appropriate. The purpose of Oregon's Fuel Allocation Program is to help mitigate shortages and hardships for priority users who are unable to acquire sufficient fuel at any price. ODOE will implement this program only after the governor proclaims a state of emergency and when market forces, voluntary conservation, or other mandatory programs are unable to provide for adequate and equitable distribution of fuel.

If fuel allocation becomes necessary, ODOE would administer the state's Fuel Allocation Program and designate the set-aside volume. ODOE is responsible for working with the state's petroleum suppliers and wholesalers to implement the set-aside volume for use by the state.

SET-ASIDE PRIORITY PROGRAM

The set-aside program is designed to interfere minimally with the market, using set-aside volumes that are sufficient only to satisfy hardship and emergency cases. The set-aside program makes no attempt to reduce or inhibit the market price of fuels. All fuel delivered through the program will be purchased at the market price, and whenever possible, through the usual supplier.

The percentage will be no larger than what is expected to be required to meet emergency supply needs. The percentage is based on the amount of fuel already in the state in storage and the amount estimated to enter the state from the prime suppliers each month.

Set-Aside Percentages

Monthly Fuel Volume from Oregon Suppliers

Motor Gasoline.....	up to 5 percent
Middle Distillate (diesel & heating oil)	up to 4 percent
Jet Fuel.....	up to 5 percent
Aviation Gasoline.....	up to 5 percent
Boiler Fuel (#4 & heavy fuel oil)	up to 3 percent
Propane.....	up to 3 percent
Kerosene	up to 2 percent

ODOE's Fuel Allocation Program is designed to ensure emergency fuel to priority users performing life saving functions, restoring Oregon's critical infrastructure, and preventing community hardships.

ODOE uses a three-tiered approach for allocating fuel to these priority users. Tier 1 covers the state's emergency services providers. Tier 2 covers the state's essential services providers. Tier 3 allows for a community to request fuel supplies from the state set-aside. A community must show it has an emergency or hardship caused by a shortage of fuel or is receiving relatively less than other areas of the state. Providing emergency fuel to communities is the only element where retail service stations may receive a set-aside allocation. However, the State will not direct set-aside volumes to specific stations. It will direct prime suppliers to release a certain volume to an area through normal supply channels.

PRIORITY FUEL USERS

Priority Fuel Users	
TIER 1 - Emergency Services Sector	<ul style="list-style-type: none"> ▪ Law Enforcement ▪ Fire Services ▪ Medical Services (Ambulances, Air Transport, and Hospitals) <p>ODOE will work with and rely on the expertise and assessments of each county emergency management agency to determine fuel needs for their respective jurisdictions.</p>
<i>Agencies and Organizations Performing Life Saving Functions</i>	
Emergency fuel requests from emergency services providers will be immediately reviewed and acted on by ODOE.	
TIER 2 - Essential Services Sector	<ul style="list-style-type: none"> ▪ ESF 1: Transportation ▪ ESF 2: Communications ▪ ESF 3: Public Works and Engineering ▪ ESF 4: Fire Fighting ▪ ESF 5: Emergency Management ▪ ESF 6: Mass Care ▪ ESF 7: Logistics Management ▪ ESF 8: Public Health and Medical Services ▪ ESF 9: Search and Rescue ▪ ESF 10: Oil and Hazardous Materials ▪ ESF 11: Agriculture and Natural Resources ▪ ESF 12: Energy ▪ ESF 13: Public Safety and Security <p>ODOE will work with and rely on the expertise and assessments of each ESF lead state agency to determine fuel needs for their respective sector(s).</p>
<i>Agencies and Organizations Performing Critical Functions to Restore Oregon's Fuel Supply and Distribution System and Other Critical Infrastructure. Tier 2 involves the state's 13 Emergency Support Functions (ESFs).</i>	
<p>Emergency fuel requests from essential services providers will be reviewed by ODOE on a case-by-case basis. Approval will depend on fuel availability and event conditions.</p> <p>Examples of essential services include, but are not limited to: 1) agriculture production and distribution; 2) energy production (utilities crews); 3) public transit; 4) public works (sewer-water crews); 5) telecommunications crews; 6) transportation (highways, roads, and bridge crews); 7) sanitation (trash pickup crews); and 8) others as appropriate.</p>	
TIER 3 - Community Hardship	<ul style="list-style-type: none"> ▪ City ▪ County ▪ Other sectors as appropriate
<i>Cities and Counties Experiencing Hardships Caused By a Shortage of Fuel</i>	
Emergency fuel requests from communities will be reviewed by ODOE on a case-by-case basis. Approval will depend on fuel availability and event conditions.	

FUEL USE DATABASE

To ensure the protection of public health and safety, the environment, and the state's economy during a fuel crisis, ODOE must ensure the delivery of fuel to emergency and essential service providers responsibly, efficiently, and without delay.

ODOE established and maintains a database containing fuel consumption figures, key contacts, and pre-designated emergency fueling locations for the state's emergency services and essential services sectors. Having a clear understanding of the fuel use needs of the state's emergency and essential services sectors prior to a fuel crisis allows ODOE to better anticipate and meet fuel needs during an actual emergency.

The database reflects fuel consumption for emergency and essential services sectors under normal day-to-day operations over a one week period. Additional fuel may be needed when agencies are responding to emergencies. Oregon's Fuel Use Database is reviewed and updated as needed. Fuel use figures for the state's emergency and essential services sectors are provided by county.

OREGON FUEL USE DATABASE SAMPLE SPREADSHEET

COUNTY	KEY CONTACT
Sample County Emergency Management 1234 Sample Spreadsheet Street Sample City, OR 97000	Emergency Manager, Primary (503) 555-5555 Office (503) 555-5555 Fax (503) 555-5555 24/7 EmerMan@co.sample.or.us
	Sheriff, Alternate (503) 555-5555 Office (503) 555-5555 Fax (503) 555-5555 24/7 Sheriff@co.sample.or.us

PRE-DESIGNATED FUELING LOCATIONS				
FUELING LOCATION	SERVICE AREA	STORAGE	BACKUP POWER	SECURITY
ABC Motor Pool	Police Fire County Sheriff OR State Police	00,000 Unleaded 00,000 Diesel	Diesel generator with fuel supply for 72 hours	Restricted Access, Perimeter Fencing, Cameras

EMERGENCY SERVICES SECTOR				
JURISDICTION	DIESEL (gal/week)	GASOLINE (gal/week)	OTHER FUELS (gal/week)	FUEL SOURCE
County Sheriff's Office	0	0	0	ABC Motor Pool
A City Police	0	0	0	ABC Motor Pool
A City Fire	0	0	0	ABC Card Lock
B City Police	0	0	0	ABC Service Station
B City Fire	0	0	0	ABC Card Lock
Sample Ambulance Service	0	0	0	ABC Service Station
Oregon State Police	0	0	0	ABC Motor Pool
TOTAL FUEL USE	000	000	000	

ESSENTIAL SERVICES SECTOR				
UTILITIES				
JURISDICTION	DIESEL (gal/week)	GASOLINE (gal/week)	OTHER FUELS (gal/week)	FUEL SOURCE
ABC Electric	0	0	0	ABC Card Lock
UTILITIES FUEL USE	0	0	0	

TELECOMMUNICATIONS				
JURISDICTION	DIESEL (gal/week)	GASOLINE (gal/week)	OTHER FUELS (gal/week)	FUEL SOURCE
ABC Telephone Compan	0	0	0	ABC Service Station
TELECOM FUEL USE	0	0	0	

OREGON DEPARTMENT OF TRANSPORTATION (ODOT)				
JURISDICTION	DIESEL (gal/week)	GASOLINE (gal/week)	OTHER FUELS (gal/week)	FUEL SOURCE
Region 2 District 4	0	0	0	ABC Motor Pool
ODOT FUEL USE	0	0	0	

OTHER				
JURISDICTION	DIESEL (gal/week)	GASOLINE (gal/week)	OTHER FUELS (gal/week)	FUEL SOURCE
ABC Air Ambulance	0	0	Jet Fuel - 0	ABC Airport
OTHER FUEL USE	0	0	0	
TOTAL FUEL USE	000	000	000	

SAMPLE

FUEL APPLICATION PROCESS - WEBEOC

ODOE may receive fuel requests due to natural disasters or unforeseen emergencies at any time. Once ODOE activates WebEOC for a determined emergency, all priority users requesting emergency fuel must log onto ODOE's WebEOC, access the Emergency Fuel Request board and complete all fields provided as appropriate. Priority users requesting fuel must be prepared to provide information on the organization requesting the fuel, 24/7 contact information, type of fuel needed, the reason for the request, and the intended use of the fuel if approved.

ODOE will process fuel requests based on 1) the availability of fuel; 2) event conditions; and 3) the Governor's priorities. ODOE would follow general guidelines to provide fuel to perform life saving functions first, restoring critical services second, and all other requests will be handled as they are received.

If WebEOC becomes inoperable due to event conditions, fuel requests can be texted, faxed, emailed, mailed, or delivered directly to ODOE for review and approval.

UNUSED SET-ASIDE VOLUME

Maximum flexibility in the release of the unused portion of the monthly set-aside volume is achieved by balancing public benefit with logistical and administrative efficiency. The Petroleum Event Manager may choose either to release to the supplier unused portions of the set-aside no later than the 20th of each month, or to hold any unused volume until the first of the following month. This unused set-aside volume will not be counted in computing the subsequent month's set-aside volume, but must be distributed the following month. Whichever option the Petroleum Event Manager selects, all suppliers are required to comply ensuring uniformity in the release of supplies.

FUEL ALLOCATION FOR OREGON CITIZENS

During a fuel supply shortage situation, the need for a method to alleviate potentially long lines at retail service stations may arise. ODOE, at the direction of the Governor, could implement the Odd/Even Fuel Allocation Measure for the public. This measure is designed to help space purchases of gasoline and aids in its equitable distribution. The measure has the potential effect of shortening lines at gasoline retail outlets by cutting in half the number of customers that may attempt to get gasoline on any given day.

The Odd/Even Fuel Allocation Measure for the public may also provide a psychological benefit by reducing uncertainty regarding fuel availability. It may additionally encourage the conservation of fuel by causing trips to be better planned. Minimizing waiting lines may also reduce consumption by saving fuel that is used while idling. Under this plan, gasoline may be purchased or sold only in accordance with the following procedures.

ODD/EVEN FUEL ALLOCATION MEASURE

Odd/Even Fuel Allocation Measure		
ODD Days of the Month	EVEN Days of the Month	Sundays, Legal Holidays, & 31 st of Any Month
Vehicles with Oregon license plates: <ul style="list-style-type: none"> Ending with odd numbers Ending with letters A-M 	Vehicles with Oregon license plates: <ul style="list-style-type: none"> Ending with even numbers Ending with letters N-Z 	Anyone may purchase gasoline on Sundays, legal holidays, or the 31 st of any month.
<p>EXEMPTIONS: The following vehicles are exempted from the odd/even gasoline purchase plan, but will wait their turn in line at any gasoline station:</p> <p>Common carriers, including taxis, rental vehicles, commercially licensed vehicles, or private vehicles used for designated commercial purposes, and vehicles with out-of-state license plates.</p>		

The Odd/Even Measure does not directly save any calculable amount of gasoline. It is designed as a distribution aid and not a conservation measure. Enforcement responsibility rests with service station personnel.

FUEL LIMIT PURCHASE REQUIREMENT

Depending on the severity of the fuel shortage situation, ODOE may advise the Governor to also require motorists to purchase a certain amount of gasoline or diesel at the pumps. The measures include the Minimum Fuel Purchase Requirement and the Maximum Fuel Purchase Requirement. These measures should be implemented in conjunction with the Odd/Even Distribution Measure.

Fuel Limit Purchase Requirement	
Minimum Fuel Purchase Requirement	Maximum Fuel Purchase Requirement
Minimize gasoline lines by discouraging the making of frequent but small gasoline purchases by consumers. This measure also discourages tank topping.	Ensures some gasoline will be available to motorists located or traveling through the state. Limiting the amount of gasoline purchased by motorists in one visit will help prevent supplies from running out prematurely at a particular retailer.
<p>NOTE: ODOE will set the minimum and maximum purchase quantity as appropriate. Retailers may lower the set amount at their discretion due to market forces.</p> <p>ASSUMPTIONS: All retail stations will be assumed to normally operate one hundred hours per week unless evidence is provided to the contrary.</p>	

LIMITED HOURS OF OPERATION

If the fuel shortage situation continues to worsen, ODOE may also advise the Governor to require retail gasoline and diesel outlets to reduce the hours of normal operations.

<p align="center">Limited Hours of Operation By Motor Fuel Retailers</p>		
<p align="center">Percentage of Hours Rule</p>	<p align="center">Designated Days Rule</p>	<p align="center">Sunday Closings with Percentage Rule</p>
<p>Order retail gasoline and diesel outlets to reduce hours of weekly operation by a fixed percentage of normal operating hours.</p>	<p>Order retail gasoline and diesel outlets to close for business on specified days of the week. Pre-designated emergency fueling locations for priority users are exempt.</p>	<p>Order retail gasoline and diesel outlets to not operate on Sundays of any week and to reduce hours of normal operation on other weekdays.</p>
<p>NOTE: If any of the three rules are ordered, stations will post the hours of operation visibly upon the premises for all motorists to see.</p>		
<p>ASSUMPTIONS: All retail stations will be assumed to normally operate one hundred hours per week unless evidence is provided to the contrary.</p>		

ODOE may advise the Governor to implement additional fuel allocation measures as appropriate.

REQUESTING FEDERAL ASSISTANCE

When an incident occurs that exceeds or is anticipated to exceed local and State resources, the Governor can request federal assistance under the Stafford Act. The Stafford Act authorizes the President to provide financial and other assistance to state and local governments to support response, recovery, and mitigation efforts following Presidential emergency or major disaster declarations.

FUEL SUPPLY

In the event of a severe or long-term fuel emergency, ODOE can advise the Governor to request the federal government assist Oregon to obtain fuel, (gasoline, diesel, jet fuel, etc), assist in fuel delivery, as well as provide portable fueling locations to support the state’s response and recovery efforts. This includes requesting generators to ensure the state’s petroleum distribution terminals and pipeline companies can assess and address damages promptly to restart facility and system operations without delay.

As the lead state agency for ESF 12, ODOE would work with the USDOE (the federal ESF 12 lead agency) to request and coordinate the delivery of supplies, equipment and systems, and personnel.

FUEL WAIVERS

ODOE can advise the Governor to request the federal government to waive a fuel or fuel additive requirement if doing so will alleviate the fuel supply crisis. The U.S. Environmental Protection Agency (EPA) with the concurrence of DOE/OE may temporarily waive a fuel or fuel additive requirement under the Clean Air Act Section 211(c)(4)(C). A fuels waiver can be issued only when the criteria specified in the Clean Air Act have been met and apply to gasoline and diesel fuel only. If the fuels waiver criteria have been met, EPA may grant a waiver to allow use of a fuel that normally is not allowed in a particular time period or geographic area.

In general, these criteria allow a fuels waiver only to address a temporary emergency fuel supply shortage that exists throughout a state or region that was caused by an unusual situation and that could not have been avoided by prudent planning. "Spot" or localized shortages generally are not fuel supply disruptions for which a waiver may be issued. A fuel supply disruption that meets the criteria for a waiver must be one that results in a generalized supply emergency. Fuels waivers cannot be issued to address concerns regarding the price of fuel.

If EPA and DOE/OE determines that a fuels waiver is necessary, ODOE will submit a formal written request for a fuels waiver to be made by or on behalf of the Governor to the EPA Administrator.

The EPA Administrator will consult with and seek concurrence by the Secretary of Energy upon receiving a formal written request for a fuels waiver. The EPA Administrator will issue a temporary waiver if it is determined that extreme and unusual fuel or fuel additive supply circumstance exist in Oregon which prevent the distribution of an adequate supply of the fuel or fuel additive to consumers. The waiver is effective for a period of 20 calendar days or less.

DRIVER HOUR WAIVERS

ODOE can also advise the Governor to request the Federal Motor Carrier Safety Administration (FMCSA) to lift driver hour requirements to ensure fuel deliveries proceed without delay to ensure public health and safety. Severe and long-term fuel disruptions have typically been widespread, affecting a number of states and caused by factors that exceed the petroleum industry's ability to respond.

FMCSA provides relief from compliance with most safety regulations when an emergency is declared. According to 49 CFR 390.5 an "emergency" means any storm, earthquake, explosion, blackout, or other occurrence, natural or manmade, that interrupts the delivery of essential services or supplies such as food and fuel or otherwise immediately threatens human life or public welfare.

When a state issues an emergency declaration, driver hour requirements are automatically lifted for up to 30 days from the date of the declaration. This applies to motor carriers or

drivers of commercial motor vehicles providing direct assistance to save lives or property or to protect public health and safety. A driver's manifest must clearly show a destination for delivery of essential service/commodity in the state declaring the emergency. It is the responsibility of each state to notify FMCSA of an emergency declaration. FMCSA will then post the state(s) emergency declaration(s) on its website for drivers to download.

DISSEMINATING EMERGENCY INFORMATION

During forecasted or actual fuel emergencies, ODOE is responsible for developing and disseminating emergency information to decision-makers, responders, the news media, and the public. Timely and accurate information increases awareness and understanding of the fuel crisis situation and helps minimize public panic, topping off gas tanks, and hoarding fuel.

ODOE will provide current event status information to decision-makers, responders, the news media, and the public. The information includes, but may not be limited to:

- Fuel Supply Information
- Conservation Measures – voluntary and mandatory
- Conservation Information and Education
- Oregon's Fuel Allocation Program

DRILLS AND EXERCISES

To ensure that Oregon is prepared to respond to a fuel crisis, ODOE will coordinate, implement, and participate in workshops and seminars, tabletops, drills, and exercises that provide opportunities for state and county decision-makers and responders to demonstrate the ability to:

- Alert and notify key responders to report to emergency centers or locations as appropriate.
- Activate, staff, and operate state and county Emergency Operations Centers throughout the duration of a fuel crisis.
- Direct and control the overall state response to petroleum emergencies. This includes assessing the severity of the event, determining potential impacts to Oregon, and determining appropriate protective actions.
- Issue voluntary and mandatory conservation measures.
- Implement Oregon's fuel allocation program.
- Provide timely emergency information and instructions to the public. This includes activating, staffing and operating the Telephone Information Center and the News Center.

- Communicate with industry, federal, state, and local emergency response organizations throughout the duration of the fuel crisis. This includes demonstrating primary and backup communication systems.

For major exercises, ODOE will establish or take part in an Exercise Planning Team. This Team includes representatives from industry, federal, state, and local agencies as appropriate. The Exercise Planning Team develops the exercise objectives and limitations, the extent-of-play, and the scenario.

After each drill or exercise, members of the Exercise Planning Team will report needed corrective actions to ODOE. ODOE will provide information about the corrective actions to the U.S. Department of Energy in the quarterly reports on the State Energy Program. ODOE will arrange for state or federal representatives to observe and provide comments to ODOE on Oregon's performance in the drills or exercises as needed.

