



PORTLAND LOCAL ENERGY ASSURANCE PLAN

JUNE 2012



Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.



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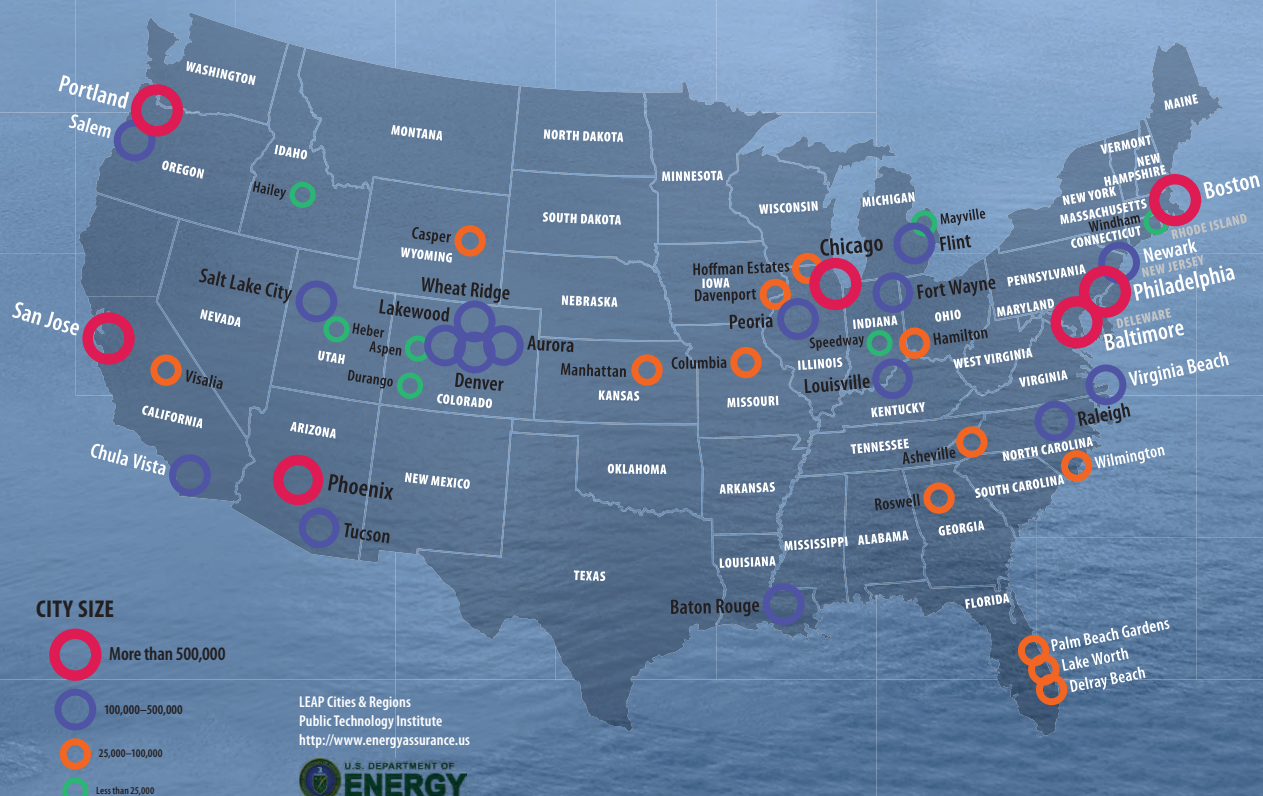
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EXECUTIVE SUMMARY

CITIES AND REGIONS AWARDED AN ARRA GRANT FOR LEAP



In April 2010, the U.S. Department of Energy awarded the City of Portland \$276,099 under the American Recovery and Reinvestment Act (ARRA).

Introduction

Energy is the backbone of our society. It warms our homes, runs our vehicles, charges our cell phones, powers the Internet and connects us to the rest of the world. Without energy, the essential services we take for granted grind to a halt – schools can't open, ATMs won't operate and food delivery trucks aren't able to reach grocery stores. We are so reliant on energy that when the supply is disrupted, even for a short time, our society is unable to function as normal.

Because of this compelling dependency, the City of Portland embarked on a first-of-its-kind planning effort to better understand and prepare for energy disruptions. The process was led by the Portland Bureau of Emergency Management (PBEM) with the support of the Portland Bureau of Planning and Sustainability (BPS) and funds from the U.S. Department of Energy (USDOE) under the American Recovery and Reinvestment Act (ARRA).

Portland is one of 43 cities in the country that received funds to create a Local Energy Assurance Plan. Over the course of 18 months, PBEM engaged stakeholders from a range of backgrounds and disciplines in dozens of planning sessions, presentations and a half-day tabletop exercise. The product of these efforts is this document – the Portland Local Energy Assurance Plan, or the Portland LEAP Report.

What is the Portland LEAP?

Energy assurance is a confidence that energy will be available when needed. Stakeholders participating in the Portland LEAP process looked at Portland's reliance on energy and the vulnerability of the energy supply, and developed recommendations on what the city and community should do to ensure greater energy assurance in the face of future energy disruptions.