PLAN REVIEW AND UPDATE

ODOE will review and update Oregon's Petroleum Contingency Plan annually or as needed. Revisions will include improvements identified through drills and exercises. ODOE's Emergency Preparedness Manager is responsible for conducting the review and coordinating revisions with industry, federal, state, and county emergency response agencies.

ODOE will work with state agencies and county emergency managers biennially to update and maintain the statewide fuel use database to ensure accurate fuel consumption numbers for the state's emergency and essential services sectors.

ODOE will work with industry, federal, State, and county emergency response agencies quarterly to update the petroleum emergency contacts list. ODOE will prepare quarterly reports detailing Oregon's petroleum emergency preparedness activities for the State Energy Program. This will ensure that Oregon's Petroleum Contingency Plan and state and local decision-makers and emergency responders authorized to implement the plan maintain a state of readiness to ensure the protection of Oregonians in the event of a fuel crisis.

Electricity Emergency Response Plan

INTRODUCTION

An electric power event can be categorized as an outage, an incident, or an emergency. Events can range from a high frequency, low impact outage or incident to a low frequency, high impact emergency. Examples of high frequency, low impact outages or incidents are cross-phasing of lines by surrounding vegetation or more serious, individuals coming in contact with high-voltage lines or equipment. Low frequency, high impact emergencies include earthquakes and man-made attacks. The following is the progressive response of the OPUC.

EMERGENCY RESPONSE PHASES AND ACTIONS

Level I: Normal Conditions¹

Conditions: Normal—no electric power disruption, shortage, or constraints on reliable service delivery.

State Agency Lead: OPUC

OPUC Duty Officer measures include:

- Receive notices of reportable¹ outages or incidents from operators.
- Evaluate reportable outages or incident notices received to anticipate impact on electric power supply, relying heavily upon electric company experts.
- Maintain a contact list located in-house to aid in contacting individuals in the various public and private industries.
- Review previous situation reports to evaluate adequacy of OPUC's response practices.
- Review previous tabletop exercises, evaluate lessons learned, and implement into response plan procedures.
- Encourage energy utilities to hold in-house tabletop exercises.
- Update OPUC's emergency response plan as needed.

¹ Electric utilities experience reportable incidences often for various reasons, such that these minor events are normal operating conditions.

- Participate in collaborative efforts with state, local government and electric utility operators.
- Identify response vulnerabilities in cross-coordination between industries and state agencies.

LEVEL II: MILD SHORTAGE, OUTAGE, OR INCIDENT

Conditions: Mild Outage or Incident—an identifiable event that may have the potential to cause an electric power disruption, shortage, or become a constraint on reliable electric power service.

Lead: Electric Power Companies

State Agency Lead: OPUC

Support: Oregon Emergency Management, Oregon Department of Energy, Oregon Emergency Response System

Level II triggered by:

- Significant storms² or similar incidents without a declaration of emergency.
- Activation of electric utility EOC.

OPUC Duty Officer response measures include:

- Receive update notices, as required, from utility operator.
- Monitor state, regional and world events and forecasted weather conditions that may impact Oregon electric power and natural gas³ supplies and service delivery.
- Keep informed by utility operators as they perform emergency response operations, procedures, and distribution of accurate event information to the public.

LEVEL III: MODERATE SHORTAGE, ESCALATING INCIDENT, OR DISRUPTION

Conditions: Imminent threat or escalating incident—an identifiable event that has been verified to lead to an electric power disruption, shortage, or become a constraint on reliable electric power service lasting two-to-four weeks.

Lead: Electric Power Companies

State Agency Lead: OPUC

Support: Governor’s Office, Oregon Emergency Management, Oregon Department of Energy, Oregon Military Department, Oregon Department of Transportation, Civil Air Patrol, Oregon State Department of Human Resources, American Red Cross

² i.e. winter storm event 2006, 2007, and 2008

³The state of Oregon has many electric generation facilities that are fueled by natural gas and those are identified as interdependencies between the natural gas and electric sectors.

Level III triggered by factors, such as:

- Moderate shortage, escalating incident, or disruption.
- Utility Operator requests for limited assistance.
- Impact extends to interdependent⁴ utility operators.

OPUC Duty Officer response measures include:

- Serve as a liaison—during Level III and Level IV status—between electric power operators and other state agencies to meet the needs of the operators on a state level. OPUC does not manage utility operations but assists in procuring state resources for the responding utility.
- Implement in-house Situation Report⁴ to define the source and details of the outage or incident. The Situation Report includes information on the operator involved, area impacted, cause (if known), and expected duration.
- Maintain communication with electric power operator for updates.
- Notify Commissioners, PUC executives, and Public Information Officer⁵ (PIO) with initial and interim situation reports as necessary.
- Send courtesy notifications to other utility operators, ODOE, OERS, and other state support agencies related to ESF 12.
- Update OERS with utility situation report.
- Evaluate geographical areas affected by the cascading effects of the event and notify stakeholders.
- Support necessary reconnaissance efforts to aid in evaluating energy infrastructure.
- Consider issuing public appeal for voluntary reduction of electric power and natural gas consumption in accordance with the Regional Curtailment Plan.

⁴Utility operators that are reliant upon the impacted energy resource provided by the originating impacted utility, which may warrant a request for assistance by the dependent utility operator.

⁵See Appendix H.

⁶ The PUC's PIO does not actively release statements regarding these incidents to the public. However, if the public inquires, concerns will be resolved as needed.

- Implement voluntary reduction of electric power and natural gas consumption in accordance with stage 1 or 2 of the Regional Curtailment Plan, as necessary, by consumers, businesses, schools, institutions, and state building operators.
- Escalate to Level IV status as appropriate.

LEVEL IV: SEVERE SHORTAGE, DISRUPTION, OR EMERGENCY

Conditions: Disruption, shortage, or constraint has taken place causing loss of electric power supply that may last weeks or months.

Lead: Electric Power Companies

State Agency Lead: OPUC

Support: Governor’s Office, Oregon Emergency Management, Oregon Department of Energy, Oregon Emergency Response System, U.S. Department of Energy, Oregon Military Department , Oregon Department of Transportation, Civil Air Patrol, Oregon State Department of Human Resources, American Red Cross

A Level IV status is triggered by several factors such as:

- Declaration of state of emergency by the Governor.
- Escalation of a high frequency, low impact outage or incident estimated to last a period of months, precluding the reliability of electric power service delivery.
- Electric power companies recognizing that either company resources—staff experts, materials, equipment—are being exhausted or a multi-jurisdictional emergency is occurring.
- A devastating natural or deliberate disaster that immediately impacts electric power infrastructure with little or no warning.
- Energy demand exceeds generation supply such that electric power shortage occurs and the situation becomes unmanageable by electric power operators, balancing authorities, and excess market supply.

Under the conditions listed the ECC will be activated under standby, limited, or full activation status determined by the Director of OEM⁷. OPUC works with the OEM team and other responders to the ECC to provide subject matter expertise.

OPUC Duty Officer response measures include:

⁷ State of Oregon Emergency Management Plan: Vol. II, Annex A.III.

- Present initial situation report to OEM at ECC and OEM's PIO consolidates information for public media release.
- Notify OERS with appropriate updates.
- Notify USDOE if necessary.
- Maintain communication with electric power operator for updates and continue providing resource support.
- Update OEM with interim situation report.
- Evaluate geographical areas affected, cascading effects of the event and notify ECC State Support Functions 1-13.
- Advise Governor and OEM Director to implement curtailment of electric power and natural gas usage in accordance with the Regional Curtailment Plan stages 3, 4, and 5.
- Identify interdependencies between the electric power, natural gas, and petroleum sector to minimize impact upon sectors outside of the electric power industry.
- Facilitate utility operators with possible resources (See Table 6.1) from various state agencies.

Following event:

- Demobilize response-recovery as emergency abates and return to normal operational conditions.
- Return borrowed assets to originating agency.

Table 6.1: Various Agencies and Resources.

AGENCY	RESOURCES ⁷								
	Fuel	Road Access	Shelter	Air Transport	Reconnaissance	Transportable Generators	Manual Labor Crews	Electricians & Technicians	Portable Kitchens
Oregon Department of Energy	X								
Oregon Department of Transportation		X							
Oregon State Police		X							
Oregon Military Department	X	X	X	X	X	X	X	X	X
Civil Air Patrol				X	X				
Oregon State Department of Human Resources			X						
Oregon Department of Forestry									X
Oregon Department of Agriculture									X
Department of Corrections	X						X	X	

The Regional Curtailment Plan⁸ applies to all regional loads. Under this plan, curtailment is requested or ordered as a percentage of historical, weather-normalized (Base Billing Period) electric consumption. Although the curtailment stages are generally associated with increasing deficits, the stages are not necessarily implemented in a sequential manner. The plan is flexible, allowing the state to move from one curtailment stage to another as required to adapt to dynamic changes of the incident (See Table 6.2).

⁸ In the event of an emergency, precedence is given to each agency to evaluate the needs of their own agency and if excess resources exist they may provide them for use in energy emergency response considerations.

⁹ See Appendix I.

Table 6.2: Regional Curtailment Plan Summary

STAGE	NATURE	CURTAILMENT %	TYPE OF CURTAILMENT
1	Voluntary	No Specific %	Uniform among all regional consumers
2	Voluntary	5% +	Uniform among all regional consumers
3	Mandatory	5% – 15%	Uniform among all regional consumers
4	Mandatory	15 %	Residential consumers
		15% +	General use consumers
		15% +	Major use consumers
5	Mandatory	% consistent with Stage 4 + additional curtailment	Continued consumer curtailment with additional utility action including plant closures and possible rotating outages

Any additional curtailment activities will be done in accordance with the plan and stated in the tariffs approved by the Public Utility Commission. The Commission will be available to handle customer appeals from utility curtailment decisions.

It is noted that although the emergency response plan is centered on an outage, incident, or emergency that originates with a utility operator, this does not limit the scope of the response plan. For example, if events outside of the purview of utility operators become relevant to the respective operator, whether by notification to OPUC from OEM or other collaborative groups, OPUC will take an active part in notifying utility operators of these events.

Natural Gas Emergency Response Plan

INTRODUCTION

A natural gas event can be categorized as an outage, an incident, or an emergency. Events can range from a high frequency, low impact outage or incident to a low frequency, high impact emergency. Examples of high frequency, low impact outages or incidents are gas discharge identified by customers, residential or business, or more serious, excavation contact with pipelines. In the latter case, excavation contact that damages or punctures a pipeline has the potential to cause ignition of gas, which may produce a hazard to life, safety, and property. Low frequency, high impact emergencies include earthquakes and man-made attacks.

EMERGENCY RESPONSE PHASES AND ACTIONS

LEVEL I: NORMAL CONDITIONS¹⁰

Conditions: Normal—no natural gas disruption, shortage, or constraints on reliable service delivery.

State Agency Lead: OPUC

OPUC Duty Officer measures include:

- Receive notices of reportable outages or incidents from operators.
- Evaluate reportable outages or incident notices received to anticipate impact on natural gas supply, relying heavily upon company experts.
- Maintain a contact list located in-house to aid in contacting individuals in the various public and private industries.
- Conduct annual inspection of intrastate¹¹ natural gas operations, facilities, and pipeline systems according to state statute¹² and federal code regulations¹³ to ensure reliable service delivery.
- Review previous situation reports to evaluate adequacy of OPUC's response practices.
- Review previous tabletop exercises, evaluate lessons learned, and implement into response plan procedures.

¹⁰ Natural gas utilities experience reportable incidences often for various reasons, such that these minor events are normal operating conditions.

¹¹ The OPUC is directly responsible to conduct audits of intrastate natural gas pipeline. Interstate natural gas pipelines and intrastate liquid petroleum pipelines are under the jurisdiction of U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

¹²Oregon Administrative Rule: Chapter 860 Division 31.

¹³Code of Federal Regulations Title 49: Parts 191, 192, 193, 195, 198, and 199.

- Update OPUC’s emergency response plan as needed.
- Participate in collaborative efforts with state, local government and utility operators.
- Identify response vulnerabilities in cross-coordination between industries and state agencies.

LEVEL II: MILD SHORTAGE, OUTAGE, OR INCIDENT

Conditions: Mild Outage or Incident—an identifiable event that may have the potential to cause a natural gas disruption, shortage, or become a constraint on reliable natural gas service.
Lead: Natural Gas Companies
State Agency Lead: OPUC
Support: Oregon Emergency Management, Oregon Department of Energy, Oregon Emergency Response System

Level II triggered by:

- Significant storms¹⁴ or similar incidents without a declaration of emergency.
- Activation of gas utility Emergency Operation Center (EOC).

OPUC Duty Officer response measures include:

- Receive update notices, as required, from utility operator.
- Monitor state, regional, and world events and forecasted weather conditions that may impact Oregon natural gas supplies and service delivery.
- Keep informed by utility operators as they perform emergency response operations, procedures, and distribution of accurate event information to the public.

LEVEL III: MODERATE SHORTAGE, ESCALATING INCIDENT, OR DISRUPTION

Conditions: Imminent threat or escalating incident —an identifiable event that has been verified to lead to a natural gas disruption, shortage, or become a constraint on reliable natural gas service lasting two-to-four weeks.
Lead: Natural Gas Companies
State Agency Lead: OPUC
Support: Governor’s Office, Oregon Emergency Management, Oregon Department of Energy, Oregon Military Department, Oregon Department of Transportation, Civil Air Patrol, Oregon State Department of Human Resources, American Red Cross

Level III triggered by factors, such as:

- Moderate shortage, escalating incident, or disruption.
- Utility Operator requests for limited assistance.
- Impact extends to interdependent¹⁵ utility operators.

OPUC Duty Officer response measures include:

- Serve as a liaison—during Level III and Level IV status—between natural gas operators and other state agencies to meet the needs of the operators on a state level. OPUC does not manage utility operations but assists in procuring state resources for the responding utility.
- Implement in-house Situation Report¹⁶ to define the source and details of the outage or incident. The Situation Report includes information on the operator involved, area impacted, cause (if known), and expected duration.
- Maintain communication with natural gas operator for updates.
- Notify Commissioners, PUC executives, and PIO with initial and interim situation reports as necessary.
- Send courtesy notifications to other utility operators, ODOE, OERS, and other state support agencies related to ESF 12.
- Update OERS with utility situation report.
- Evaluate geographical areas affected by the cascading effects of the event and notify stakeholders.
- Support necessary reconnaissance efforts to aid in evaluating energy infrastructure.
- Consider issuing public appeal for voluntary reduction of natural gas and electric¹⁷ consumption in accordance with stage 1 or 2 of the Regional Curtailment Plan.
- Implement voluntary reduction of natural gas and electric power consumption in accordance with stage 1 or 2 of the Regional Curtailment Plan, as necessary, by consumers, businesses, schools, institutions, and state building operators.

¹⁴ i.e. winter storm event 2006, 2007, and 2008.

¹⁵ Utility operators that are reliant upon the impacted energy resource provided by the originating impacted utility, which may warrant a request for assistance by the dependent utility operator.

¹⁶ See Appendix H.

¹⁷ The state of Oregon has many electric generation facilities that are fueled by natural gas and are identified as interdependency between the natural gas and electric sectors.

- Escalate to Level IV status, as appropriate.

LEVEL IV: SEVERE SHORTAGE, DISRUPTION, OR EMERGENCY

Conditions: Disruption, shortage, or constraint has taken place causing loss of natural gas supply that may last weeks or months.

Lead: Natural Gas Companies

State Agency Lead: OPUC

Support: Governor's Office, Oregon Emergency Management, Oregon Department of Energy, Civil Air Patrol, Oregon Department of Transportation, Oregon Military Department, Oregon State Department of Human Resources, American Red Cross, Oregon Emergency Response System, U.S. Department of Energy

A Level IV status is triggered by:

- Declaration of state of emergency by the Governor.
- Escalation of a high frequency, low impact outage or incident estimated to last a period of months, precluding the reliability of natural gas service delivery.
- Natural gas companies recognizing that either company resources—staff experts, materials, equipment—are being exhausted or a multi-jurisdictional emergency is occurring.
- A devastating natural or deliberate disaster that immediately impacts natural gas infrastructure with little or no warning.
- Energy demand exceeds generation supply such that natural gas shortage occurs and the situation becomes unmanageable by natural gas operators, balancing authorities, and excess market supply.

Under the conditions listed the ECC will be activated under standby, limited, or full activation status determined by the Director of OEM¹⁸. OPUC works with the OEM team and other responders to the ECC to provide subject matter expertise.

OPUC response measures include:

- Present initial situation report to OEM at ECC and OEM's PIO consolidates information for public media release.
- Notify OERS with appropriate updates.
- Notify USDOE if necessary.

¹⁸ State of Oregon Emergency Management Plan: Vol. II, Annex A-III.

- Maintain communication with natural gas operator for updates and continue providing resource support.
- Update OEM with interim situation report.
- Evaluate geographical areas affected by cascading effects of the event and notify ECC State Support Functions 1-13.
- Advise Governor and OEM Director to implement curtailment of natural gas and electric usage in accordance with the Regional Curtailment Plan stages 3, 4, and 5.
- Identify interdependencies between the natural gas, electric power, and petroleum sector to minimize impact upon sectors outside of the natural gas industry.
- Facilitate utility operators with possible resources (See Table 6.3) from various state agencies.

Following event:

- Demobilize response-recovery as emergency abates and return to normal operational conditions.
- Return borrowed assets to originating agency.

Table 6.3: Various Agencies and Resources

AGENCY	RESOURCES ¹⁹								
	Fuel	Road Access	Shelter	Air Transport	Reconnaissance	Transportable Generators	Manual Labor Crews	Electricians & Technicians	Portable Kitchens
Oregon Department of Energy	X								
Oregon Department of Transportation		X							
Oregon State Police		X							
Oregon Military Department	X	X	X	X	X	X	X	X	X
Civil Air Patrol				X	X				
Oregon State Department of Human Resources			X						
Oregon Department of Forestry									X
Oregon Department of Agriculture									X
Department of Corrections	X						X	X	

The Regional Curtailment Plan²⁰ applies to all regional loads. Under this plan, curtailment is requested or ordered as a percentage of historical, weather-normalized (Base Billing Period) natural gas consumption. Although the curtailment stages are generally associated with increasing deficits, the stages are not necessarily implemented in a sequential manner. The plan is flexible, allowing the state to move from one curtailment stage to another as required to adapt to dynamic changes of the incident (See Table 6.4).

Table 6.4: Regional Curtailment Plan Summary

STAGE	NATURE	CURTAILMENT %	TYPE OF CURTAILMENT
1	Voluntary	No Specific %	Uniform among all regional consumers
2	Voluntary	5% +	Uniform among all regional consumers
3	Mandatory	5% – 15%	Uniform among all regional consumers
4	Mandatory	15 %	Residential consumers
		15% +	General use consumers
		15% +	Major use consumers
5	Mandatory	% consistent with Stage 4 + additional curtailment	Continued consumer curtailment with additional utility action including plant closures and possible rotating outages

Any additional curtailment activities will be done in accordance with the plan and stated in the tariffs approved by the Public Utility Commission. The Commission will be available to handle customer appeals from utility curtailment decisions.

It is noted that although the emergency response plan is centered on an outage, incident, or emergency that originates with a utility operator, this does not limit the scope of the response plan. For example, if events outside of the purview of utility operators become relevant to the respective operators, whether by notification to OPUC from OEM or other collaborative groups, OPUC will take an active part in notifying utility operators of these events.

¹⁹ In the event of an emergency, precedence is given to each agency to evaluate the needs of their own agency and if excess resources exist they may provide them for use in energy emergency response considerations or as directed by the Governor.

²⁰See Appendix I

LNG Import Terminal Emergency Preparedness

INTRODUCTION

The LNG import-export terminals proposed for siting along the Oregon coast and Columbia River would be subject to natural disasters like earthquakes, tsunamis, floods, fires, and winter storms. LNG import-export terminals would also be subject to man-made events such as industrial accidents (including fire), spills, terrorism, bomb threats, civil disturbances or violence in the work place. These events could affect Oregon citizens working at the import-export terminals, living adjacent to the terminals, or working, living, or recreating along the LNG vessel transit routes.

AUTHORITY

Should an LNG import-export terminal be built and operate in the state, ensuring the health and safety of Oregonians in the event of LNG emergencies is the responsibility of the Governor. The Governor designated ODOE the lead state agency to protect Oregonians from LNG emergencies involving leaks or fires. These events could jeopardize the health and safety of Oregon citizens.

ODOE works with LNG developers, the U.S. Coast Guard, other state agencies, and local emergency response organizations to create an LNG emergency preparedness and response plan for each proposed project. ODOE will develop and maintain the Oregon Statewide LNG Emergency Response Plan (LNG ERP) - a statewide strategy for responding to emergencies at LNG import-export terminals and incidents along the transit corridors involving LNG vessels.

GUIDING PRINCIPLES

The purpose of the LNG ERP is to ensure an effective and well-coordinated response with LNG developers, USCG, state, and local organizations to protect public health, safety, and the welfare of Oregonians in the event of an LNG emergency. The LNG ERP also ensures a consistent federal, state, and local response to LNG emergencies in Oregon regardless of which import-export terminal and local community in Oregon is impacted.

ODOE will direct and control the state's overall response to LNG emergencies that impact the state and will implement the LNG ERP as appropriate depending on event conditions. The LNG ERP will be developed in coordination with plans and procedures of industry and federal, state, and local emergency response organizations. These include:

- Federal Emergency Response Framework

- U.S. Coast Guard Navigational Vessel Inspection Circular No. 05-08
- Vessel Transit Management Plan
- LNG Import-Export Terminal Security Plans
- National Fire Protection Association Handbook
- Jordan Cove Emergency Response Plan
- Oregon LNG Emergency Response Plan
- Oregon Department of Energy Duty Officer Procedures
- Oregon Emergency Response System Duty Officer Procedures
- Clatsop County LNG Emergency Response Plan
- Coos County LNG Emergency Response Plan
- Local Fire and Law Enforcement LNG Emergency Response Plans

PROPOSED OREGON STATE LNG EMERGENCY RESPONSE PLAN FORMAT

The LNG ERP will address the unique conditions surrounding each LNG emergency and will take into account that it is not possible to plan for every contingency. As a result, the LNG ERP will be designed to cover all levels of LNG events regardless of the cause. These could range from minor inconveniences to the worst case situation – an LNG fire jeopardizing public health and safety.

The LNG ERP will also provide decision-makers the flexibility to assess the severity of each potential emergency, determine its potential risks to Oregonians and then implement the appropriate protective actions to mitigate the unique event conditions.

The LNG ERP will consist of three parts. They include:

1. An Overview of Oregon’s LNG Supply and Distribution System – The overview will describe LNG, the LNG import-export terminal(s) in Oregon, and discuss LNG production capabilities and distribution systems associated with these projects.
2. Basic Plan – The Basic Plan will describe Oregon’s strategy and approach to respond to LNG emergencies that impact the state. The Basic Plan will provide descriptions of the essential elements of advance planning that have been taken into consideration and provisions to cope with emergency situations. It will also identify the emergency response roles of lead and support organizations responding to LNG emergencies.
3. Procedures – Procedures will describe the objectives of each emergency response position at the ODOE EOC. The procedures will include check lists with specific tasks to be completed by each response position. This includes procedures for:

- Providing emergency notifications, providing event status updates, and terminating an event. Emergency contact information for LNG developers and federal, state, county, and local decision-makers and responders are also provided.
- ODOE EOC setup, staffing, and operations.
- ODOE Telephone Information Center setup, staffing, and operations.
- ODOE News Center setup, staffing, and operations.
- Members of the ODOE EOC Emergency Management Team, Assessment Team, Public Information Team, Operations Team, and Logistics Team.
- Determining and issuing protective actions and decisions.
- Declaring a state of emergency.
- Requesting federal support.
- Developing and issuing news releases. This includes boilerplate news releases, brochures, calendars, and other pre-printed public information materials.
- Other as appropriate.

REFER TO APPENDIX J - PROPOSED OREGON STATE LNG EMERGENCY RESPONSE PLAN FORMAT

Chapter 7

Ensuring Program Readiness

OREGON STATE ENERGY ASSURANCE PLAN

INTRODUCTION

To ensure that Oregon is prepared to respond to an energy crisis, ODOE and OPUC will work with industry and federal, state, and local emergency response organizations to conduct workshops and seminars, drills, tabletops, and exercises as appropriate and as resources allow. Training is essential to maintain program readiness to protect public health and safety in the event of a petroleum, electricity, or natural gas emergency impacting Oregon. ODOE will maintain open communications with USDOE and other western states to monitor regional, national, and international energy sector concerns and issues with potential impacts to Oregon's energy infrastructure. ODOE and OPUC will review and update the Oregon State Energy Assurance Plan annually or as needed.

TRAINING

ODOE is responsible for coordinating the training and Oregon's participation in drills and exercises involving the petroleum sector. ODOE will provide and coordinate training opportunities for decision-makers and responders at all levels of government and industry on Oregon's Petroleum Contingency Plan and procedures. This includes classroom instruction or participation in state or regional drills and exercises.

OPUC is responsible for coordinating the training and Oregon's participation in drills and exercises involving the electricity and natural gas sectors. OPUC will provide and coordinate training opportunities for decision-makers and responders at all levels of government and utilities on Oregon's Electricity and Natural Gas Emergency Response Plans.

Lessons learned from drills and exercises will be incorporated into the energy sector-specific emergency response plans as appropriate.

MAINTAINING REGIONAL, NATIONAL, AND INTERNATIONAL ENERGY OUTLOOK

DOE/OE is the lead federal agency in response to energy emergencies that impact the nation. As the lead federal agency, DOE/OE provides training and information sharing opportunities to the states. ODOE's Emergency Preparedness Manager and OPUC's Utility Safety, Reliability & Security Administrator will participate in the following DOE/OE activities as time and resources allow.

- Periodic conference calls to address energy issues
- Annual meeting, conference, or workshop
- Online training for new Software, communications tools
- Regional exercise

ODOE's Emergency Preparedness Manager will serve as the designated state contact for petroleum emergencies to provide DOE/OE and other western states with timely assessments of event conditions and other pertinent emergency information during petroleum emergencies.

OPUC's Utility Safety, Reliability & Security Administrator will serve as the designated state contact for electricity and natural gas emergencies to provide DOE/OE and other western states with timely assessments of event conditions and other pertinent emergency information during electricity and natural gas events.

PUBLIC INFORMATION AND OUTREACH

ODOE and OPUC will conduct a public education program for Oregonians to help ensure the public has access to information about:

- The potential impacts of energy lifeline shortages or disruptions to the community.
- Preventive measures to help avoid or reduce the impacts if energy supply shortages or disruptions were to occur.
- Conservation measures to be taken before, during and after energy emergencies to help the state recover from supply shortages and disruptions.

Activities include, but are not limited to:

- Providing information materials to the counties for distribution to local residents.
- Providing emergency response information on ODOE's and OPUC's web pages.
- Making emergency response information available to libraries, schools, hospitals, and other locations as appropriate.
- Providing speakers upon request to give presentations on the Oregon State Energy Assurance Plan and energy sector specific emergency response plans.
- Providing information upon request to the news media about the Oregon State Energy Assurance Plan and energy sector-specific emergency response plans as appropriate.

PLAN REVIEW AND UPDATE

ODOE and OPUC will review and update the Oregon State Energy Assurance Plan annually or as needed. Revisions will include improvements identified through drills and exercises. ODOE's Emergency Preparedness Manager will initiate the review and coordinate revisions with industry, federal, state, and county emergency response agencies as appropriate. ODOE will submit the Oregon State Energy Assurance Plan to USDOE annually as the plan of record.

Appendices

OREGON STATE ENERGY ASSURANCE PLAN

APPENDIX A: State of Oregon Emergency Operations Plan: Emergency Support Function 12

APPENDIX B: Memorandum of Understanding Between ODOE and OPUC

APPENDIX C: Fuel Supply Disruption Tracking Form

APPENDIX D: Petroleum Alert and Emergency Notification Call Tree

APPENDIX E: Notification & Activation of Oregon Emergency Response Organizations for Fuel Emergencies

APPENDIX F: ODOE Situation Report Sample for Fuel Emergencies

APPENDIX G: ODOE Emergency Operations Center Organizational Chart

APPENDIX H: Utility Emergency Incident & Outage Situation Report Form

APPENDIX I: Regional Curtailment Plan

APPENDIX J: Proposed Oregon State LNG Emergency Response Plan Format

APPENDIX K: Oregon Distributed Energy Resiliency Study Executive Summary

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ESF 12 – Energy

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ESF 12 Tasked Agencies	
Primary Agencies	Oregon Department of Energy (ODOE) Public Utility Commission (PUC)
Supporting Agencies	Department of Administrative Services (DAS) Department of Human Services (DHS) Oregon Military Department (OMD) Oregon Department of Transportation (ODOT)
Adjunct Agencies	

1 Purpose

- Facilitate restoration of damaged energy systems and components during a potential or actual emergency or major disaster.
- Manage state response to emergencies involving radioactive materials releases from fixed nuclear facilities (Hanford), commercial nuclear power plants (Columbia Generating Station and the Trojan Independent Spent Fuel Storage Installation), and research reactors (Oregon State University and Reed College).
- Manage state response to transportation accidents involving radioactive material shipments on Oregon highways.
- Manage state response to emergencies involving the severe or long-term shortage or disruption of petroleum products. This includes implementing the state wide fuel allocation program when appropriate.
- Manage state response to emergencies involving the transportation, transmission and distribution of Liquefied Natural Gas (LNG).

2 Scope

Gathers, assesses, and shares information on energy system damage and estimations of the impact of energy system outages within affected areas. Determine issues and implements appropriate protective actions to ensure the protection of public health and safety during energy emergencies. Works closely with, and aids in, meeting requests for assistance from local officials, energy industry suppliers and distributors. Within ESF 12, energy includes producing, refining, transporting, generating, transmitting, conserving, building, distributing and maintaining energy systems and system components.

3 Roles and Responsibilities

3.1 Primary Agencies

3.1.1 Department of Administrative Services

Provide restorative services including structural, HVAC and electrical systems within state-owned facilities during or after an incident in the state of Oregon which requires a coordinated response.

3.1.2 Oregon Department of Energy

- The Oregon Department of Energy is responsible for planning, preparedness, response, and recovery from petroleum disruptions (ORS 176), liquefied natural gas mishaps (496), and radiological emergencies (496).
- ODOE operates an agency Emergency Operations Center (EOC) in Salem. The agency EOC serves as the state-wide coordination point for ODOE emergency response activities. ODOE provides a liaison to the state Emergency Coordination Center (ECC) when activated. ODOE maintains six 24/7 duty officers. ODOE is responsible for ensuring state and local emergency response organizations are trained and prepared to respond to petroleum, LNG, and radiological emergencies.
- Petroleum Emergency Preparedness and Response - ODOE maintains Oregon's Petroleum Contingency Plan. The purpose of the plan is to ensure an effective, well-coordinated response with industry, federal, state, and local emergency response organizations to protect public health and safety, the environment, and the region's economy. The plan applies a free market approach with government intervention only when it becomes necessary to protect public health and safety.
- Lead agency for ensuring a coordinated response to severe or long-term petroleum emergencies that impact the state. ODOE developed and maintains the Oregon Petroleum Contingency Plan that includes a state-wide fuel allocation program. ODOE is also the lead agency for ensuring a coordinated response to transportation, transmission and distribution emergencies involving Liquid Natural Gas (LNG) vessels, pipelines, and facilities.
- Developed and maintains the state of Oregon's LNG Emergency Response Plan. The plan defines the state's role and responsibilities to prepare for, respond to, and recover from LNG emergencies that threaten the health and safety of Oregon citizens, the environment, and the region's economy.

ESF 12. Energy

- LNG Emergency Preparedness and Response - Three LNG import facilities are proposed for Oregon to serve the growing need for natural gas supplies in the region. The projects, if built, would receive LNG from ocean going vessels, temporarily store it, and then regasify it before sending it out by pipeline to homes, businesses, electrical generating plants and industries in the Pacific Northwest as well as other parts of the Western United States. Two of the state's LNG Import terminals are proposed the Columbia River and one is proposed in Coos Bay, Oregon.
- Nuclear Emergency Preparedness and Response - ODOE is the lead state agency on nuclear emergency preparedness, response, and recovery. This includes incidents involving fixed nuclear facilities, Independent Spent Fuel Storage Installations (ISFSI), Research Reactors, and radioactive materials transport on Oregon highways (ORS 469). ODOE developed and maintains the Oregon CGS/Hanford Emergency Response Plan, Trojan ISFSI Plan, and the Radioactive Materials Transportation Plan. These plans define the state's role and responsibilities to prepare for, respond to, and recover from radiological emergencies that threaten the health and safety of Oregon citizens, the environment, and the region's economy. ODOE also reviews Oregon State University and Reed College Research Reactor Emergency Response Plans.
- The Federal Emergency Management Agency evaluates ODOE's ability to respond to radiological emergencies biannually to ensure program readiness.
- Assess energy system damage and monitors repair work.
- Collect, assess and provide information to energy supply, demand, and market impacts.
- Identify supporting resources necessary to restore energy systems.
- May deploy DOE response teams as needed to affected areas to assist in response and restoration efforts.

3.1.3 Public Utility Commission

- Regulates the state's investor owned electric, natural gas and telephone utilities, and certain water companies.
- Ensure that utilities and companies have adequate emergency preparedness plans in place.
- During emergencies, disasters, and when the State ECC is activated, the PUC serves as the state's liaison to the utilities.

- Provide assistance to ensure public utilities and PUC regulated entities can effectively restore power, natural gas and other energy sources following a disaster which impact energy resources. Ensure public utilities and PUC regulated entities mobilize and employ the necessary resources available in accordance with emergency plans, as applicable.

3.2 Support Agencies

3.2.1 Department of Human Services

- Provide assistance as appropriate when a disaster occurs that impacts energy resources causing any public health concern or crisis.
- Provide restorative services including structural, HVAC and electrical systems within state-owned facilities during or after an incident in the state of Oregon which requires a coordinated response.

3.2.2 Oregon Military Department

- Provides support assistance as needed.

3.2.3 Oregon Department of Transportation

- Provide traffic control for response to transportation accidents involving radioactive material shipments on state highways.
- Provide staging areas for checkpoints of shipments of agriculture products coming from southeast Washington in the event of a radioactive materials release from Hanford or the Columbia Generating Station.
- Provide technical assistance to transit providers to help with additional riders a fuel crisis would bring to transit systems.
- Provide technical assistance to local governments that start or expand rideshare programs in response to a fuel shortage.
- Assist with distribution of fuel crisis information through local ODOT District and DMV offices.
- Impose highway restrictions as needed in the event of an energy resource emergency, to include actions such as reduced speed limits and new multi-occupant vehicle lane designations.

3.3 Adjunct Agencies

[TO BE DEVELOPED]

4 Concept of Operations

OEM will coordinate all requests for assistance and communicate with the state agencies to identify the appropriate action and state resources to be used. Once Energy assets have been identified to meet the request, OEM will create an action using Ops Center to the specific State agencies to accomplish the task.

ODOE operates an agency Emergency Operations Center (EOC) in Salem. The agency EOC serves as the state-wide coordination point for ODOE emergency response activities. ODOE provides a liaison to the state Emergency Coordination Center (ECC) when activated. ODOE maintains six 24/7 duty officers. ODOE is responsible for ensuring state and local emergency response organizations are trained and prepared to respond to petroleum, LNG, and radiological emergencies.

In the event of a petroleum emergency, ODOE would direct and coordinate the state's overall response effort. ODOE will assess the severity and duration of a supply shortage or disruption, identify potentially affected areas, determine the risks and potential impacts to Oregonians, and advise the Governor on how best to protect the health and safety of Oregonians and the state's economy. This includes recommending and implementing voluntary or emergency conservation measures to reduce the use of petroleum products in the state and implementing Fuel Allocation Procedures if necessary. ODOE is also responsible for coordinating all emergency information and instructions released to the public and news media regarding the state's response effort and emergency actions.

The Oregon Petroleum Contingency Plan includes a state-wide fuel allocation program. If fuel allocation becomes necessary, ODOE would administer the state's Fuel Allocation Program and designate the set-aside volume. ODOE is responsible for working with the state's petroleum suppliers and wholesalers to implement the set-aside volume for use by the state. The set-aside program is designed to interfere minimally with the market, using set-aside volumes that are sufficient only to satisfy hardship and emergency cases. The set-aside program makes no attempt to reduce or inhibit the market price of fuels. All fuel delivered through the program will be purchased at the market price, and whenever possible, through the usual supplier.

ODOE's Fuel Allocation Program is designed to ensure emergency fuel to priority users performing life saving functions, restoring Oregon's critical infrastructure, and preventing community hardships. ODOE uses a three-tiered approach for allocating fuel to priority users. Tier 1 covers the state's emergency services providers. Tier 2 covers the state's essential services providers. Tier 3 allows for a community to request fuel supplies from the state set-aside. A community must show it has an emergency or hardship caused by a shortage of fuel or is receiving relatively less than other areas of the state. Providing emergency fuel to communities is the only element where retail service stations may receive a set-aside allocation. However, the State will not direct set-aside

volumes to specific stations. It will direct prime suppliers to release a certain volume to an area through normal supply channels.

During a fuel supply shortage situation, the need for a method to alleviate potentially long lines at retail service stations may arise. ODOE would implement the Odd/Even Fuel Allocation Measure for the public as appropriate.

All fuel rationing activities requires an Energy Emergency Declaration from the Governor.

In the event of an emergency at an LNG import terminal or along the transport route, ODOE will direct and control the state's overall response effort. This includes:

- Receiving initial notifications from LNG developers about an event,
- Notifying and/or establishing contact with all affected federal, state, and county emergency response organizations to ensure a coordinated response,
- Working with the U.S. Coast Guard, state agencies, and local emergency response organizations to assess the severity of the event, determine impacts to Oregon, and advise the Governor on protective actions for the public, and
- Developing and disseminating emergency information to the public and the news media.