The product of this process is two-fold:

1. An energy emergency plan for the City of Portland, referred to as the *Energy Annex*, that provides an understanding of the roles and responsibilities of emergency response agencies, energy providers and distributors, and the community.
2. An *Improvement Plan* with recommendations to guide next steps in addressing Portland's dependency on energy before, during and after an emergency.

The Portland LEAP links to, and builds upon, existing plans including *the Oregon State Energy Assurance Plan*, Portland's *Natural Hazard Mitigation Plan (Risk Reduction Strategy)* and the Portland Urban Area's *Critical Infrastructure Protection Plan*. It is also informed by the city's *Climate Action Plan* and the recommendations proposed by the Portland Peak Oil Task Force.

Key Findings: What did we learn?

The following are some of the key items learned or confirmed as a result of the Portland LEAP process and incorporated into the *Energy Annex* and *Improvement Plan*:

Portland is Oregon's energy hub. A six-mile stretch of the Willamette River in Portland's NW Industrial Area contains the bulk of Oregon's critical energy infrastructure for petroleum, natural gas, liquefied natural gas, and electricity. This area is also a regional crossroads for pipelines, transmission lines, rail, shipping and trucking.

Portland's energy infrastructure is vulnerable. This critical energy hub is located in an area of significant seismic risk. Ground shaking from a magnitude 8 or 9 Cascadia Subduction Zone earthquake would make the NW Industrial Area susceptible to earthquake-induced liquefaction, lateral spreading and landslides. Secondary seismic hazards including destructive fires and hazardous material releases may also be triggered by an earthquake.

Some critical energy facilities in this area have infrastructure over 100 years old that were built to no or very antiquated standards, other facilities are 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.¹

Portland is a net importer of energy. Portland, and Oregon as a whole, imports 100 percent of its petroleum and natural gas. Hydropower (dams on the Columbia River) provides 27 percent of Multnomah County's electricity². Portland, and Oregon, must bring in energy for society to function as we know it.

The importance of coordination between the public and private sectors. Close coordination between the City of Portland, energy utilities and industries will be paramount during an energy emergency. During a major energy disruption, utilities will need help from emergency responders to gain access to their sites. Site access, transportation and debris removal for both utility crews and emergency response workers will be critical to restoring power in a timely manner.

Coordination between local jurisdictions and state agencies can be improved. There is little understanding in the Portland area of the Oregon Department of Energy's *Oregon Petroleum Contingency Plan* and minimal awareness of the Fuel Allocation Program. Priority groups identified in ODOE's plan may not correspond to local government, business and industry priorities.

Hospitals and clinics are prepared for a short-term, but might not be prepared for a long-term disruption. Most hospitals are prepared to support themselves for approximately three to seven days, depending on the type and size of the energy disruption.

Portland has taken steps to become less reliant on energy. Widespread implementation of sustainable practices has helped increase Portland's energy resilience. In March 2007 the Portland City Council passed an ordinance (No. 36488) establishing a goal to reduce oil and natural gas use in Portland by 50 percent in 25 years and to take related actions to implement recommendations of the Peak Oil Task Force. That same ordinance directed the Office of Planning & Sustainability to develop policy options to improve building environmental performance, including reducing oil and natural gas use.

In 2007, the Oregon legislature adopted a Renewable Portfolio Standard that sets aggressive targets for Portland's two electric utilities, Portland General Electric and Pacific Power. The utilities are required to quickly increase the percentage of renewable energy provided – from roughly 4 percent in 2007 to 10 percent in 2012 and reaching 25 percent in 2025.

¹ Earthquake Risk Study for Oregon's Critical Energy Infrastructure Report, Wang, Y., Bartlett, S., Miles, S.
² Energy – Background Report for Portland Plan.

Over 1,000 homes have received whole-home energy remodels since the beginning of the Clean Energy Works Portland pilot. The City supported two Solarize Portland campaigns in 2011, resulting in over 120 new solar system installations (2011) and over 570 installations since the program's inception in 2009. In summer of 2012, Portland is beginning to focus on the development of community-scale, collectively-funded solar systems.

The City continues to improve the energy efficiency of City buildings, streetlights and water and wastewater systems³.

Additionally, the City remains committed to implementing a diverse transportation network for bicycles, pedestrians, and light rail. These multi-modal transportation networks enable bicycles and light rail to be used as preferred modes of transportation in emergency situations when fuel is scarce. Portland's diverse fleet of vehicles including electric and hybrid cars also increases the City's energy resilience.

In June 2012 City Council passed an ordinance to remove barriers to urban food production and distribution activities such as market gardens, farmers markets, and food-buying clubs. Access to locally grown food eases dependence on fossil fuel to transport, process and distribute food.

³ [Climate Action Plan 2009 - Two Year Progress Report](#)

The Energy Annex: How will Portland respond to a major energy disruption?

Responding to a major energy disruption in Portland will not be easy. First and foremost, the bulk of the energy infrastructure in the region is not owned or maintained by the City of Portland or other public sector agencies. However, the *Energy Annex* provides a framework to guide the City's response during an energy disruption.