In the event of a radiological emergency, ODOE will direct and control the state's overall response. This includes:

- Alert and mobilize emergency responders,
- Provide timely and accurate information to the public and news media,
- Assess the severity of the radiological accident,
- Issue and implement appropriate protective action recommendations to protect public health and safety,
- Identify and track the radioactive release, and
- Sample, process, and analyze potentially contaminated soil, vegetation, air, and water.

5 Supporting Documents

- National Response Framework, ESF 12 – Energy
- County ESF 12 Annexes

- PUC-Utility Emergency Response Binder
- ODOE-OPUC Procedural Flowchart & existing MOU

6 Appendices

None at this time.

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**UNDERSTANDING ON THE AREAS OF RESPONSIBILITIES
PERTAINING TO EMERGENCY RESPONSE BETWEEN THE OREGON
DEPARTMENT OF ENERGY AND THE OREGON PUBLIC UTILITY
COMMISSION**

PURPOSE

This Memorandum of Understanding (MOU) establishes a framework for cooperation and outlines responsibilities for the Oregon Department of Energy (ODOE) and the Oregon Public Utility Commission (OPUC) for preparedness and response to energy emergencies that impact the state. This includes petroleum disruptions and shortages, natural gas events, and electricity emergencies. While ODOE takes the lead in preparing for, responding to, and recovery from petroleum mishaps, OPUC is responsible for electricity and natural gas incidents.

RESPONSIBILITIES

Initial Notifications

Petroleum Events – ODOE will provide courtesy notifications to the OPUC. No action is required by the OPUC unless the petroleum emergency impacts the natural gas or electricity supply and distribution systems.

Natural Gas Events – OPUC will provide courtesy notifications to the ODOE. No action is required by ODOE unless the natural gas event impacts the petroleum supply and distribution system.

Electricity Events – OPUC will provide courtesy notifications to ODOE. No action is required by ODOE unless the electricity event impacts the petroleum supply and distribution system.

Event Assessment and Protective Action Decisions

Petroleum Events – ODOE will work with petroleum industry partners to assess the severity of the fuel disruption or shortage, determine its impact on Oregon, and implement protective actions as appropriate to protect the health and safety of Oregonians. This includes issuing voluntary and emergency fuel conservation measures as appropriate and the allocation of emergency fuel if it becomes necessary. Emergency conservation measures and the allocation of fuel require an Emergency Declaration by the Governor. ODOE will work with the Governor's Office and the appropriate state agencies to secure an Emergency Declaration, if appropriate. If fuel allocation becomes necessary, ODOE will work with and rely on the expertise of the OPUC to determine fuel needs for the electricity and natural gas sectors.

Natural Gas Events – OPUC will work with natural gas companies to assess the severity of the natural gas disruption or shortage, determine its impact on Oregon, and implement protective actions as appropriate to protect the health and safety of Oregonians.

Electricity Events – OPUC will work with utility companies and the Bonneville Power Administration to assess the severity of electricity outages, determine its impact on Oregon, and implement protective actions as appropriate to protect the health and safety of Oregonians.

Emergency Information

Petroleum Events – ODOE will draft and disseminate emergency information to the news media and the public. ODOE will provide event status updates to the Governor, the legislative leadership, the Petroleum Advisory Group, state and local emergency response organizations including OPUC, states in the Petroleum Administration Defense District V, U.S. Department of Energy (USDOE), and other federal agencies as appropriate.

Natural Gas Events – OPUC will draft and disseminate emergency information to the news media and the public. OPUC will provide event status updates to the Governor, the legislative leadership, natural gas industry, state emergency response organizations including ODOE, USDOE, Pipeline Hazardous Materials Safety Administration, and other federal agencies as appropriate.

Electricity Events – OPUC will draft and disseminate emergency information to the news media and the public. OPUC will provide event status updates to the Governor, the legislative leadership, state emergency response organizations including ODOE, and other agencies as appropriate.

Emergency Center

Petroleum Events – The ODOE Emergency Operations Center (EOC) will be activated in response to petroleum emergencies that impact the state. ODOE staff will direct and control the state's overall response to petroleum emergencies from the ODOE EOC. This includes assessing the severity of the event; determining the event's impacts on Oregonians; determining and implementing appropriate protective actions; and issuing emergency information to federal, state, and local response organizations, the news media, and the public. If the Oregon Emergency Coordination Center (ECC) at the Oregon Emergency Management Division (OEM) is activated, ODOE will send a liaison to the Oregon ECC to provide information on ODOE actions in response to the petroleum event as appropriate.

Natural Gas Events – OPUC will report to the Oregon ECC at OEM in response to natural gas emergencies that impact the state. OPUC staff will provide support to the state's overall response to natural gas emergencies from the Oregon ECC. This includes assessing the severity of the event; determining the event's impacts on Oregonians; determining and implementing appropriate protective actions; and issuing emergency information to federal, state, and local response organizations, the news media, and the public.

Electricity Events – OPUC will report to the Oregon ECC at OEM in response to electricity emergencies that impact the state. OPUC staff will provide support to the state’s overall response to electricity emergencies from the Oregon ECC. This includes assessing the severity of the event; determining the event’s impacts on Oregonians; determining and implementing appropriate protective actions; and issuing emergency information to federal, state, and local response organizations, the news media, and the public.

Interface with the U.S. Department of Energy’s (USDOE) Office of Energy Assurance

USDOE’s Office of Energy Assurance (OE) is the lead federal agency in response to energy emergencies that impact the nation. OE will call the designated state contacts (noted below) for timely assessment of the event conditions and other pertinent emergency information during energy emergencies. OE will also provide training and information sharing opportunities to the states. They include:

- ⇒ Periodic Conference Calls to Address Energy Issues as Needed
- ⇒ Annual Meeting/Conference
- ⇒ Online Training for New Software/Communications Tools
- ⇒ Regional exercise (optional)

Petroleum Events – ODOE will serve as OE’s primary contact for information about emergencies impacting Oregon’s petroleum supply and distribution system. ODOE will ensure that the agency’s plans and procedures are consistent with OE’s for information sharing. ODOE will also participate in activities conducted by OE as appropriate and as resources allow.

Natural Gas Events – OPUC will serve as OE’s primary contact for information about emergencies impacting Oregon’s natural gas supply and distribution system. OPUC will also participate in activities conducted by OE as appropriate and as resources allow.

Electricity Events – OPUC will serve as OE’s primary contact for information about emergencies impacting Oregon’s electricity supply and distribution system. OPUC will also participate in activities conducted by OE as appropriate and as resources allow.

Emergency Response Training

Petroleum Events – ODOE will conduct drills and exercises to ensure the industry, federal, state, and local emergency response organizations are prepared to respond to petroleum emergencies that impact the state.

Natural Gas Events – OPUC will monitor industry-initiated drills and exercises to ensure the natural gas operators are prepared to respond to natural gas emergencies that impact the state.

Electricity Events – OPUC will monitor industry-initiated drills and exercises to ensure the utility operators are prepared to respond to electricity emergencies that impact the state.

Plan/Procedures

Oregon State Energy Assurance Plan - ODOE and OPUC will review and update the Oregon State Energy Assurance Plan annually or as needed. Revisions will include improvements identified through drills and exercises. ODOE's Emergency Preparedness Manager will initiate the review and coordinate revisions with industry, federal, state, and county emergency response agencies as appropriate. ODOE will submit the Oregon State Energy Assurance Plan to USDOE annually as the plan of record.

Sector Specific Emergency Response Plans

Petroleum Events – ODOE will develop and maintain emergency plans and procedures for petroleum emergencies that impact the state. The Oregon Petroleum Contingency Plan will be reviewed annually and revised as appropriate to ensure that plans and procedures are consistent with: the changing trends of the world petroleum market; and the plans and procedures of federal, state, and local organizations that support ODOE's response to petroleum emergencies. ODOE will update the Oregon Petroleum Emergency Contacts List quarterly.

Natural Gas Events – OPUC will develop and maintain emergency plans and procedures for natural gas emergencies that impact the state. The Natural Gas Emergency Plan will be reviewed annually and revised as appropriate to ensure that plans and procedures are consistent with: the changing trends of the world natural gas market; and the plans and procedures of federal, state, and local organizations that support OPUC's response to natural gas emergencies.

Electricity Events – OPUC will develop and maintain emergency plans and procedures for electricity emergencies that impact the state. The Electricity Emergency Plan will be reviewed annually and revised as appropriate to ensure that plans and procedures are consistent with: the changing trends of the world electricity market; and the plans and procedures of federal, state, and local organizations that support OPUC's response to electricity emergencies.

EFFECTIVE DATES, EXPIRATION AND CHANGES TO THIS MEMORANDUM OF UNDERSTANDING

Effective Date


This Memorandum of Understanding (MOU) is effective as of the date it is signed.

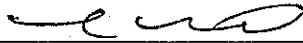
Expiration

This MOU will remain in effect until formally cancelled by one of the parties to the MOU.

Changes

This MOU can be changed by mutual agreement of the parties involved. In the event of changes, a new MOU will be issued and signed by the parties.

 15/9/12
Date
Bob Repine
Acting Director
Oregon Department of Energy

 15/8/12
Date
Michael Dougherty
Interim Executive Director
Public Utility Commission of Oregon



Appendix C

FUEL SUPPLY DISRUPTION TRACKING FORM

DATE:

COMPLETED BY:

TIME: am/pm

TITLE:

1. PETROLEUM INFRASTRUCTURE AFFECTED

REFINERY(S)

- BP Cherry Point
- Conoco Phillips
- Shell Anacortes
- Tesoro Refining & Marketing Company

DISTRIBUTION TERMINAL(S)

- BP
- Chevron
- Conoco Phillips
- Kinder Morgan
- McCall Oil
- NuStar
- Shell
- Tesoro

PIPELINE COMPANY(S)

- Chevron Pipeline (*Salt Lake City to Spokane*)
- Kinder Morgan Pipeline (*Portland terminal to PDX and Eugene Terminal*)
- NuStar Pipeline (*Umatilla to Union Pacific storage facility south of Hermiston*)
- Olympic Pipeline (*WA refineries to Portland terminals - 230 miles*)

2. FACILITY OR SYSTEMS AFFECTED

SYSTEM AFFECTED

- Tank Farm(s) Pipelines Containment Marine Dock Loading Racks Other: _____

DESCRIPTION: _____

CAUSE OF SUPPLY DISRUPTION OR ACCIDENT

- Refinery or Terminal Shutdown Pipeline Failure Natural Disaster Terrorism or Sabotage War or Civil Unrest Fire or Explosion Other: _____

DESCRIPTION: _____

3. PRODUCT SUPPLY AFFECTED

- Crude Jet Fuel Fuel Oil Heating Oil Other _____
 Gasoline Aviation Gasoline Additives (No. 2 Distillate) Other _____
 Diesel Propane Other _____

4. PETROLEUM INDUSTRY RESPONSE & RECOVERY ACTIONS

- Facility operators must complete a Facility Operations Log following petroleum emergencies and a Facility Start-Up Plan prior to restarting operations. ODOE responders should obtain this information from operators during the state's assessment of fuel supplies. See Attachment 1B.
- Power Yes ___ No ___
 Water Yes ___ No ___
 Communications Yes ___ No ___

5. PETROLEUM INDUSTRY REQUESTS OF ODOE

- Request ODOE coordinate acquiring waivers of federal and state driver hour limitations to increase bulk highway fuel transport.
- Request ODOE coordinate acquiring waivers from DEQ and EPA for the import of gasoline that does not meet local and federal air quality requirements.
- Request ODOE coordinate with USDOE to obtain Jones Act waivers for the import of petroleum products on non-US flag vessels.
- Request ODOE facilitate obtaining generators for distribution terminals in the event of a power outage to support recovery actions.
- Other actions as appropriate: _____

6. SUPPLY ASSESSMENT

REFINERIES

Capacity (B/D)

Washington State	Operating	Shut Down	Restarting	Reduced Runs	Back to Normal
BP Cherry Point - Blaine					
Conoco Phillips – Ferndale					
Shell – Anacortes					
Tesoro – Anacortes					
TOTAL SUPPLY DISRUPTION					

TERMINALS

Capacity (B/D)

Oregon State	Operating	Shut Down	Restarting	Reduced Runs	Back to Normal
BP – Portland					
Chevron – Portland					
Conoco Phillips – Portland					
Kinder-Morgan – Portland					
Kinder-Morgan – Eugene					
McCall Oil – Portland					
Shell Oil – Portland					
NuStar – Portland					
Tesoro – Vancouver, WA					
TOTAL SUPPLY DISRUPTION					

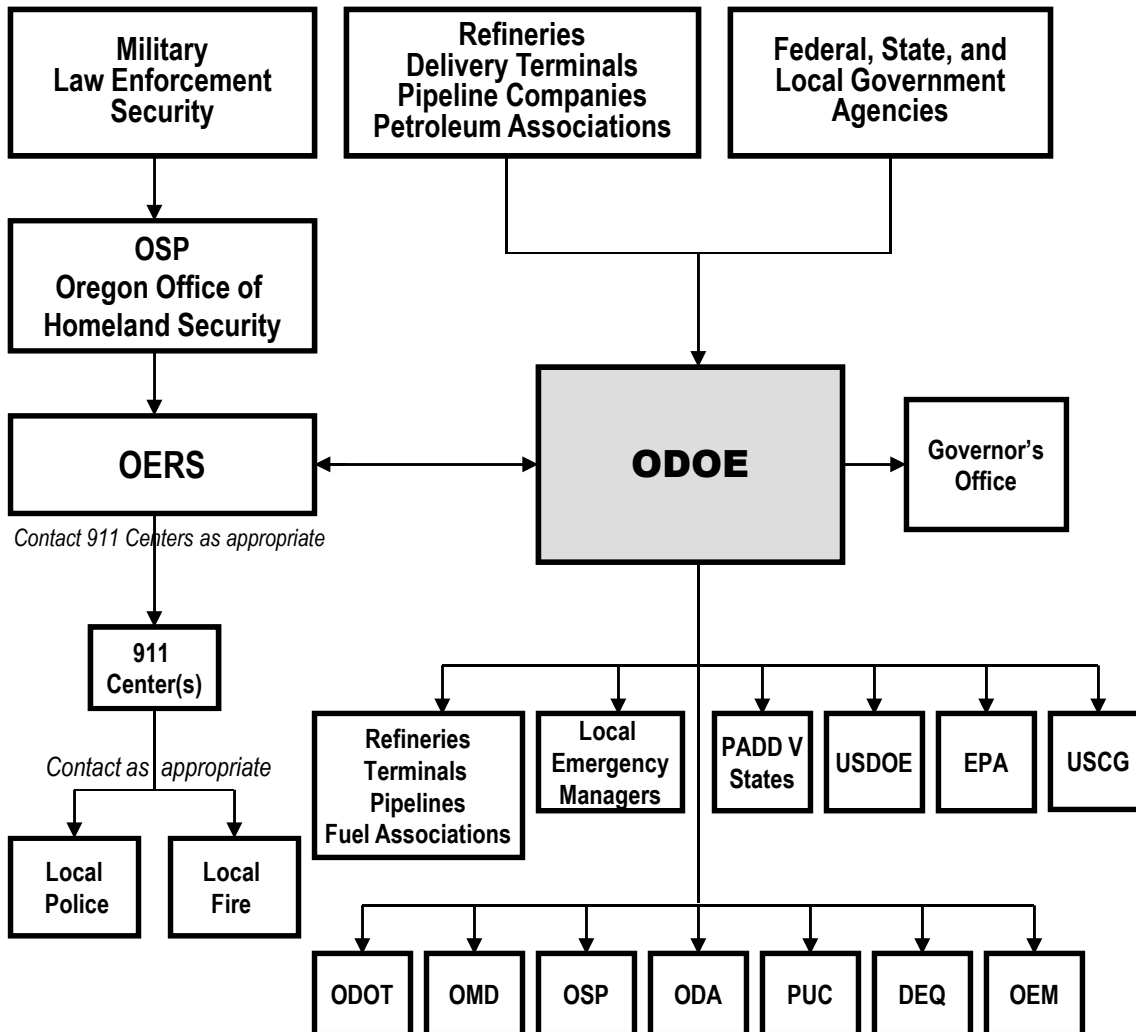
PIPELINE COMPANIES

Capacity (B/D)

Regional	Operating	Shut Down	Partial Shut Down	Reduced Rates	Back to Normal
Olympic Pipeline WA Refineries to Portland Distribution Terminals					
Chevron Pipeline Salt Lake City, UT to Spokane, WA – Supplies NE Oregon					
Kinder-Morgan Pipeline Kinder-Morgan Portland terminal to Portland International Airport and Eugene, OR Terminal					
NuStar Pipeline Umatilla to Union Pacific storage facility south of Hermiston					
TOTAL SUPPLY DISRUPTION					

Appendix D

Petroleum Alert and Emergency Notification Call Tree



Alert and Emergency Notifications:

- To report suspicious activity, actual attacks, or other emergency situation at the terminals or pipelines.
- To report forecasted petroleum shortage or disruption.
- To report potential or actual attacks on the petroleum supply or distribution system.
- To report other energy events that may impact the the state's petroleum supply or distribution system.

ACRONYMS

DEQ:	Oregon Department of Environmental Quality
ODA:	Oregon Department of Agriculture
ODOE:	Oregon Department of Energy
ODOT:	Oregon Department of Transportation
OERS:	Oregon Emergency Response System
OEM:	Oregon Emergency Management
OMD:	Oregon Military Department
OSP:	Oregon State Police
PADD V:	Petroleum Administration for Defense District V: Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington
PUC:	Public Utility Commission
USCG:	U.S. Coast Guard
USDOE:	U.S. Department of Energy
US EPA:	U.S. Environmental Protection Agency

Appendix E

Notification and Activation of Oregon Emergency Response Organizations for Petroleum Emergencies

The Oregon Department of Energy (ODOE) will provide initial notifications to federal, state, and local emergency response organizations in the event a petroleum emergency. Upon activation of the agency's Emergency Operations Center, ODOE may request organizations send representatives to the ODOE EOC to support the state's response to fuel shortages and disruptions depending on the severity of event conditions.

Emergency Response Organization	Level 1	Level 2	Level 3	Level 4
	No discernable shortage. Possible shortages elsewhere	5-10% reduction in supply for a week or more. Estimated shortage by days a terminal is closed or the number of substitutions of truck deliveries instead of normal pipeline supply.	10-15% reduction in supply for three weeks or more. Curtailments by local gas distribution companies for two weeks or more.	Greater than 15%* reduction in availability of petroleum products.
Governor	<i>ODOE routinely monitors international and domestic events to better anticipate problems with potential impacts to Oregon's petroleum supply, distribution system and prices.</i>	Notify. Standby for additional information.	Notify. Report to ODOE EOC if requested.	Notify. Report to ODOE EOC.
State Agencies: OERS, OEM, ODOT, OSP, OMD, PUC, ODA, DAS, and DEQ		Notify. Standby for additional information.	Notify. Report to ODOE EOC if requested.	Notify. Report to ODOE EOC.
County Agencies: 36 County Emergency Management Agencies		Notify. Standby for additional information.	Notify. Limited activation of county EOCs as appropriate.	Notify. Full activation of county EOCs as appropriate.
Federal Agencies: USDOE, EPA, and USCG		Notify. Standby for additional information.	Notify. Standby for additional information.	Notify. Standby for additional information. Support ODOE EOC as needed.
PADD V States: Alaska, Arizona, California, Idaho, Hawaii, Nevada, and Washington		Notify. Standby for additional information.	Notify. Standby for additional information.	Notify. Standby for additional information.
Refineries: BP Cherry Point Refinery, Conoco Phillips Refinery, Shell Anacortes Refinery, and Tesoro Refinery		Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.. Support fuel allocation measures as needed.
Terminals: BP, Chevron, Conoco Phillips, Kinder-Morgan Energy, McCall, Shell Oil Products, NuStar, and Tesoro Petroleum (Vancouver, WA)		Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation. Support fuel allocation measures as needed.
Pipelines: Chevron Pipeline Company, Chevron Willbridge Products System, NuStar, Kinder-Morgan Pacific Operations, & Olympic Pipeline Company		Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation. Support fuel allocation measures as needed.
Associations: OPMA and WSPA		Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.	Notify. Assess and report on supply situation.. Support fuel allocation measures as needed.