In the event of any emergency, the City's response priorities are life safety, incident stabilization, environmental protection and property conservation. Priority is given to provide emergency assistance to vulnerable populations.

When the energy supply is disrupted, the City will work collaboratively with critical infrastructure owners and operators to help get facilities back online as quickly as possible. The City's coordinating efforts may include assisting utilities to access and secure their sites (including credentialing), facilitating damage assessments, debris removal, reopening roads, and ensuring consistent understanding of service restoration priorities.

The City will prioritize its need for fuel and provide that information to the Oregon Department of Energy (ODOE) via Multnomah County. Priority energy restoration will focus on critical facilities to include hospitals, 9-1-1 center, emergency coordination center and other government facilities, shelters, water and wastewater treatment facilities and pump stations, fire stations, and schools among others.

Depending on the scale of the disruption, a range of response actions may be taken by ODOE:

- Asking the public to adopt voluntary conservation measures.
- Limiting the operating hours of gas stations.
- Limiting the amount of fuel available for purchase.
- Allocating fuel in a tiered or staged process.

During a major energy disruption, the public will only have access to the gas supply left in the fuel pipes. City government typically has 30 days worth of fuel on hand (petroleum and diesel) assuming normal operations; however, that amount will be consumed rapidly given round-the-clock response operations during an emergency.

The Improvement Plan: What do we need to do next?

The data and information obtained and the relationships forged during the Portland LEAP process are already helping prepare Portland for the hazards threatening our vital energy systems. The Portland LEAP was a first step. Further action is needed by the public and private sectors and other key stakeholders to build on this momentum.

The following recommendations will help the region better prepare for a major energy disruption and build a resilient community:

Formalize the relationship between the public and private sectors. A formal public and private sector partnership with energy providers, distributors, energy users and state agencies including Public Utility Commission (PUC) is needed to strengthen preparations for a major energy disruption. This effort could better define roles, responsibilities, priorities, technology and protocols for communication between the City of Portland, energy utilities and industries in Portland's NW Industrial Area.

Objective – Work with the PUC and private sector energy providers to formalize a liaison position to the City's Emergency Coordination Center by December 2013.

Expand the city's portfolio of high efficiency buildings and renewable energy technologies and pursue alternate energy sources for critical facilities and essential functions. The City has taken steps to pursue green building initiatives that result in structurally sound and energy-lean critical facilities. Examples using innovative technology to create energy lean critical facilities include the following. The Columbia Boulevard Wastewater Treatment Plant is the largest wastewater treatment plant in Oregon with the ability to accept and treat up to 400 million gallons per day. The plant is an essential facility and is equipped with two redundant electrical power feeds. As a byproduct of the sewage treatment process, the plant produces and reuses digester "biogas." Two 860 kW engine generators powered by this biogas produce more than 40% of the treatment plant's daily energy needs as well as producing heat for treatment plant building and process needs. However, while the system is not currently configured for these generators to act as standby or emergency generators, or send power back to the grid, the plant has other equipment to meet those needs in the event that both the primary and standby power feeds to the plant are out of service.

Diesel-powered engine generators in the digester complex and the Wet Weather Screening Facility combine to produce enough electricity to power the plant's offices, Operations Control Center, and maintenance shops. In addition, the plant's standby generators have enough energy to pump and provide a basic amount of sewage treatment in the event of a wholesale power outage. The plant's Operations Control Center is where personnel monitor 100 sewage pump stations and other critical system components throughout the city. More than half of those pump stations have fixed, standby generators. In addition to fixed standby generators, the maintenance crews have immediate access to seven large portable generators. Finally, each wastewater essential facility is equipped with a quick-connect feature so that a portable generator can quickly be hooked up and provide power to a facility within minutes.

The City's new Emergency Coordination Center – the centralized location that supports the on-scene response to an emergency – has a 26 kV solar photovoltaic array that supplements the electrical power requirements of the building. Additionally, the facility's building envelope design reduces building loads thereby lowering the rate of energy used.

Portland must increase investments that place it on a path toward further energy independence by adopting programs that allow Portland to produce more of its own energy locally, such as solar and wind power or biofuel.

Other opportunities include diversifying our fleet of emergency vehicles, back-up power for critical facilities and exploring innovative resources that can be used both on a day-to-day basis and during emergencies, e.g. a solar powered emergency communications trailer.

Objective – Continually assess the energy profile of critical facilities and where feasible integrate building systems that use renewable energy technologies to make them less reliant on the energy grid.

Encourage community resilience to an energy disruption. Incentivize ways to increase the energy resilience of homes and businesses through weatherization and solar energy programs. Reinforce preparedness messages – promote affordable and effective ways Portlanders can prepare for a disaster that reinforce sustainable practices.

Objective – Collaborate with the Bureau of Planning & Sustainability to promote programs such as Clean Energy Works and Portland Community Solar.

Ensure the energy assurance plan informs bureau-specific and citywide Continuity of Operations (COOP) Plans and utility asset management plans.