Appendix F

SITUATION REPORT #75

September 15, 2010 (9:00 a.m. PST)



OREGON
DEPARTMENT OF
ENERGY

<http://www.energy.state.or.us/EOC/index.htm>

EMERGENCY SUPPORT FUNCTION (ESF) 12: ENERGY

ORS 176.809 authorizes the Oregon Department of Energy (ODOE) to prepare and respond to petroleum emergencies that impact Oregon. ODOE continues to work with suppliers, wholesalers, and distributors to restore the petroleum infrastructure and ensure fuel is delivered to emergency and essential service providers in the state in the aftermath of the magnitude 9.0 earthquake Tuesday, June 15, 2010 at 10 a.m. The quake rocked the Pacific Northwest from Canada to Northern California and caused approximately four minutes of ground shaking which was felt significantly west of the Cascades and most severely along the coast.

BACKGROUND

There are no internal crude resources in Oregon and the state has no refining capabilities. Oregon imports 100 percent of its refined petroleum products. More than 90 percent of the fuel Oregon receives come from four refineries in the Puget Sound Area of Washington State. More than 70 percent of this fuel is transported 230 miles from the refineries to eight petroleum distribution terminals near the Linton Wilbridge and St. Helens Road area of Northwest Portland via the Olympic Pipeline. Once the fuel reaches the Portland distribution terminals, one pipeline, a fleet of about 1,500 trucks, and barges on the Columbia distribute fuel to roughly 2,250 retail service stations throughout the state.

On average there is a one week supply of diesel and unleaded gasoline in storage at the Portland distribution terminals. Retail service stations store a 2-3 day supply of fuel onsite. The Portland International Airport has a 3-day supply of jet fuel in storage on site.

Refineries and petroleum distribution terminals are not designed to withstand a 9.0 earthquake with four minutes of ground shaking. Damages to facilities, tanks, facility piping, and other systems was significant throughout western Oregon and Washington. While crude and product pipelines are flexible by design, earth movement from a catastrophic quake put significant stress on the pipelines and will likely caused leaks and damages throughout the lines. It will likely weeks or months to fully assess and repair anticipated damage to these facilities. Expect little to no production or product movement for more than one week.

Electricity, telecommunications, pipelines, bridges and roads, natural gas and city water supply are critical resources for facility operations, responding to emergencies onsite, and recovery efforts to restore the petroleum infrastructure following a catastrophic event.

0 – 72 HOURS

ODOE ACTIONS

- Activated ODOE EOC and established communications with refineries, petroleum distribution terminals, and pipeline companies servicing Oregon to assess impacts to the petroleum infrastructure.

- ODOE Liaisons responded to the Joint Field Office to address fuel issues and concerns. ODOE requested generators for refineries and petroleum distribution terminals.
- Established contact with the U.S. Department of Energy, Lead Federal Agency for ESF 12. We participated in USDOE daily conference calls with all 50 states to assess regional and national fuel outlook and possible assistance to Oregon.
- Requested information from the Oregon Public Utility Commission (PUC) about damages to the electricity, natural gas, and telecommunications infrastructure. Power, natural gas, and communications capabilities are critical to the refineries, petroleum distribution terminals, and pipeline companies to conduct timely damage assessments of facilities, equipment, and systems and for operations.
- Requested information from the Oregon Department of Transportation (ODOT) on damages to roads and bridges to determine viable transportation corridors to support fuel deliveries.
- Requested the Oregon Department of Aviation conduct a flyover of the refineries and petroleum distribution terminals for a visual assessment of the conditions at these facilities.
- Requested U.S. Coast Guard provide special access for workers to enter distribution terminals during the lockdown of port facilities. MARSEC 3 puts the Port of Portland in lockdown stopping the movement of fuel and worker traffic into and out of the petroleum distribution terminals.
- Drafted and issued news releases providing information on impacts to Oregon's fuel supply and distribution system, protective action recommendations for the public and voluntary fuel conservation measures.

PETROLEUM INDUSTRY ACTIONS

REFINERIES - Onsite workers at four refineries in Washington State completed initial visual inspections of its facilities. All four refineries sustained severe damage to their facilities, equipment, and systems and remain in shutdown mode. All four refineries lost power as a result of the earthquake and do not have generators onsite. Refineries remain without power. Power is required for refinery workers to complete a detailed engineering inspection of pipes, vessels, structures, and tanks to evaluate mechanical integrity.

PETROLEUM DISTRIBUTION TERMINALS – Onsite workers at eight Portland petroleum distribution terminals completed initial visual inspections of their facilities. All eight distribution terminals report severe damages to terminal facilities, tanks, containment systems, additive systems and facility piping resulting in spills and leaks. All eight terminals are without power. Some terminals have small generators onsite to produce limited backup power for running boilers for steam heating of heavy oil lines and tanks and for providing minimal lighting. These generators do not produce enough power to drive operations or to complete a more detailed assessment of damages. Power is required for terminal workers to complete a detailed engineering inspection of pipes, vessels, structures, and tanks to evaluate mechanical integrity.

PIPELINE COMPANIES – Pipeline operators reported difficulty in assessing integrity of the pipeline system due to the loss of power. Aerial Patrols have conducted over-flights along the Right of Way and reported many releases requiring verification. Operators had to postpone dispatching personnel to inspect the pipeline Right of Ways until roads and bridges were viable. Inspecting the pipeline Right of Way must be done by vehicle and walking the length of the pipelines. Power is also necessary to verify the pressure and integrity of the pipelines.

72 – 168 Hours

Assumptions: Limited telecommunications capabilities, generators delivered to refineries and petroleum distribution terminals, and limited viable roads and bridges.

- ODOE EOC remained fully operational and decision-makers and emergency responders continue to work with refineries, petroleum distribution terminals, and pipeline companies servicing Oregon to assess impacts to the petroleum infrastructure.
- ODOE Liaisons continued participation at the JFO to coordinate ESF 12 response and recovery efforts for the fuel sector. This included working with the Oregon Military Department to coordinate the delivery of generators to the petroleum distribution terminals and working with Washington State on the delivery of generators to the refineries.
- ODOE requested USDOE provide assistance in obtaining fuel from other regions to support emergency response efforts in Oregon. ODOE requested Oregon Military Department assistance in providing portable fueling locations to dispense fuel for emergency and essential services providers.
- Continued to work closely with PUC to monitor the restoration efforts of the electricity, natural gas, and telecommunications infrastructure to support fuel supply and distribution system damage assessment and restoration efforts.
- Continued to work closely with ODOT to monitor the restoration of roads and bridges to determine viable transportation corridors to support fuel deliveries.
- Continued to work closely with USCG to approve access of workers to the distribution terminals in a MARSEC 3 lockdown of port facilities.
- Began work with Oregon counties impacted by quake to assess fuel needs of emergency service providers. This included law enforcement, fire service, and medical service providers.
- Began work with state agencies to assess fuel needs for essential service providers. This included utilities, telecommunications, transportation, sanitation, public works, agriculture, and other essential service providers to assess fuel needs.
- Continued to draft and issue news releases providing information on impacts to Oregon's fuel supply and distribution system, protective action recommendations for the public and voluntary fuel conservation measures.

PETROLEUM INDUSTRY ACTIONS

Refineries, petroleum distribution terminals, and pipeline companies received generators allowing onsite workers the ability to begin detailed engineering inspections of pipes, vessels, structures, tanks, and pipelines to evaluate mechanical integrity. It took 24-48 hours to complete a detailed inspection of facilities with the available power. There was no production or movement of fuel at this time.

1 Week – 1 Month

Assumptions: Limited telecommunications capabilities, refineries and petroleum distribution terminals operating with generators, and limited viable roads and bridges.

- ODOE EOC remained fully operational and decision-makers and emergency responders continue to work with refineries, petroleum distribution terminals, and pipeline companies servicing Oregon to get fuel production and movement restored.
- ODOE Liaisons continued participation at the JFO to coordinate ESF 12 response and recovery efforts for the fuel sector. This included working with the Oregon Military Department to identify locations to establish portable fueling stations and coordinate the delivery of fuel obtained from USDOE from other regions to the emergency and essential service providers in Oregon.
- Worked with ODOT to implement public campaign promoting mobility conservation measures like taking public transit, carpooling, bicycling, and other ways to limit driving personal vehicles.
- Implemented Odd/Even fuel allocation for the public.
- Worked with Oregon Department of Justice (DOJ) to suspend regulations on additives like boutique gasoline requirements until the supply chain was fully restored. Some fuels from outside the region did not meet Oregon standards.
- Worked with DOJ to suspend regulations on vapor recovery systems at dock facilities to allow all distribution terminals with working docks to receive fuel from tanker vessels. Both Chevron and Kinder Morgan dock facilities sustained significant damage. Of the eight distribution terminals, only Chevron and Kinder Morgan (docks located right next to each other) were permitted to receive gasoline products by tankers. The dock facilities at six of the terminals were not equipped with vapor recovery systems.
- Continued to work closely with PUC to monitor the restoration efforts of the electricity, natural gas, and telecommunications infrastructure to support fuel supply and distribution system damage assessment and restoration efforts.
- Continued to work closely with ODOT to monitor the restoration of roads and bridges to determine viable transportation corridors to support fuel deliveries.
- USCG change in its MARSEC 2 level (from MARSEC 3 to MARSEC 2) lifted lockdown of port facilities allowing access of workers to the distribution terminals without security clearance.
- Continued to draft and issue news releases providing information on impacts to Oregon's fuel supply and distribution system, protective action recommendations for the public and voluntary fuel conservation measures.

PETROLEUM INDUSTRY ACTIONS

Refineries, petroleum distribution terminals, and pipeline companies completed engineering assessments of facilities and systems. The assessments confirmed significant damages to the integrity of pipes, vessels, structures, tanks, and pipelines, which severely impacted operations. Industry personnel prioritized and repaired facilities, equipment and systems as needed to jumpstart fuel production and distribution. Limited fuel production and movement occurred during this period.

1 Month – Present

Assumptions: Moderate telecommunications capabilities, electricity restored to refineries and petroleum distribution terminals, and some viable roads and bridges to support fuel deliveries.

- ODOE EOC continues 24/7 operation at a limited activation to continue working with petroleum distribution terminals to set aside and allocate available fuel for emergency and essential service providers as directed by ODOE.
- If JFO is still operational, ODOE Liaisons will continue to participate at the JFO to coordinate ESF 12 response and recovery efforts for the fuel sector.
- Monitor and determine when waivers for additives and vapor recovery systems are to be lifted. Trigger – viable roads and bridges allowing for delivery of additives.
- Monitor and determine when to terminate Odd/Even fuel allocation for the public.
- Monitor and determine when to terminate fuel allocation for emergency and essential services. Trigger – when emergency and essential services are able to fuel up at their normal fueling locations.
- Continue to work closely with PUC to monitor the restoration efforts of the electricity, natural gas, and telecommunications infrastructure.
- Continue to work closely with ODOT to monitor the restoration of roads and bridges to determine viable transportation corridors to support fuel deliveries.
- Continue to draft and issue news releases providing information on impacts to Oregon’s fuel supply and distribution system, protective action recommendations for the public and voluntary fuel conservation measures.

PETROLEUM INDUSTRY ACTIONS

Refineries, petroleum distribution terminals, and pipeline companies continue repairs to facility, equipment, and systems. Moderate fuel production and movement during this period.

FOR MORE INFORMATION:

Deanna Henry
Emergency Preparedness Manager
Nuclear Safety & Energy Emergency Preparedness Division
Oregon Department of Energy
(503) 932-4428
deanna.henry@state.or.us

Oregon Petroleum Supply & Distribution System Status

REFINERIES

REFINERY	Capacity (B/D)				
	OPERATING	SHUT DOWN	RESTARTING	REDUCED RUNS	BACK TO NORMAL
BP Cherry Point 4519 Grandview Road Blaine, WA 98230					
Conoco Phillips 3901 Unick Road Ferndale, WA 98248					
Shell Anacortes 8505 S. Texas Road Anacortes, WA 98221					
Tesoro Refining and Marketing Company March Point Road Anacortes, WA					

PETROLEUM DISTRIBUTION TERMINAL

TERMINAL	Capacity (B/D)				
	OPERATING	SHUT DOWN	RESTARTING	REDUCED RUNS	BACK TO NORMAL
BP 9930 NW St Helens Rd Portland, OR 97231					
Chevron 5924 NW Doane Ave Portland, OR 97208					
Conoco Phillips 5528 NW Doane Ave Portland, OR 97208					
Kinder-Morgan <i>(Third Party Terminal)</i> 5880 NW St. Helens Rd Portland, OR 97210					
McCall Oil 5550 NW Front Ave Portland, OR 97210					
Shell Oil 3800 NW St. Helens Rd Portland, OR 97210					
NuStar <i>(Third Party Terminal)</i> 9420 NW St. Helens Rd Portland, OR 97231					

Tesoro <i>(Vancouver, WA Storage Terminal -Columbia River)</i> 2211 Saint Francis Ln Vancouver, WA 98660					
PIPELINE COMPANIES					
PIPELINE	Capacity (B/D)				
	OPERATING	SHUTDOWN	PARTIAL SHUTDOWN	REDUCED RATES	BACK TO NORMAL
Olympic Pipeline WA Refineries to Portland Distribution Terminals					
Chevron Pipeline Salt Lake City, UT to Spokane, WA – Supplies NE Oregon					
Kinder-Morgan Pipeline Kinder-Morgan Portland terminal to Portland International Airport and Eugene, OR Terminal					
NuStar Pipeline Umatilla to Union Pacific storage facility south of Hermiston					

SAMPLE

Appendix G ODOE EOC OPERATIONS



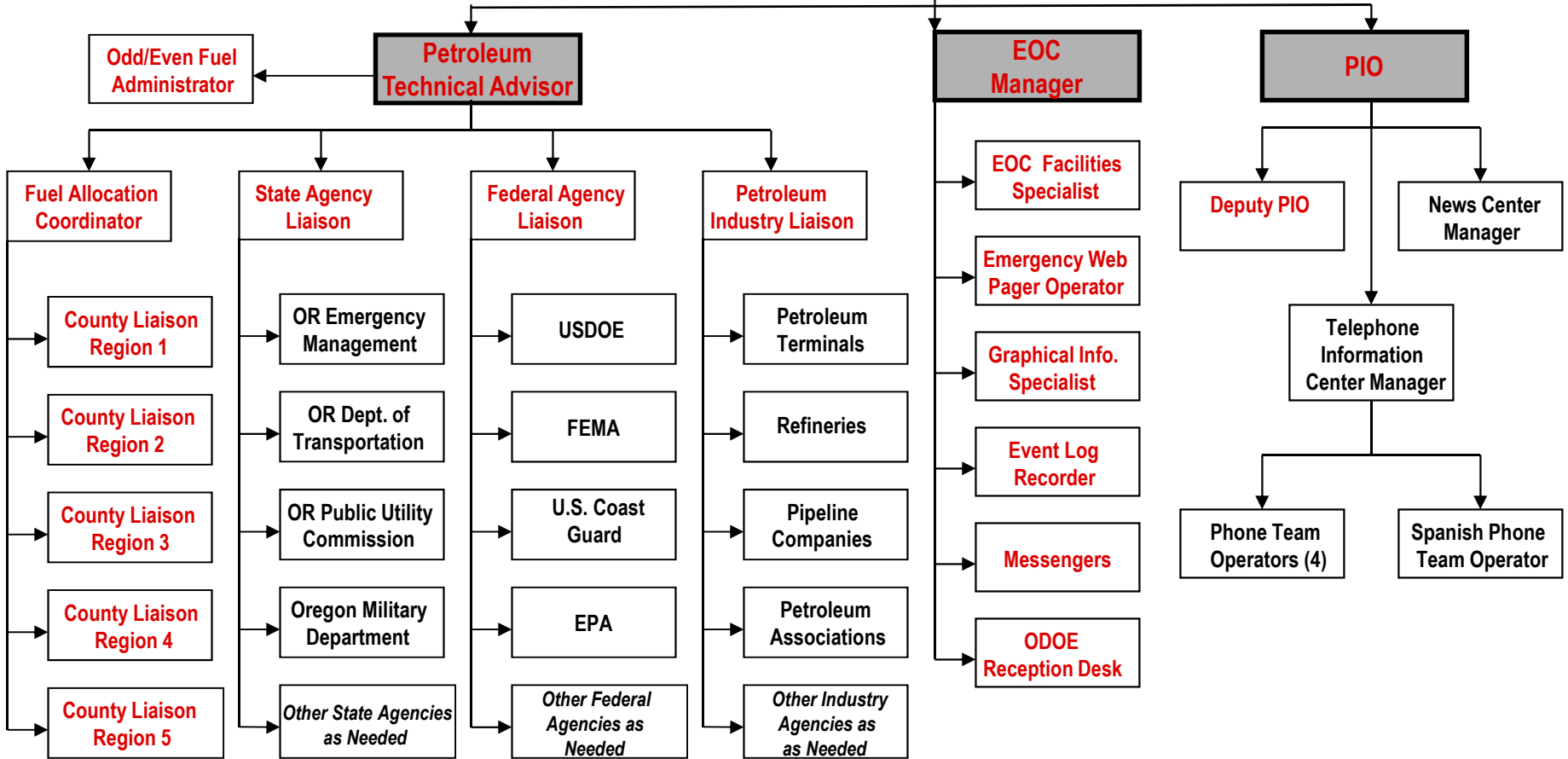
ODOE positions in **red** are required for full EOC activation.
(One individual can fill more than one required position if appropriate)

- Region 1:** Clackamas, Hood River, Multnomah, & Washington Counties
- Region 2:** Benton, Clatsop, Columbia Lane, Lincoln, Linn, Marion, Polk, Tillamook & Yamhill Counties
- Region 3:** Coos, Curry, Douglass, Jackson, & Josephine Counties
- Region 4:** Crook, Deschutes, Gilliam, Jefferson, Klamath, Lake, Sherman, Wasco, & Wheeler Counties
- Region 5:** Baker, Grant, Harney, Malheur, Morrow, Umatilla, Union, Wallowa Counties

GOVERNOR

ODOE DIRECTOR

**PETROLEUM
EVENT MANAGER**



Appendix H

UTILITY EMERGENCY INCIDENT & OUTAGE SITUATION REPORT FORM

DRAFT



OREGON PUBLIC UTILITY COMMISSION

March 31, 2010

Introduction

This document provides a Utility Emergency Incident & Outage Situation Report form to be used in the administration of the Oregon State Energy Assurance Plan.