Align findings from energy assurance plan with energy profiles of essential facilities including back up power availability and uninterruptible power supply (UPS), essential functions, and alternate facilities to ensure they are adequate to meet emergency needs. As one example – many facilities have generators; however, the generator only powers emergency lighting and fire life safety measures (elevators, emergency egress) – not operations like computers, phones, printers, etc.

City essential service planning processes should consider: outage tolerances, recovery time objectives for critical systems, fuel diversity, alternative or redundant fuel delivery systems and back-up fuel and power capability. Additionally, a citywide COOP plan should prioritize fuel for generators at critical facilities that are expected to be operational after an emergency.

City infrastructure bureaus annually report the status and condition of the City's physical infrastructure (roads/bridges/streets, water, wastewater, parks and critical facilities). These asset reports give a snapshot of the five infrastructure systems to enable effective resource allocation to deliver community services. The City should work collaboratively with energy providers to better understand their asset management plans and determine whether they have: assessed the potential risk and consequence of asset failure and have plans in place to mitigate those risks.

Objective – Ensure all city bureaus have updated their COOP plans to take into account their energy profile, internal and external interdependencies, necessary service restoration resources, and contingency plans and work with private sector utilities to evaluate expected lengths of time to resume utility service after a Cascadia earthquake by December 2014.

Certify more damage assessment teams. The City should work with the utilities to coordinate and train more post-earthquake damage assessment teams. This will give utilities the ability to assess their own facilities without relying on city damage assessment teams, which prioritizes critical health care facilities, emergency response facilities and shelters before commercial structures.

Objective – Conduct at least two Applied Technology Council (ATC)-20 post-earthquake damage assessment training for 80 structural engineers, architects and inspectors to serve on damage assessment teams by September 2013.

Improve process for emergency notifications. Continue to improve the communication and notification process between utilities, government and emergency response agencies and the public.

Objective – Work with utilities to formalize a contemporaneous process to communicate the impacts of outages and restoration actions for planned and unanticipated power outages with potentially affected customers, government and emergency response agencies and the public via a centralized website i.e., www.publicalerts.org, by June 2013.

Conduct drills. A regional practice drill should be performed with relevant public and private partners. The exercise or series of drills should focus on several possible disruptions to the energy system and demonstrate the need for having energy resource options (i.e. renewable, petroleum, natural gas and electricity).

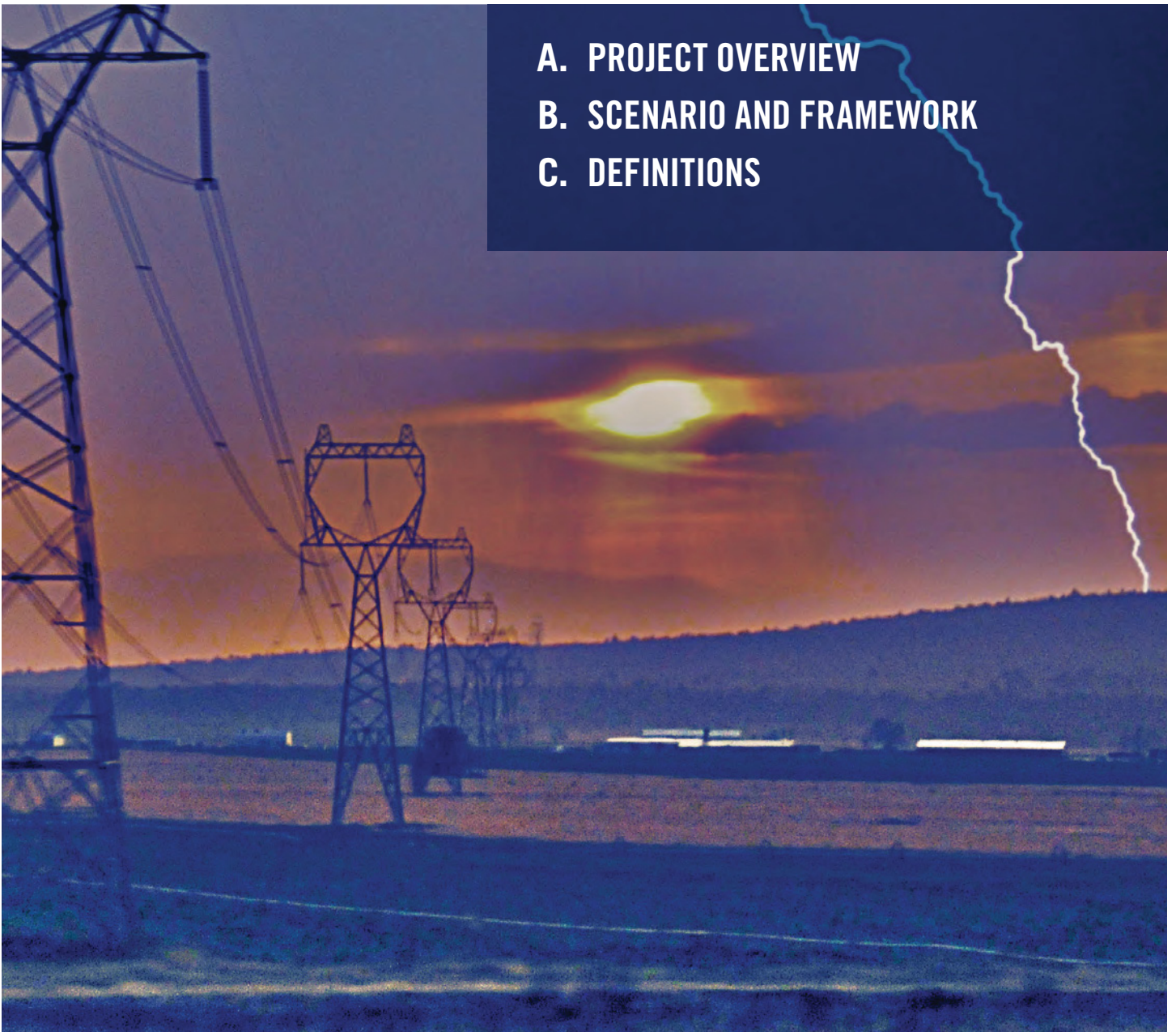
Objective – Plan a series of table top and functional exercises that test elements of the Energy Annex by September 2014 and use lessons learned to update the Energy Annex.

Recommend changes to the Oregon Department of Energy's Fuel Allocation Program. When the Governor declares an emergency and the Oregon Department of Energy implements their Fuel Allocation Program end users are prioritized into three tiers. Tier 1 includes emergency services sectors (law enforcement, fire, EMS) and Tier 2 includes essential services (public works, transit, telecommunications, utilities). Of concern is that emergency vehicles cannot navigate roads that are heavily strewn with debris so debris removal operations must be performed first – or at least simultaneously.

Objective – Work with ODOE to consider accommodating certain essential functions, including debris management, as part of their Tier 1 Fuel Allocation Program.



I. PORTLAND LEAP INTRODUCTION



- A. PROJECT OVERVIEW**
- B. SCENARIO AND FRAMEWORK**
- C. DEFINITIONS**

A. Project Overview

The Portland Bureau of Emergency Management (PBEM) is the lead agency for the Portland Local Energy Assurance Plan (LEAP). PBEM partnered with the Portland Bureau of Planning and Sustainability and the Mayor's Office to facilitate collaboration, coordination, and comprehensive planning efforts that affect all City bureaus and offices.

The Portland LEAP was a process to bring together members of the community. A key outcome of the Portland LEAP is a greater understanding of the interdependencies of the energy industry, emergency response organizations and the community – especially as they relate to emergency planning efforts.

When the Portland LEAP is completed we will have:

- Shared understanding of the roles and responsibilities of government agencies and energy providers and a better understanding of existing mutual aid providers.
- Understanding of response actions and priorities in a major energy disruption.
- Profile of fuel and electricity use to better understand where and how we use these resources, the impacts from the loss of these energy sources, recognize where alternative and back-up energy sources could be used, and improve energy efficiency.
- Knowledge of what is needed to make our energy systems more resilient.

Energy Assurance and the Importance of Definitions

The terms mitigation, resilience and vulnerability are frequently used when discussing emergency preparedness, response and recovery. It is important to recognize the terms are often used differently, depending on the discipline or perspective of the person or organization. The Definitions Section includes these terms and others that are used in this report.

One of the key terms for the Portland LEAP is energy assurance. As used in the Portland LEAP Report, energy assurance is a confidence that energy will be available when needed. To accomplish that level of security and availability of energy, we must take actions to reduce our vulnerabilities and prepare for an energy disruption.

The USDOE describes energy assurance as an array of activities that fall into three main categories: preparation and planning, response, and education and outreach.

- Preparation and planning involve identifying key assets and personnel, developing and updating energy emergency response plans, training personnel, and conducting exercises that test the effectiveness of response plans.
- Response activities include monitoring events that may affect energy supplies, assessing the severity of disruptions, providing situational awareness, coordinating restoration efforts, and tracking recoveries.
- Education and outreach activities include communicating and coordinating with key stakeholders, increasing public awareness, and forming partnerships with the private sector.

Why Portland Needs a Local Energy Assurance Plan

Much of Oregon's critical energy infrastructure is located in the heart of the high seismic hazard area along a six-mile stretch of the lower reach of the Willamette River in Northwest Portland. This area includes marine oil terminals, fuel tank farms, liquefied natural gas, natural gas, ports and riverfront facilities, pipelines and high voltage electrical transmission systems. This Critical Energy Infrastructure Hub (CEI Hub) for Oregon sits on top of soils that are highly susceptible to earthquake-induced ground deformation, lateral spreading, liquefaction and other hazards.

The critical energy infrastructure hub provides the majority of the energy we use in Portland and in Oregon. The statewide importance of these energy resources results in a dependency that requires collaboration and sharing of information among energy providers, distributors and users, and government agencies.