OVERVIEW

The Oregon Public Utility Emergency Response Plan is incorporated in Part II of the Energy Assurance Plan. The Emergency Response Plan outlines four levels of alert with its associated triggering events as shown below.

	ACTIVATING EVENTS
LEVEL I	An injury causes hospitalization or death.
	Service to more than 50,000 electric customers (50 natural gas customers) is disrupted for over 2-hours.
LEVEL II	Activation of electric or natural gas utility Emergency Operation Center (EOC).
LEVEL III	Moderate shortage, escalating incident, or disruption.
	Utility Operator requests for limited assistance. Impact extends to interdependent utility operators.
LEVEL IV	Escalation of a high frequency, low impact outage or incident estimated to last a period of months, precluding the reliability of electric or natural gas service delivery.
	Utility companies recognizing that either company resources—staff experts, materials, equipment—are being exhausted or a multi-jurisdictional emergency is occurring.
	A devastating natural or deliberate disaster that immediately impacts electric or natural gas infrastructure with little or no warning.
	Energy demand exceeds generation supply such that electric or natural gas shortage occurs and the situation becomes unmanageable by natural gas operators, balancing authorities, and excess market supply. Implementation of mandatory Regional Curtailment Plan required.

When an event escalates and triggers Level III, the Public Utility Commission Duty Officer will complete this form in conjunction with other LEVEL III response actions. This form will serve as a situational report to collect relevant information to be used to brief PUC executive staff, Oregon Emergency Management, and other necessary parties.

OREGON PUBLIC UTILITY COMMISSION
UTILITY EMERGENCY INCIDENT & OUTAGE SITUATION REPORT

Section 1-General Information

Utility/Operator Name: Select	Initial Incident & Outage Information
Reporting Individual: (Type Here)	Date: Select
Title: (Type Here)	Time: Select
Phone Number: (Type Here)	# of Affected Metering Points: (Type Here)
Fax Number: (Type Here)	Location(s): Baker Baker City
Email: (Type Here)	
Provider Type: Natural Gas	
Disruption Origin: <input type="checkbox"/> Within Utility System	
<input type="checkbox"/> Outside Utility System	
If Outside, Where? (Type Here)	

Section 2-Incident & Outage Information

Hazard(s): Natural Accidental Deliberate Systemic

Level 1 Activation: Hospitalization Death Loss of Service to More Than 50 Customers Damage Greater than \$5k

Level 2 Activation: Utility/Operator Activated Company Emergency Operation Center (EOC)

Level 3 Activation: Moderate shortage, escalating incident, or disruption

Utility Operator requests for limited assistance

Impacts extends to interdependent utility operators

Other: _____

Explanation: (Type Here)

DRAFT COPY

Natural Gas Specific: Transmission Problem Distribution Problem Pressure Problem

Actions Taken: Shed Firm Load Shed Interruptible Load Repair/Restore

Issuing Warning Alert Other: _____

Estimated
Restoration Time: Select Select

Actual Restoration
Time: Select Select

For PUC Staff Only		
Date Received: Select	Time: Select	Received By: Select Name

OREGON PUBLIC UTILITY COMMISSION
UTILITY EMERGENCY INCIDENT & OUTAGE SITUATION REPORT

Section 1-General Information

Utility/Operator Name: Portland General Electric	Initial Incident & Outage Information
Reporting Individual: (Type Here)	Date: Select
Title: (Type Here)	Time: Select
Phone Number: (Type Here)	# of Affected Metering Points: (Type Here)
Fax Number: (Type Here)	Location(s): Baker Baker City
Email: (Type Here)	
Provider Type: Electric	
Disruption Origin: <input type="checkbox"/> Within Utility System	
<input type="checkbox"/> Outside Utility System	
If Outside, Where? (Type Here)	

Section 2-Incident & Outage Information

Hazard(s): Natural Accidental Deliberate Systemic

Level 1 Activation: Hospitalization Death Loss of Service to More Than 500 Customers Damage Greater than \$100k

Level 2 Activation: Utility/Operator Activated Company Emergency Operation Center (EOC)

Level 3 Activation: Moderate shortage, escalating incident, or disruption

Utility Operator requests for limited assistance

Impacts extends to interdependent utility operators

Other: _____

Explanation: (Type Here)

DRAFT COPY

Electric Specific:	<input type="checkbox"/> Generation Tripped	<input type="checkbox"/> Transmission Tripped	<input type="checkbox"/> Substation Related
Actions Taken:	<input type="checkbox"/> Shed Firm Load	<input type="checkbox"/> Shed Interruptible Load	<input type="checkbox"/> Repair/Restore
	<input type="checkbox"/> Reduce Voltage	<input type="checkbox"/> Issuing Warning Alert	<input type="checkbox"/> Other: _____

Estimated
Restoration Time: Select Select

Actual Restoration
Time: Select Select

For PUC Staff Only			
Date Received:	Select	Time: Select	Received By: Select Name

ORDER NO. 93 - 084

ENTERED JAN 19 1993

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 500

In the Matter of the Commission's Investigation)
into an Electric Load Curtailment Plan.)

ORDER

DISPOSITION: CURTAILMENT POLICIES ADOPTED

INTRODUCTION

Oregon Revised Statutes Chapters 757 and 758 require those who sell electricity (or natural or synthetic gas) to the public in Oregon to have in place load-curtailment plans approved by the Commission. The requirement applies to individuals, firms, partnerships, corporations, associations, cooperatives, and municipalities. The plans would apply during any energy emergency declared by the Governor pursuant to ORS 176.750 through 176.820. The current plans on file with the Commission have been in effect since the late 1970's.

Load-curtailment plans address energy shortages lasting months, rather than short-term shortages that might result from a period of unusually cold weather. ORS 757.710 directs that the plans address "any predictable circumstance that may jeopardize prolonged continuity of service."

During the past three years, a group of regulatory and utility representatives from Oregon, Washington, Idaho, and Montana have developed a regional electric load curtailment plan. Representatives from private and public utility companies, state regulatory commissions, the Bonneville Power Administration, the direct service industries, the Northwest Power Planning Council, the Oregon Department of Energy, and others, worked to develop the plan. They created a regional plan designed to deal effectively with long-term shortage situations and promote curtailment plan uniformity among the states. The plan was issued in May 1992.

The regional plan does not, by itself, have any enforcement authority. Sponsors of the plan encourage the four states to individually adopt curtailment plans consistent with the regional plan.

At its public meeting on August 4, 1992, the Commission considered a recommendation by its staff that it initiate an investigation into revising the Commission's electric load curtailment policies. The Commission adopted its staff's recommendations. The regional plan has served as a focal point for the investigation.

The Commission served notice of its investigation on a large number of individuals and organizations who might be interested in curtailment plans. Written comments were invited. During September 1992 hearing sessions were held in Salem, Grants Pass, Bend, and Baker City, Oregon. Those who commented on the plan agreed with the general principles stated in the regional plan.

Commission staff recommends that the Commission require each electric energy utility operating in Oregon to file a load curtailment plan with the Commission. Staff recommends that the filed plans be based on a model plan issued by the Commission. Staff also recommends that the Commission adopt the regional curtailment plan as a general policy guideline for dealing with long-term electric energy shortages.

PROPOSED CURTAILMENT POLICIES

The proposed model plan contains five phases of curtailment. The first two involve appeals for voluntary curtailment; the last three involve mandatory curtailment amounts. The model plan provides for enforcement of mandatory curtailment by the use of penalties.

The voluntary phases would consist of requests that customers curtail their consumption of electricity. Most people would be willing to reduce their consumption when faced with the consequences of a shortage.

If voluntary curtailment failed to bring resources and loads into balance, mandatory curtailment would be required. In phase one of mandatory curtailment, customers would be required to consume less electricity than they consumed during the corresponding billing period the previous year. A required percentage reduction would be established and would apply to all customers.

The second stage of mandatory curtailment would require an additional reduction in consumption of electricity. As more severe curtailment steps are required, differences among the customer classes become more important. Some will be able to take additional curtailment measures with less disruption than others. Therefore, it may not be practical or even possible to require the same percentage reduction for all customer classes. For instance, the Commission may decide that residential customers should continue curtailing at least 15 percent, general use customers should curtail 20 percent, and major use customers should curtail 25 percent. The required amount of curtailment would be at least 15 percent, and all customers within a customer class would be subject to the same requirements.

The third, and last, stage of mandatory curtailment would be the curtailment of last resort to keep the system functioning. Selective shutoffs of service and rolling blackouts could be ordered.

A system of escalating penalties would be used to enforce mandatory curtailment. The penalties would start at ten cents per kilowatt hour of excess use and go as high as forty cents per kilowatt hour of excess use plus disconnection of service.

Exemptions would be available to customers who demonstrated to their utility that the required curtailment would result in unreasonable exposure to health or safety hazards, would seriously impair their welfare, or would cause extreme economic hardship. For example, critical load customers like hospitals, police, and fire stations could obtain exemptions after demonstrating that nonessential energy use had been curtailed. A customer dissatisfied with the utility's response could appeal to the Commission.

CURTAILMENT POLICIES ADOPTED

The goal of utility companies and government officials is to have electric energy available to the public on a consistent, uninterrupted basis. However, many factors affect the balance between demand for electricity and the supply of it, and programs do not always work out as planned. A prolonged drought or loss of existing resources could put an unanticipated strain on the supply network. Utilities might be unable to obtain approval for and build new resources to timely meet increasing load demands.

The Commission does not expect a significant shortage of electrical energy in Oregon in the foreseeable future, but contingency plans are both prudent and required by law. At its public meeting on November 24, 1992, the Commission considered energy load curtailment issues. The Commission adopted the policies recommended by its staff.

The staff recommendation includes a model plan to be used by individual utilities in preparing their individual curtailment plans. Staff also recommends that the Commission adopt the regional plan as a statement of general principles and a declaration of its commitment to a regional approach to curtailment planning.

The model plan provides an appropriate balance between the need for flexibility in dealing with future events and the need for specificity so people will know how the plan will work. It allows decision-makers to match the level of curtailment to the shortage being experienced. As circumstances change, curtailment requirements can be adjusted. The plan is designed to require only the minimum necessary administrative burdens on utilities, but still ensure that customers are treated fairly and consistently. The plan imposes equal burdens on similarly situated customers.

In the event of a shortage of electricity, the Commission will initiate the statewide voluntary phases of the curtailment program, although utilities are at liberty to seek voluntary curtailment from their customers at any time. The Commission will publicly declare the need for curtailment and coordinate its activities with the utilities. Obtaining significant curtailment from the public will be crucial to the success of the voluntary portion of the program.

If voluntary curtailment is insufficient and there still is a shortage of electricity, the Governor may declare an emergency and start the mandatory portion of the program. If directed by the Governor in an executive order, the Commission will issue an order directing Oregon consumers of electricity to curtail the amount of electricity consumed. The percentage of required curtailment in phase one will be between five and 15 percent. The utilities will then administer their curtailment plans on file with the Commission.

Any additional curtailment activities will be done in accordance with the plan adopted in this order and stated in the tariffs approved by the Commission.

The Commission will be available to handle customer appeals from utility curtailment decisions. The Commission's existing procedures are adequate to handle any curtailment-related disputes.

The issues addressed in this order relate to the possibility of a long-term shortage of electricity. The effects of such a shortage would be regional. The Commission will work with people from other states as well as those from Oregon to best handle any shortage. The Commission urges others involved in supply/resource issues to cooperate and work together. Oregon, and other states, will be better able to effectively deal with a supply shortage if all parties in interest in the region work together.

CONCLUSIONS OF LAW

1. Utilities filing curtailment plans consistent with Attachment 1 to this order will meet the requirements of ORS 757.710(1);
2. The model plan is consistent with the public health, safety, and welfare, and with Oregon energy policies;
3. Implementation of the model plan is technically feasible and will minimize the effects of any shortages requiring curtailment;
4. The Commission consulted with the director of the Department of Energy about curtailment issues;

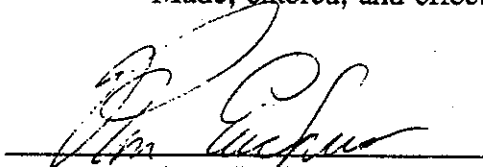
5. The Commission should direct utilities to file curtailment plans consistent with the attached model plan;
6. The Commission should adopt the regional plan as a statement of general principles.

ORDER

IT IS ORDERED that:

1. Within 90 days of the issue date of this order, each person defined in ORS 758.400 engaged in the business of sale or resale of electricity in Oregon shall present for approval a curtailment plan consistent with the model plan included as Attachment 1 to this order;
2. The Commission adopts as a statement of general principles the Regional Curtailment Plan for Electric Energy included as Attachment 2 to this order.

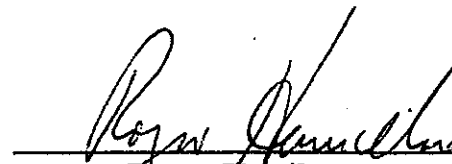
Made, entered, and effective JAN 19 1993.



Ron Eachus
Chairman

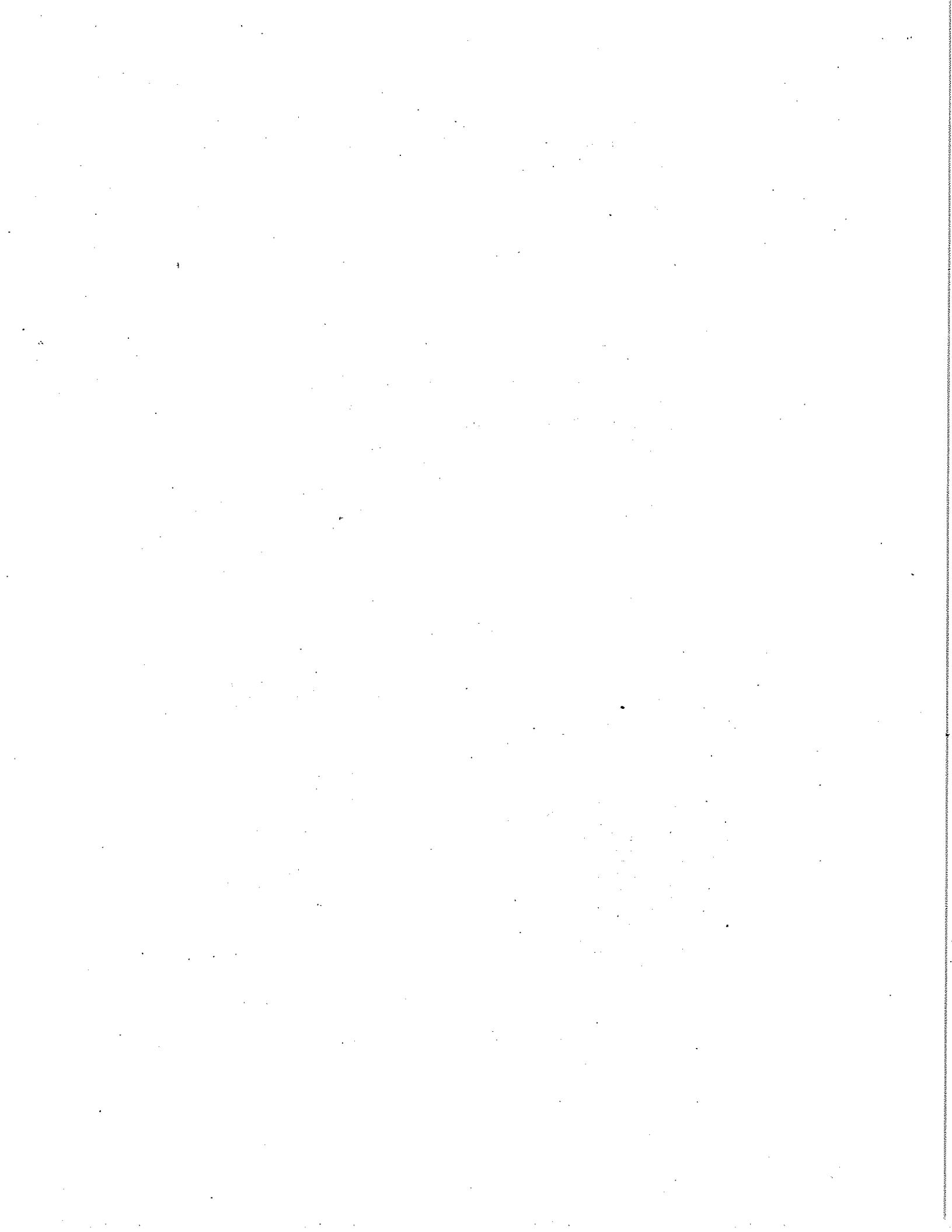
COMMISSIONER SMITH WAS
UNAVAILABLE FOR SIGNATURE

Joan H. Smith
Commissioner



Roger Hamilton
Commissioner

A party may request rehearing or reconsideration of this order pursuant to ORS 756.561. A party may appeal this order pursuant to ORS 756.580.



CONDENSED VERSION
REGIONAL CURTAILMENT PLAN
FOR ELECTRIC ENERGY

within the States of Washington, Oregon, Idaho, and Montana

SECTIONS I AND II. PURPOSE AND OVERVIEW OF THE REGIONAL CURTAILMENT PLAN

This Plan identifies the process by which the States of Washington, Oregon, Idaho, and Montana would initiate and implement regional load curtailment. Included in the Plan are detailed procedures to be followed during a protracted regional electrical energy shortage to ensure uniform treatment of all regional consumers. The Plan is not intended to be activated for relatively short-term emergencies such as those caused by extremely cold weather or the temporary loss of a major transmission line, even if individual States take action to alleviate the problem.

The goal of this Plan is to accomplish curtailment while treating consumers fairly and equitably, minimizing adverse impacts from curtailment, complying with existing State laws and regulations, and providing for smooth, efficient, and effective curtailment administration. This Plan serves as a guideline or blueprint for each of the four Pacific Northwest States to use in developing their individual State curtailment plans.

SECTION III. DEFINITIONS

The following definitions apply to terms used in this Regional Curtailment Plan and in individual State plans. If the first letter(s) of the term are shown in parentheses, the term may appear in either upper case or lower case throughout the Plan.

- A. **Base Billing Period**. One of the billing periods comprising the Base Year. Billing Periods are established by the utility and are normally either monthly or bimonthly. Base Billing Period data are weather-normalized before being used to calculate the amount of curtailment achieved.
- B. **Base Year**. Normally, the 12-month period immediately preceding imposition of State-initiated load curtailment. If energy use during that period is atypical, States may select a different 12-month period.
- C. **Critical Load Consumer**. A consumer that supplies essential services relating to public health, public safety, or energy production.

- D. **Curtailment.** Load reduction, irrespective of the means by which that reduction is achieved.
- E. **Curtailment Target.** The maximum amount of energy that a consumer may use and still remain in compliance with the State curtailment order; the Curtailment Target is figured individually for each consumer by Base Billing Period.
- F. **Excess Power Consumption.** The lower of the following two values for loads subject to penalty: (1) the difference between a consumer's actual (or metered) consumption level during a billing period and the Curtailment Target, or (2) the difference between the consumer's weather-normalized energy use during a billing period and the Curtailment Target.
- G. **Extra-Regional.** Any load, resource, or entity located outside of the region as defined in section 3.(14) of P.L. 95-501, the NW Power Act.
- H. **General Use Consumer.** Any non-residential consumer who does not qualify as a Major Use Consumer.
- I. **Implementation Record.** The collection of significant notes, memos, correspondence, and other material generated for each curtailment, whether such documents are formal or informal in nature. The Utility Coordinator is responsible for maintaining the Implementation Record.
- J. **Major Use Consumer.** A consumer who has purchased over 5 average annual megawatts (43,800 MWh) during the Base Year.
- K. **Non-Regional.** Any load, resource, or entity located outside of the region as defined in this Plan.
- L. **Plan.** This Regional Curtailment Plan.
- M. **Region.** The States of Washington, Oregon, Idaho, and those portions of Montana that are west of the Continental Divide and/or within the control area of the Montana Power Company.
- N. **Regional Electric Energy Curtailment Analysis Model (REECAM).** A computer program used by the Utility Coordinator and other interested parties to evaluate the status of the regional electric power system and analyze the need for region-wide curtailment.
- O. **Regional Load.** The load placed by ultimate consumers within the region on their respective utility suppliers; the load subject to curtailment under this Plan.
- P. **State.** Any of the four Pacific Northwest States: Washington, Oregon, Idaho, and Montana.
- Q. **State Contact(s).** Individuals who represent their respective States in connection with curtailment issues.

- R. **State-Initiated.** Actions taken by the States to implement their individual State load curtailment plans.
- S. **Threshold Consumption Level.** The maximum amount of energy that a consumer can use during mandatory load curtailment without being subject to penalties under this Plan.
- T. **Utility Contact(s).** Individuals who represent their respective utilities in connection with curtailment issues.
- U. **Utility Coordinator.** The Director of the Northwest Power Pool.
- V. **Utility Curtailment Reports.** Report(s) summarizing curtailment data; such reports are to be submitted monthly by utilities to their respective States and the Utility Coordinator.
- W. **Weather-Normalization.** The procedure that utilities use to reflect the impact of weather on utility load levels. Some utilities refer to this process as "weather-adjustment."

SECTION IV. CURTAILMENT STAGES

State curtailment directives apply to all Regional Loads. Under the Plan, curtailment is requested or ordered as a percentage of historical, weather-normalized (Base Billing Period) electric energy consumption. Although the curtailment stages are generally associated with increasing deficits, the stages are not necessarily implemented in a sequential manner; the Plan is flexible so as to allow States to move from one curtailment stage to another as required to adapt to rapid and dramatic changes in the energy supply situation.

The five curtailment stages are:

<u>Stage #</u>	<u>Nature</u>	<u>Curtailment %</u>	<u>Type of Curtailment</u>
Stage 1	Voluntary	No Specified %	Uniform among all regional consumers
Stage 2	Voluntary	5% +	Uniform among all regional consumers
Stage 3	Mandatory	5% - 15%	Uniform among all regional consumers
Stage 4	Mandatory	15% 15% + 15% +	Residential Consumers General Use Consumers Major Use Consumers
Stage 5	Mandatory	% Associated with Stage 4 + additional curtailment	Continued Consumer Curtailment plus Utility Action, including Plant Closures and possible Black-Outs

SECTION V. INITIATION OF REGIONAL LOAD CURTAILMENT

Using REECAM (described in Appendix A of the Plan) and other analytical tools, the Utility Coordinator shall monitor the region's energy situation and notify State and Utility Contacts when it appears that a protracted energy shortage could be developing. The State Contacts, in consultation with the Utility Coordinator, Utility Contacts, and other interested parties, will analyze the results of REECAM to determine if regional load curtailment is required. If they agree on the need, they will settle on the appropriate stage and level (percentage reduction), consult with others within their respective States using briefing materials prepared by the Utility Coordinator, and then again coordinate with each other. To the extent changes in the original recommendation are indicated as a result of such intra-State consultations, the State Contacts will work together to reach a new consensus. The State Contacts will then begin developing situation-specific curtailment implementation procedures. The States will initiate region-wide load curtailment by notifying the public, the Utility Coordinator, and all utilities operating within their respective borders that load curtailment is in effect.

SECTION VI. ADMINISTRATION OF STATE-INITIATED CURTAILMENT

A. Utility Activities

(1) Overview

- (a) **Ability of Utilities to Comply with Plan Requirements.** Utilities will conform to the requirements of their respective State plans to the extent possible. Utilities may petition their States for exemption from specific requirements of their State plan.
- (b) **Stage-by-Stage Utility Administrative Obligations.** Upon notice that their respective States have called for regional load curtailment, the region's utilities shall immediately begin complying with the directives of their State plan(s). All requirements for lower level stages continue to apply to higher level stages. Throughout the curtailment period, utilities will provide consumers with as much useful information as they reasonably can. The requirements specified below represent the minimum actions that each utility must take to remain in compliance with the Plan.
 - **Stage 1.** Utilities must begin (or continue if they have already begun) providing curtailment information to their consumers. Both the nature of the information and the means by which they convey it to consumers (media communications, bill stuffers, etc.) are left to the utility. Utilities shall also assist States, as appropriate, in briefing the media about the shortage.
 - **Stage 2.** In Stage 2, utilities must: (a) notify their consumers of the percentage level of State-initiated voluntary curtailment; (b) provide curtailment tips to consumers; (c) answer consumer questions about curtailment; (d) provide curtailment reports to the States and the

Utility Coordinator; and (e) provide more detailed information to the media than provided in Stage 1.

- **Stage 3.** In Stage 3, utilities must: (a) notify their consumers of the percentage level of State-ordered mandatory curtailment; (b) calculate weather-normalized Base Billing Period data and Curtailment Targets for all consumers who will be audited in the current billing period; (c) provide Curtailment Targets to all consumers who request such data for their own accounts; (d) provide audited consumers with information about how to apply for exemption and adjustment of Base Year data; (e) process requests for exemption and Base Year data adjustments from those consumers selected for audit who would otherwise be subject to penalties; and (f) implement the penalties aspect of the Plan.
- **Stage 4.** In Stage 4, utilities must notify their consumers of any applicable changes in State-initiated mandatory curtailment.
- **Stage 5.** In Stage 5, utilities must collaborate with the States to develop and implement the most effective methods for securing the required load curtailment.

(2) **Suggested Curtailment Actions.**

Utilities shall disseminate information to consumers regarding actions they can take to reduce their electric energy consumption. The States and utilities will work together to develop this material. The recommendations will be based on the actions described in Appendix C of the Plan, "Curtailment Measures." Utilities will be responsible for tailoring this curtailment information to their service areas, adding utility-specific information, printing, and disseminating the material to their consumers.

(3) **Base Year Data and Curtailment Targets.**

- (a) **Identification of the Base Year.** Each time the Plan is activated, the States will identify the applicable Base Year. Once established, the Base Year for a shortage will remain unchanged throughout the curtailment period. Normally, the Base Year is the 12-month period immediately preceding initiation of load curtailment under this Plan. Base Year and Base Billing Period data shall be weather-normalized using the utility's standard procedures. The States may choose an alternative Base Year if they decide that the data for the 12-month period preceding load curtailment is atypical and its use would result in an inequitable allocation of curtailment among the region's consumers.
- (b) **Estimating Base Billing Period Data for Consumers for Whom No Base Billing Period Data Exists.** Base Billing Period data must be obtained or developed for any consumer who is audited under this Plan. Utilities have the option of excluding residential and General Use

Consumers without actual Base Billing Period data from the random sample of audited consumers. Utilities must estimate the Base Billing Period data for any audited consumer for whom actual data does not exist or is found to be inaccurate.

- (c) **Communicating Curtailment Target Information to Consumers.** During mandatory curtailment, utilities are required to provide retrospective, current billing period, and forthcoming billing period Curtailment Target information to any consumer who so requests. Utilities are also required to provide retrospective Curtailment Target information to any audited consumer who will be issued a warning or penalty. At their option, utilities may provide Curtailment Target information to other consumers or consumer classes as well.

- (4) **Auditing Consumers for Compliance with State Orders for Mandatory Load Curtailment.** Each month, utilities must audit at least one percent of residential users, five percent of General Use Consumers, and 100% of their Major Use Consumers (including those Major Use Consumers with estimated Base Billing Period data) plus any consumers penalized in the previous billing period. The number of consumers exempted or excluded from audit does not affect the sample size.

New samples shall be drawn each month. Consumers penalized under this Plan shall continue to be audited until their energy use falls below the Threshold Consumption Level. Once their energy use falls below that level, they will be audited again only if selected by random sample.

Unless a utility is auditing 100% of its residential users and General Use Consumers, all such consumers selected for audit shall be chosen on a random sample basis, except that the following consumers are to be excluded:

- (a) consumers granted an exemption under this Plan; and (b) consumers with an estimated power bill in the current billing period. Utilities may also choose to exclude consumers with estimated Base Billing Period data, assuming the States do not require their inclusion in the pool of consumers subject to audit.

- (5) **Penalties for Non-Compliance.**

- (a) **Nature of Penalties.** The Plan identifies penalties for non-exempted consumers who fail to comply with State orders for mandatory curtailment. The penalties under this Plan are structured as follows:

<u>Violation *</u>	<u>Penalty</u>
First Bi-monthly Violation	10¢ per kWh of excess use
Second Bi-monthly Violation	20¢ per kWh of excess use
Third Bi-monthly Violation	40¢ per kWh of excess use
Fourth Bi-monthly Violation	1 Day Disconnection + 40¢ per kWh of excess use

Fifth Bi-monthly Violation

2 Day Disconnection +

40¢ per kWh of excess use

Sixth and All Subsequent Violations

Penalties are determined by the State. Civil penalties or other corrective actions would be possibilities.

- * The penalty for violators who are billed every two months will escalate on every power bill in which they are subject to penalty. Consumers billed on a monthly basis will be assessed the same penalty on two successive occasions before incurring the next higher level penalty. During any continuous period of curtailment, assessed penalties remain "on the record" for the purposes of administration of subsequent penalties, even if there has been an intervening period of "compliance."

Utilities are expected to adhere to their standard disconnect criteria and procedures whenever disconnecting consumers in accordance with this Plan. Health, safety, and welfare considerations are to be taken into account, and consumers must pay normal disconnect and reconnect charges.

- (b) **Calculation of Financial Penalties.** Financial penalties will be calculated by multiplying the consumer's Excess Power Consumption each billing period by the appropriate penalty level identified above.

- (1) **Threshold Consumption Level.** The Threshold Consumption Level assigned to each consumer class is identified in the table below. If the required load reductions are not occurring during a curtailment period, the States may change the percentage relationship of the Threshold Consumption Level to the Curtailment Target so as to effect better compliance with the curtailment order.

<u>Type of Consumer</u>	<u>Threshold Consumption Level</u>
Residential Consumers	10% above Curtailment Target
General Use Consumers	10% above Curtailment Target
Major Use Consumers	2% above Curtailment Target

- (2) **Excess Power Consumption Calculation.** Penalties are not assessed if a consumer's load (either actual load or weather-normalized load) is equal to, or less than, the Threshold Consumption Level. Excess Power Consumption is the lower of the following two values for each sampled load subject to penalty: (a) (Actual Load) minus (Curtailment Target) or (b) (Weather-Normalized Load) minus (Curtailment Target).

(c) **Assessment of Penalties.**

- (1) **Penalties vs Warnings.** Consumers will be assessed penalties only if they have Excess Power Consumption and if they are to be penalized based on the utility's penalty assessment procedures described below. Any sampled consumer who is not penalized and whose use exceeds the Curtailment Target will receive a warning.
- (2) **Penalty Assessment Procedures.** Utilities sampling at the mandated minimum percentages for each sector as specified in this Plan [1%-5%-100%] (or as otherwise specified by the States and reflected in the Implementation Record) shall assess penalties on all consumers with Excess Power Consumption.

Utilities sampling a higher percentage of consumers than required under the Plan may choose among the following penalty assessment options:

- (a) Assess penalties on all sampled consumers with Excess Power Consumption; (this methodology must be used for Major Use Consumers even if the utility chooses option (b), below, for its other consumer sectors); or
 - (b) Develop a ratio of the minimum percentage sample size to the actual percentage sampled for the residential and/or General Use consumer sectors. Multiply the resulting percentages by the total number of violators in each respective consumer sector to determine the minimum number of penalties that must be assessed in each sector. Calculate the percentage violation for each individual consumer that has been sampled (Excess Power Consumption divided by Curtailment Target) and apply penalties to the "worst offenders" in the overall sample based on their percentage "Excess Power Consumption." Also penalize all consumers who were penalized in the previous billing period and who still have Excess Power Consumption.
- (3) **Treatment of DSIs.** Penalties applicable to BPA's direct-service industrial customers will be assessed by the States based on billing data provided by BPA.
- (d) **Billing Consumers for Penalties.** Utilities may describe the penalty on the power bill as "State-mandated" and shall include any State-provided material describing the penalty aspect of the Plan as a bill stuffer in the bills of penalized consumers. The States will consider printing this material on State letterhead so as to reinforce the public's understanding that penalties are due to a violation of State mandate. Utilities shall note

that failure to pay penalties will result in service disconnection in accordance with standard disconnect criteria and procedures.

- (e) **Treatment of Penalties Pending Adjustment/Exemption Determinations.** Consumers who have applied for adjustment of Base Billing Period data and/or exemption from mandatory curtailment may request a stay of enforcement of the penalty aspect of the Plan pending a final decision regarding its request. Any consumer who has been granted such a stay shall be subject to retroactive penalties as applicable if the request is ultimately denied.
- (f) **Use of Funds Collected under the Penalty Provisions of the Plan.** Funds collected under State-ordered penalty provisions of this Plan shall be set aside in a separate account. The ultimate disposition of these funds will be determined by the appropriate State commission in the case of investor-owned utilities and by the governing bodies of publicly-owned utilities.
- (6) **Incentives.** Whenever curtailment is in effect, individual utilities are encouraged to implement creative incentive programs to motivate consumers to provide additional load reductions relative to their Curtailment Targets.
- (7) **Exemptions and Adjustments.**
- (a) **Consumer Application for Exemption/Adjustment.** Utilities are responsible for informing their consumers how to apply for exemption from Plan requirements or adjustment of Base Billing Period data. Utilities may elect to process exemptions and adjustments only for audited consumers. Consumers seeking an exemption or adjustment shall apply first to their utility and then, if dissatisfied with that outcome, to their respective State. The State will not consider any consumer's appeal unless it has first been processed by the consumer's utility.
- (b) **Granting Consumer Requests for Exemption from Mandatory Curtailment.** No automatic consumer exemptions will be granted under mandatory State-initiated load curtailment. Exempted consumers should be told that exemption may not protect them from Stage 5 black-outs.
- **Critical Load Consumers.** Critical Load Consumers may be exempted once they have demonstrated to their utility that they have eliminated all non-essential energy use and are using any reliable, cost-effective back-up energy resources in load.
 - **Other Consumers.** Exemptions for consumers not qualifying as Critical Load Consumers under this Plan will be evaluated based on whether curtailment would result in unreasonable exposure to health or safety hazards, seriously impair the welfare of the affected consumer, cause extreme economic hardship relative to the amount of energy saved, or produce counterproductive results.

- (c) **Utility Record-Keeping Relative to Consumer Exemptions.** Utilities shall make their records regarding exemption determinations available to their respective States upon request.
- (d) **Utility Exemption from State Plan Requirements.** Utilities may appeal to their respective States, requesting an exemption from any aspect of their State plan. Their petition for exemption should identify the specific requirements from which they wish to be exempted, the reason(s) behind their request, and alternative actions that they can reasonably take in lieu of such requirements.
- (8) **Measurement of the Amount of Curtailment Achieved and Determination of Compliance.** At all times during State-initiated regional load curtailment, utilities shall provide their respective States and the Utility Coordinator with consumption and savings data on a monthly basis in the form specified in Appendix D of the Plan. To the extent that circumstances at the time of actual load curtailment dictate the need for additional data or more frequent data submittal, the States shall so inform the utilities and the utilities shall use best efforts to comply with the State request.
- (9) **Special Arrangements.**
- (a) **Use of Consumer-Owned Generation Facilities.** The States' mandatory curtailment orders apply only to electric energy purchased from a utility; all consumers are required to reduce their electric energy purchases from their utility by the required percentage. However, consistent with their respective utility's needs for safety and system protection, consumers having their own generation facilities or access to electricity from non-utility power sources may use energy from those other sources to supplement their curtailed power purchases from their electric utility.
- (b) **Curtailment Scheduling.** During periods of mandatory curtailment, a consumer is obligated to provide the requisite amount of curtailment within each billing period. Within that period, and subject to equipment limitations and utility rules on load fluctuations, consumers are free to schedule their curtailment so as to minimize the economic cost, hardship, or inconvenience they experience as a result of the mandatory curtailment requirement.
- (c) **Case-by-Case Arrangements.** Utilities may choose to work creatively with individual consumers to secure additional curtailments as appropriate.

B. **State Activities**

- (1) **Providing Curtailment Information to Utilities.** States shall provide utilities with information regarding curtailment administration and work with utilities to

develop consumer curtailment tips for consumers. (See Plan Appendix B, "Types of Curtailment Information" and Appendix C, "Curtailment Measures.")

- (2) **Processing Utility Requests for Exemption and Second Level Consumer Appeals for Adjustments and/or Exemptions.** The States shall process utility requests for exemption from Plan requirements and consumer requests for either exemption or adjustment of Base Year data in cases where the consumer is appealing its utility's determination. The States shall keep interested parties apprised of the status of appeals-in-process.
- (3) **Periodic Reassessment of Administrative Decisions and Maintenance of the Implementation Record.** Together, the States will review the appropriateness and continued applicability of implementation decisions on a monthly basis, or as otherwise indicated. Significant decisions shall be recorded in the Implementation Record. The types of matters that will be addressed in the periodic reviews and which may be reflected in materials that will become part of the Implementation Record include:
- **Achievements and Objectives.** Analysis of the amount of curtailment actually achieved based on the data provided in the Utility Curtailment Reports and a review of the most recent REECAM results;
 - **Curtailment Stage and Level.** Identification of the applicable curtailment stage and level; also, any identified procedures for changing the applicable curtailment stage and/or level;
 - **Public Information.** The general agreement among the States as to how to disseminate the curtailment message: tenor of messages, dates of announcements, specifics as to utilized media, etc.;
 - **Base Year Consumption.** The Base Year to be used for measuring curtailment impacts;
 - **Procedural Matters.**
 - (a) Development of additional administrative procedures as required;
 - (b) Assessment of the need, if any, for making changes to the Plan to secure increased compliance with the curtailment directives;
 - (c) Discussion of implementation problems and proposed solutions thereto; and
 - (d) Evaluation of the appropriateness of the materials being made available to utilities and provided by utilities to the States, and a determination as to whether changes are required;
 - **Curtailment Records.** The specific requirements on utilities and States regarding curtailment records (what needs to be recorded, how that information will be stored, who can access it...); and

- **Return to Normal Operations.** The general agreement among the States relative to announcing an end to regional load curtailment and resuming normal utility operations.
- C. **Return to Normal Operations.** Once the shortage is alleviated, the States and utilities must bring closure to the curtailment process and effect a return to normal operations. The States will detail the process for utilities to follow. The nature of the actions to be taken will be influenced by the applicable stage of curtailment. At a minimum, the following types of activities need to occur: (1) The public must be informed that curtailment is no longer required; (2) Curtailment activities must officially cease as of the date that curtailment orders are lifted by the States. The States will provide utilities with guidelines to bring closure to curtailment activities such as: exemptions and appeals, penalty assessments, curtailment incentives (if any), and curtailment reports; and (3) State authorities will take whatever action is required to rescind any State orders for mandatory load curtailment.