The Portland LEAP is funded by the US Department of Energy

In April 2010, the US Department of Energy (USDOE) awarded Portland \$276,099 under the American Recovery and Reinvestment Act (ARRA). Portland is one of 43 cities and towns in 25 states to receive money to develop new or improve existing energy assurance plans. This is the first time the energy assurance plans are being developed at the local level.

The Portland LEAP Timeline and Process

The amount of time allotted for the Portland LEAP, as designated by the ARRA funding, is 24 months (April 2010 – April 2012). The Portland LEAP staff began working at the Portland Bureau of Emergency Management at the end of August 2010 and convened the Portland LEAP Kick-Off Meeting on November 10, 2010.

An inclusive public involvement process was used to develop the Portland LEAP bringing in neighborhood associations, businesses, environmental organizations, non-profit organizations, emergency response agencies, government sector, private industry, telecommunications organizations, energy providers and distributors, hospitals, public health and other organizations. Through a series of committee meetings and with staff research, the Portland LEAP Report was created.

B. Project Scenario and Framework

Comprehensive energy assurance planning emphasizes maintaining access to all energy resources by preparing for all hazards that could cause disruptions. In addition, energy assurance planning involves working with government agencies, energy providers and affected stakeholders to make sure services are restored to the public as quickly as possible.

The *2010 City of Portland Natural Hazards Mitigation Plan* identified earthquakes as the most severe hazard for Portland – as a result, the Portland LEAP used an earthquake scenario for LEAP planning purposes. The scenario below was used to stimulate dialogue and planning efforts for the Portland LEAP. The full description of the scenario is on the Portland LEAP website:

<http://www.portlandonline.com/oem/leap>.

Portland LEAP Scenario

What: Cascadia Subduction Zone earthquake with an impact to Portland of M8.0.

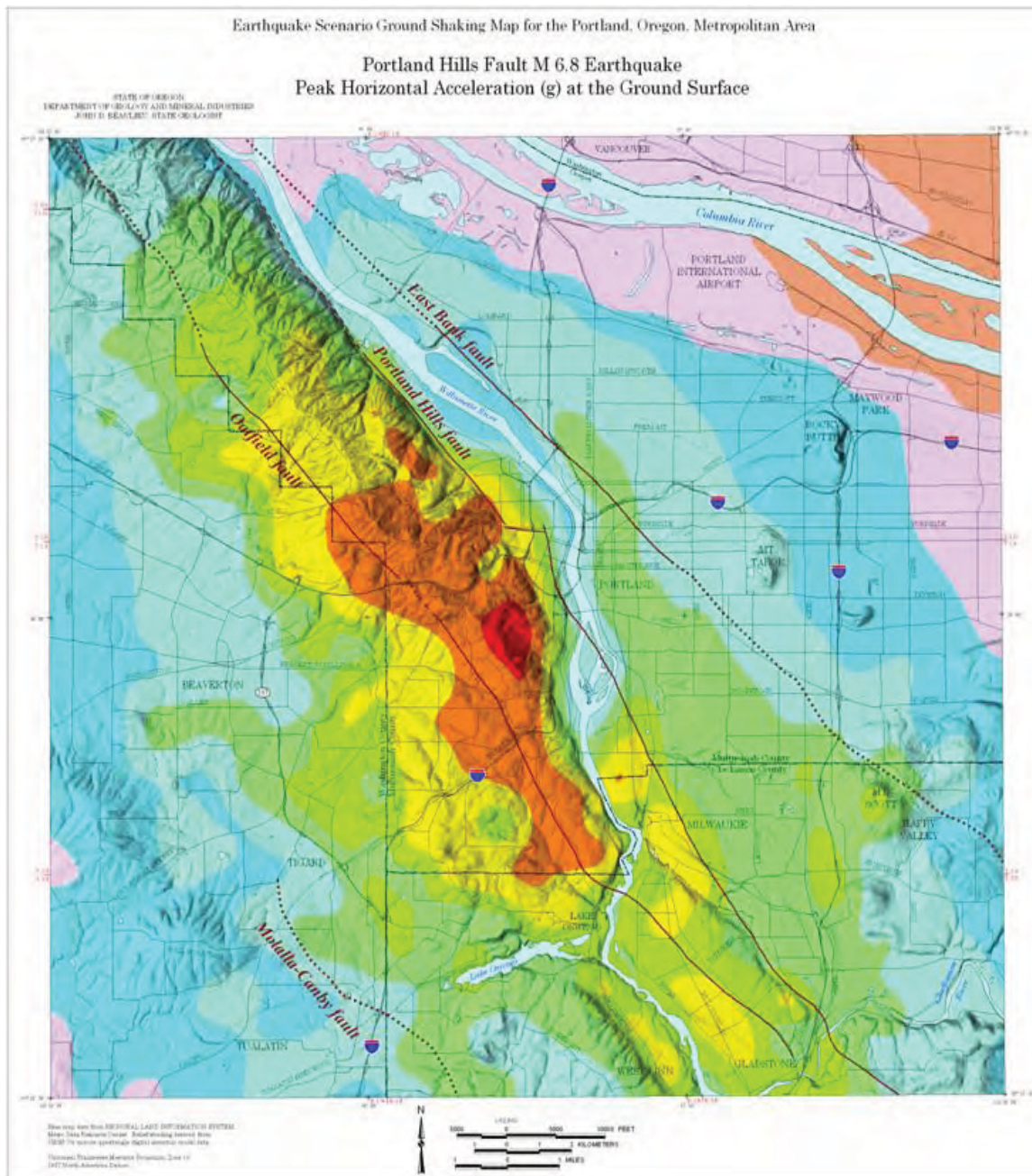
Where: The earthquake occurs directly west of Portland (90 miles away).

When: Noon on a Wednesday in November 2011.

Timeline: 72 hours after the earthquake – it is now Saturday.

Portland LEAP Framework

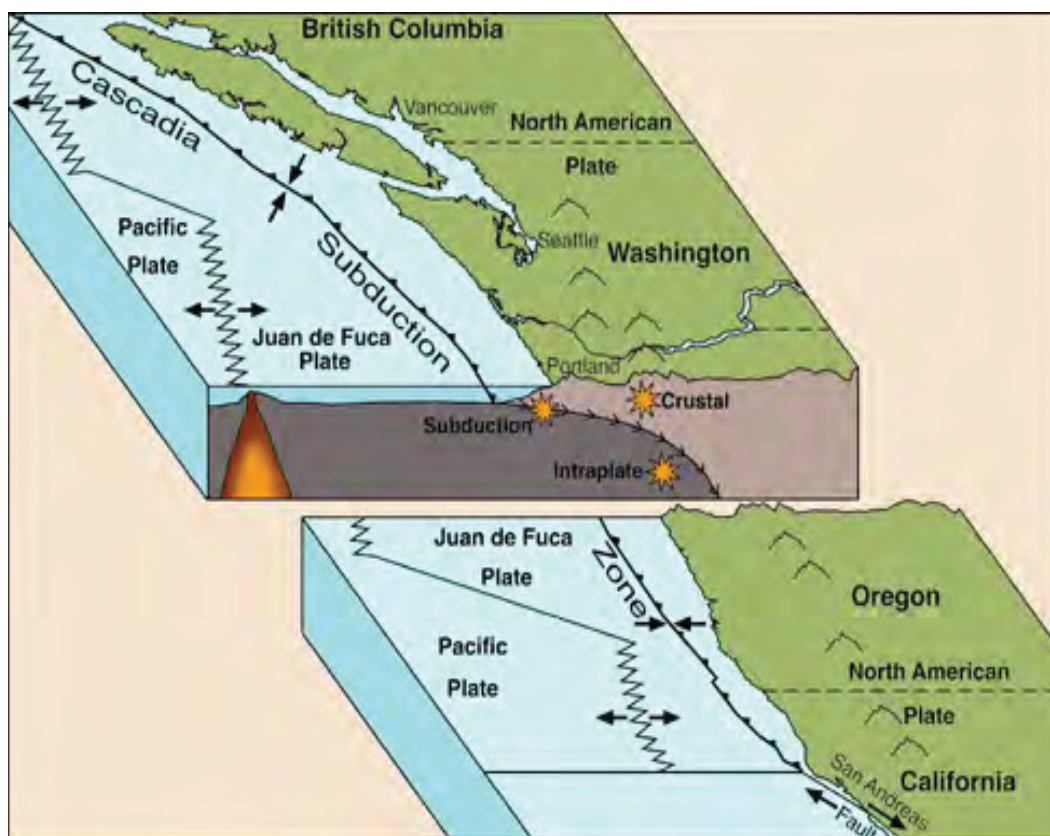
Portland is vulnerable to crustal and subduction zone earthquakes. Portland straddles three identified crustal faults that stretch the length of Portland: the Oatfield Fault, west of the northwest hills; the East Bank Fault, traversing the Willamette River into Oregon City and the Portland Hills Fault. The faults run parallel to one another along the Willamette River and are about 1½ miles apart.



Source: Department of Geology and Mineral Industries (DOGAMI), Portland Hills Fault M 6.8 Earthquake Peak Horizontal Acceleration (g) at the Ground Surface

The Cascadia Subduction Zone is a 680 mile-long fault where the Juan de Fuca and the North American plates converge. As it

heads eastward, the heavier Juan de Fuca plate plunges, or subducts, beneath the North American plate.



Source: DOGAMI

In the Portland LEAP scenario, a Cascadia Subduction Zone earthquake occurs off the Oregon coast at noon on a Wednesday in November resulting in strong ground shaking, coastal subsidence, landslides, liquefaction, lateral spreads and a coastal tsunami. The earthquake registers as M8.0 in Portland, resulting in major damage in Portland and throughout the region.

The USGS reports that extensive ground-shaking is expected for western Oregon from the Cascadia Subduction Zone fault.

This prolonged shaking would produce significant damage to Portland's critical energy infrastructure, likely disrupting the flow of petroleum, natural gas, and electricity for weeks. When this critical energy infrastructure is disrupted, the impacts are felt in the Portland metropolitan area, throughout Oregon and the Pacific Northwest.