SECTION VII. UTILITY LIABILITY AND FINANCIAL RELIEF

State law in each of the four Pacific Northwest States provides for waivers of, or exemptions from, liability in the case of utilities enforcing mandatory load curtailment ordered by the State. Individual consumer data will be treated as proprietary in accordance with standard utility practices and State law (identified in Plan Appendix F). If State law prohibits utilities from releasing consumer account information to the State, consumers seeking exemptions and/or adjustments shall expressly authorize such exchange. Utilities may seek financial relief for the extraordinary costs of curtailment using established channels, including utility rate case procedures and BPA power sales contract provisions.

SECTION VIII. ANNUAL REVIEW, POST-CURTAILMENT EVALUATION, AND UPDATE OF THE REGIONAL CURTAILMENT PLAN

At least once a year and after any curtailment, the Utility Coordinator will convene a meeting of all four State Contacts and interested utilities for the purpose of reviewing and updating the Plan and associated Appendices. Upon completion of the review, necessary changes will be made, a list of those changes prepared, and a revised plan issued. Changes will be noted in Appendix G.

SECTIONS IX AND X. APPENDICES AND RELATED CURTAILMENT INFORMATION

The following appendices are included in the Plan: (A) Regional Electric Energy Curtailment Analysis Model; (B) Curtailment Information; (C) Curtailment Measures; (D) Utility Curtailment Reports; (E) Contact Information Regarding the Utility Coordinator, State Contacts, and Utility Contacts; (F) State Statutes Citations and State Agencies; and (G) Annual Updates to the Plan. The following supplemental material is available under separate cover: (A) Individual State Plans and Summary of the Differences among the State Plans; (B) Utility Plans; and (C) State Statutes (copies of the actual statutory language).

APPENDIX J

Proposed Oregon State LNG Emergency Response Plan

Oregon Revised Statutes (ORS) 176.750-810 authorizes the Oregon Department of Energy (ODOE) to develop and maintain a statewide contingency plan in response to liquefied natural gas (LNG) emergencies that impact the state. This describes the format of the state’s LNG Emergency Response Plan should an LNG import terminal be built in Oregon.

Introduction: Overview of Oregon’s LNG Supply & Distribution System	
BASIC PLAN	PROCEDURES
<p>Plan Section 1 - Guiding Authority and Principles</p> <p>This section of the basic plan describes the Governor’s Energy Resources Emergency Powers and ODOE authority to plan, prepare, and respond to LNG emergencies that impact the state.</p>	<p>Procedures Section 1 – supports Section 1 of the basic Plan. Information includes a copy of the:</p> <ul style="list-style-type: none"> • ORS 176.750-810 • Governor letter appointing ODOE lead state agency to plan, prepare, and respond to LNG emergencies
<p>Plan Section 2 – Scope</p> <p>This section describes the purpose, scope, and concept of operations for the Oregon LNG Emergency Response Plan.</p>	<p>Procedures Section 2 – supports Section 2 of the basic Plan. Information includes:</p> <ul style="list-style-type: none"> • Emergency Planning Zone Map • Description of Zone 1, Zone 2, and Zone 3
<p>Plan Section 3 - Emergency Response Organizations</p> <p>ODOE works with federal, state, local, law enforcement, and industry organizations to ensure a coordinated response effort to LNG emergencies. This section of the basic plan describes the roles and responsibilities of local, state, federal, and industry organizations responding to LNG emergencies in Oregon.</p>	<p>Procedures Section 3 – supports Section 3 of the basic plan. Information includes:</p> <ul style="list-style-type: none"> • Established agreements with local, state, federal, and industry organizations responding to LNG emergencies in Oregon as appropriate.
<p>Plan Section 4 – Alert and Notifications</p> <p>This section describes how federal, state, local, law enforcement, and industry emergency response organizations are notified of LNG events that impact the Oregon.</p>	<p>Procedures Section 4 – supports Section 4 of the basic plan. Information includes:</p> <ul style="list-style-type: none"> • Alert & Emergency Notification Call Tree • Emergency Contact List • Maintenance Procedures for Emergency Contact List.
<p>Plan Section 5 – Communications</p> <p>This section describes the need for effective communication and information sharing after initial notifications are made as described in Section 4. This section explains ODOE’s approach to gather and disseminate emergency information and/or instructions to government officials, industry, emergency responders, news media, and the public.</p>	<p>Procedures Section 5 – supports Section 5 of the basic plan. Information includes pre-printed materials including brochures, boilerplate news releases, event update forms, activity logs, commonly asked questions/answers, and procedures for communicating with the:</p> <ul style="list-style-type: none"> • Governor’s Office • Legislative Leadership • Local Emergency Response Organizations • State Emergency Response Organizations • Federal Emergency Response Organizations • LNG Terminal • News Media • Public

<p>Plan Section 6 - Emergency Response Measures</p> <p>This section provides an overview of the Plan’s five levels of readiness conditions. This includes information on the state’s primary concern and response actions for each readiness condition.</p> <ul style="list-style-type: none"> • Condition A - Normal • Condition B - Awareness • Condition C - Caution • Condition D - Alert • Condition E - Imminent Danger 	<p>Procedures Section 6 – supports Section 6 of the basic plan. Information includes procedures for ODOE Emergency Operations Center (EOC) activation in response to LNG emergencies, ODOE EOC capabilities, and procedures for key ODOE EOC response positions. This includes:</p> <ul style="list-style-type: none"> • Governor’s Representative • ODOE Director • LNG Event Manager • Technical Advisor • LNG Facility Specialist • Public Information Officer (PIO) • Deputy PIO • County Liaison • State Agency Liaison • Federal Agency Liaison • LNG Terminal Liaison • EOC Manager • EOC Facilities Specialist • Graphical Information Specialist • Emergency Web Page Operator • News Center Manager • Telephone Information Center Manager • Phone Team Operator(s) • Other Positions as Appropriate
<p>Plan Section 7 - Recovery</p> <p>This section describes the actions that will be taken by ODOE and other federal, state, and local emergency response organizations along with the LNG terminal after the emergency to return the facility and community back to pre-emergency conditions.</p>	<p>Procedures Section 7 – supports Section 7 of the basic plan. Information includes procedures for key ODOE response positions for the Recovery Phase. This includes:</p> <ul style="list-style-type: none"> • LNG Event Manager • LNG Facility Specialist • Public Information Officer (PIO) • County Liaison • State Agency Liaison • Federal Agency Liaison • LNG Terminal Liaison
<p>Plan Section 8 – Maintaining Emergency Preparedness</p> <p>This section explains how ODOE will maintain the Oregon LNG Emergency Response Plan and ensure the state is prepared to respond to a LNG emergency in coordination with the local and federal emergency response organizations as well as the LNG terminal. This section will also describe how ODOE will work to increase public awareness of and confidence in the Oregon LNG Emergency Response Program.</p>	<p>Procedures Section 8 – supports Section 8 of the basic plan. Information includes a schedule for:</p> <ul style="list-style-type: none"> • Schedule for plan review updates. • Schedule for training, drills, and exercises. • Public education and outreach program.

Appendix K

Oregon Distributed Energy Resiliency Study

Introduction

This Report's overarching objective is to identify opportunities to improve energy resilience through the design and integration of distributed renewable energy investments into the existing energy network. This study considers how new technologies, including renewable energy resources, could provide local energy generation to communities and emergency service providers during energy emergencies, when their energy network supply may possibly be disrupted.

The Oregon Department of Energy (ODOE) will use the information that is provided by this Project to support its Energy Assurance Plan (EAP).

Highlights of this Report are briefly noted below. For a more complete understanding of such items, this Report should be read in its entirety.

Access to Information

This Report is broadly based on information, data, and reports that were provided by various organizations, including:

- Bonneville Power Administration (BPA)
- Idaho Power Company (IPC)
- Oregon Department of Energy (ODOE)
- Oregon Department of Transportation (ODOT)
- Oregon Public Utility Commission (PUC)
- PacifiCorp
- Portland Gas and Electric (PGE)
- United State Department of Energy (U.S. DOE)
- U.S. DOE Energy Information Administration (EIA)
- U.S. DOE National Energy Technology Laboratory (NETL)
- Western Electricity Coordinating Council (WECC)

All such information is considered to be in the public domain. Confidential information was not provided or utilized.

Critical Facilities

Renewable Resources

Section 1 identifies the full spectrum of Oregon's existing and planned renewable resources. However, not all of Oregon's wind resources qualify as critical in an energy assurance context. In fact, there are reasons why none of Oregon's renewable resources are critical, including:

Renewable resources (most notably wind and solar) provide energy but not capacity.

Renewable resources cannot be dispatched and, therefore, are less likely to be useful during an energy crisis.

During a large-scale emergency, the complete restoration of the electric grid may take hours or even days. That period of time is sufficiently long to observe considerable variation in capacity and energy from renewable resources.

During a large-scale electric emergency, prevailing utility operating practices are to bring renewable resources back on-line after all other resources are dispatched.

Hydroelectric Resources

Hydroelectric resources are responsible for approximately 42 percent of the electricity consumed in Oregon. The dams of special importance include John Day, The Dalles, Bonneville, and McNary, which are all located along the Columbia River and collectively account for over 6,000 megawatts (MW) of capacity, or nearly 80 percent of Oregon's hydroelectric energy. Hypothetical events that affect the river (e.g., drought, floods, terrorist attacks, federal court decisions regarding salmon restoration) could result in the loss of approximately half of Oregon's electric supply.¹

Conventional Resources

Conventional resources (excluding hydroelectric) account for approximately 54 percent of Oregon's electric supply with natural gas (14 percent) and coal (34 percent) ranking highest, on the basis of historical energy usage. The most critical non-hydroelectric conventional plants are Boardman (coal), Hermiston, Beaver, Klamath, Port Westward, and two Coyote Springs facilities (all natural gas).

Electric Transmission

All electric transmission lines in the Pacific Northwest at or above 345 kilovolts (kV) should be classified as being critical to Oregon. BPA is responsible for 5,568 miles of lines throughout the Pacific Northwest at or above 345 kV. While some of BPA's lines are outside of Oregon, the interconnected nature of the transmission system still requires such lines to be classified as being critical. BPA's regional 230-kV and

¹ It should be noted that the regional electric transmission and generation systems are highly interconnected. Some of the hydroelectric energy produced by plants that are located along the Columbia River is not intended for Oregon's use and other interconnected plants could be utilized as replacement energy.

287-kV transmission lines should also be considered to be critical, in the absence of any detailed determinations to the contrary. In addition, BPA's high-voltage substations should also be included. A delineated list of such lines and substations is not available due to security concerns.

Electric Distribution

Currently, there are no distribution lines that are considered to be critical from a regional or statewide perspective. Specific distribution lines that serve emergency service providers are critical, but cannot be delineated due to the absence of pertinent information.

Smart Grid and Advanced Metering Infrastructure

Currently, Smart Grid and Advanced Metering Infrastructure (AMI) are not widely utilized in Oregon, which precludes such assets from being considered a critical asset.

Blackstart Operations

A large-scale emergency in Oregon could cause the electric transmission and generation grid to become completely de-energized (e.g., dark). Such events would be followed by a blackstart start condition whereby certain generating units are called upon to initially re-energize the grid. While the identities of specific blackstart generating units have been withheld by Oregon's electric utilities for reasons of security, they are likely to include larger hydroelectric plants.

Emergency Service Providers

The energy requirements of certain service providers are considered to be of paramount importance during emergency conditions. The entities of highest priority include:

- 911 dispatch centers

- Airports

- Assisted care living facilities (e.g., senior citizen facilities, handicap persons facilities, homes of the disabled)

- Communications service providers (e.g., voice, data, Internet, television, cable television, radio)

- Correctional facilities (e.g., jails and prisons)

- Electric utilities (critical facilities such as warehouses and maintenance and repair centers)

- Emergency Operations Centers (EOC)

- Emergency shelters (e.g., designated locations such as schools, religious institutions, recreation centers)

- Fire stations

Petroleum Distribution Terminals

Gas stations (if required to serve the petroleum needs of other emergency service providers)

Health care (e.g., hospitals, ambulance services, and clinics which contain emergency room facilities)

National Guard

Oregon Department of Transportation (ODOT)

Other essential county, state, and federal departments

Police stations

Public Works (e.g., water, wastewater, street maintenance, traffic signals at priority intersections)

Railroad operations and crossings

Red Cross

Schools (short-term, until all students return home)

Providing reliable and resilient electric service to the above entities during a large-scale emergency is a critical matter that requires the PUC's attention. The PUC works with utilities to ensure timely restoration of the power grid during emergencies. Energy related characteristics are discussed in Section 2.

Vulnerability and Risk Assessment

Section 3 contains an assessment of the vulnerabilities and risks that are associated with Oregon's key energy categories, as summarized in the following table. Overall, findings indicate that hydroelectric resources are most critical to Oregon.

Table 1
Energy Sector Criticality and Vulnerability

CATEGORY	Market Dominance/ Relative Capacity	Number of Customers Served	Strategic Location	Seasonal Vulnerability	Degree of Redundancy	Historical Evidence of Disruption
Electric Generation (Conventional without Hydroelectric)	Low	Low	High	High	Medium	Low
Hydroelectric Generation	High	High	High	High	Medium	Low
Renewable Electric Resources	Low	Low	High	High	Medium	Medium
Electricity Transmission	Low	Low	High	Low	Medium	Low
Natural Gas Transmission/ Pipelines	High	High	Low	High	High	Low

Key issues that confront critical assets are found to include the following:

Critical Infrastructure Protection (CIP) and terrorist attacks: Critical infrastructure is defined to be assets that are so vital to Oregon, that their incapacity or destruction would have a debilitating impact on the state’s security, economy, public health or safety. Large hydroelectric generating facilities and associated high-voltage transmission lines are considered critical to Oregon as they serve a significant percentage of state’s electricity requirements. The U.S. DOE conducted an audit of BPA’s critical infrastructure in 2010 and discovered that BPA did not, for the most part, implement a major physical control system (e.g., electronic perimeter intrusion motion detection and alarms).

High levels of precipitation or runoff: Periods of high spring runoff can have a significant impact on hydroelectric power and, thereby, cause a reduction in the utilization and pricing of renewable resources, as evidenced in April-May 2011.

Seismic activity: Earthquakes can significantly impact Oregon’s electric, natural gas and petroleum resiliency. The Oregon Department of Geology and Mineral Industries (DOGAMI) is evaluating the impacts of earthquakes in Oregon and its report should be reviewed for additional information.²

Weather: Severe windstorms have historically impacted Oregon’s electric grid, thereby causing widespread curtailments in electric service.

² “Oregon State Energy Assurance Plan”, Oregon Department of Energy, Oregon Public Utility Commission, March 2011.

Integration of Renewable Energy and Smart Grid Technologies

Section 4 contains a discussion of the technical issues, which confront the integration of renewable resources, the role that Smart Grid technologies could play in addressing such matters, and the benefits that can be provided to Oregon's constituents. Some of the potentially more notable benefits include:

Improve electric reliability: Smart Grid technologies can improve the reliability of electric service by reducing the duration of outages and the number of customers without service.

Reduce electric production costs: Providing consumers with real-time electric pricing information and alternative tariffs (such as critical peak pricing) can yield reduced electric costs to consumers and the cost of electricity production.

Reduce peak electric demand: The amount of electricity demanded by Oregon's consumers varies greatly throughout the year, with peak electric demand occurring during the hottest and coldest points of time. Smart Grid applications can communicate the real-time price of electricity to consumers, especially during periods of peak demand. Consumers are expected to react to such price signals by reducing usage, and thereby reduce peak demand. Reductions in peak demand will cause delays or cancellations in the need for new electric power plants.

Reduce system losses: Smart Grid applications provide electric utilities with greater insight into the operation of their electric distribution systems. Such information can be used to configure the distribution system (e.g., the opening and closing of switches) in a manner that minimizes electric losses. Reductions in electric losses translate into a reduction in the total cost of electric supply and retail costs to consumers.

Future Renewable Energy Requirements

Section 5 contains a discussion of the regulatory and technological frameworks for promoting and facilitating energy resiliency in Oregon through the use of future renewable resources and Smart Grid applications. Examples of specific ways that renewable resources may be beneficial to Oregon's energy resiliency include:

Improve fuel diversity: Oregon is heavily dependent on hydroelectric resources to meet its electric requirements. Increasing resource diversity improves the state's energy resiliency and ability to respond to large-scale events that affect electric supply. Renewable resources promote Oregon's energy resiliency, as they are likely to be independent of emergencies that affect availability of hydroelectric energy. The role that Smart Grid plays in such cases is to provide electric utilities with greater insight into the real-time operations and control of renewable resources.

Reduce response times to emergencies: Damage to the electric grid could require significant repair and loss of service to Oregon's constituents. It is reasonable to

assume that repairs to larger facilities, such as high-voltage equipment or hydroelectric dams, would be more intrusive than that of smaller facilities. Since renewable resources are generally smaller in scale, it can then be argued that they might become operational faster than their large-scale counterparts.

Enhance reliability and dispatch: Oregon's largest electric utilities do not include renewable resources in their emergency operating plans. Two key reasons are that renewable resources are considered to be less reliable than conventional resources and they cannot be dispatched. These obstacles can be partly addressed through the two-way communications capabilities that are common in Smart Grid applications.

Capturing these benefits requires a technological roadmap, which is discussed in Section 5 and includes:

- Identify key public facilities where electric service reliability is critical

- Require utilities to revise their outage restoration plans to include important public facilities

- Establish a minimum functionality requirements for any AMI project proposed by the state's utilities

- Require utilities to describe how data from AMI and Smart Grid technologies will be archived and utilized to improve utility asset management, operations, maintenance, planning processes, and electric reliability

- Evaluate market conditions that might impede the development of bulk wholesale renewable power sources

Recommended Next Steps

Lastly, Section 6 offers numerous candidate next steps that Oregon should consider to enhance the resiliency of electric supply. The broad categories under consideration include:

- Identification and documentation of critical assets

- Promotion of Smart Grid applications

- Review of electric utility operations

- Characterize emergency stakeholders (locations, energy requirements, backup capabilities and gaps)