The resulting impacts to the energy system include damage that renders many parts of the system inoperable. Use of back-up power will be required. Energy restoration will occur in phases, ranging from days, to weeks and months.

C. Definitions

After Action Report (AAR) – The administrative process used by the jurisdiction to review and discuss the response to an incident or to a team exercise to identify strengths and weaknesses, and to determine needed improvements in the documents, process, and programs.

All-hazards approach – Since 2001, the common practice has been to develop and implement emergency response plans that take an “all-hazards approach.” The *2010 Energy Sector-Specific Plan: An Annex to the National Infrastructure Protection Plan* describes all-hazards as a grouping classification encompassing all conditions, environmental or man-made, that have the potential to cause injury, illness, or death; damage to or loss of equipment, infrastructure services, or property; or alternatively causing functional degradation to social, economic, or environmental aspects. This definition is from the Public Technology Institute’s *Local Government Energy Assurance Guidelines – Version 2.0*.

Business Continuity Plan – The purpose of Business Continuity Planning (BCP) is to minimize potential damage to operations, reduce the duration of a disaster, and to minimize legal exposure. This can be accomplished by (1) responding properly when a disaster occurs, (2) resuming operations quickly, and (3) reconstructing damaged equipment or facilities. Business continuity planning includes prevention plans (before disaster), emergency response plans (during disaster), and business resumption plans (after disaster). This description is from *When Disaster Strikes: Business Continuity Planning*, an article in the IPC Review, Vol. 47, No. 10, November 2006.

Continuity of Operations Plan (COOP) – A Continuity of Operations Plan is a plan that provides for the continuity of essential functions of an organization in the event an emergency prevents occupancy of its primary facility. The plan provides the organization with an operational framework for continuing its essential functions when normal operations are disrupted or otherwise cannot be conducted from the primary facility. This definition is from the City of Portland’s *Comprehensive Emergency Management Plan*.

Critical infrastructure – Critical infrastructure is the publicly and privately controlled systems and assets, including the built and natural environments and human resources, essential to the sustained functioning of the Portland/Vancouver metropolitan area including the counties of Clackamas, Columbia, Multnomah, and Washington in Oregon and Clark County in Washington. Such systems and assets specifically include those necessary to ensure the continuity of security, safety, health, and sanitation services, support the area’s economy, and/ or maintain public confidence. Incapacitation or destruction of any of these systems or assets would have a debilitating impact on the area either directly, through interdependencies, and/or through cascading effects. This definition was established in the *Critical Infrastructure Protection Plan Portland/Vancouver Urban Area*. The Public Technology Institute also has a definition of critical infrastructure; this definition is discussed in the Infrastructure Interdependency section of the Portland LEAP report. Within that definition, energy is one of the 18 sectors for critical infrastructure and key assets identified in the *National Infrastructure Protection Plan*.

Crustal earthquakes – Generally occur along shallow faults near the earth’s surface. Crustal earthquakes make up the majority of earthquakes in the Cascadia area (western Washington, Oregon, and northwestern California) and are a result of fault movement in the earth’s surface. Crustal earthquakes are usually less than magnitude M7.5 and strong shaking generally lasts 20 to 60 seconds. Aftershocks are anticipated after a crustal earthquake. Crustal earthquakes with their shallow depth and close proximity to people and developed property could result in severe damage to structures.

Damage assessment – The process used to appraise or determine the number of injuries and deaths, damage to public and private property and the status of key facilities and services such as hospitals and other health care facilities, fire and police stations, communications networks, water and sanitation systems, utilities and transportation networks resulting from a man-made or natural disaster.

Emergency – Any natural, technological or human-made, event or circumstance causing or threatening: widespread loss of life, injury to persons or property, human suffering or financial loss, including but not limited to fire, explosion, flood, severe weather, landslides or mud slides, drought, earthquake, volcanic activity, tsunami or other oceanic phenomena, spills or releases of oil or hazardous material, contamination, utility or transport emergencies, disease, blight, infestation, civil disturbance, riot, sabotage, acts of terrorism and war. This definition is from Portland City Code 3.124.010.

Emergency support functions (ESF) – From the National Response Plan (NRP), a grouping of government and certain private sector capabilities arranged into an organizational structure to provide support, resources, and services.

Energy assurance – As used in the Portland LEAP report, energy assurance is a confidence that energy will be available when needed.

Energy resources – Unless the context requires otherwise, energy resources includes electricity, natural gas, petroleum, coal, wood fuels, geothermal sources, radioactive materials and any other resources yielding energy. This definition is from Oregon Revised Statutes (ORS) 176.750.

Energy emergency – As used in this section, energy emergency means a severe fuel shortage caused by international market conditions or hostilities, or any other emergency threatening the availability of any energy resource necessary to maintain essential services and transportation, the shortage of which jeopardizes the health, safety and welfare of the people of the State of Oregon. This definition is from ORS 176.809.

Essential facilities – For the City of Portland, essential facilities include those that serve the Portland Fire Bureau, Portland Police Bureau, City Hall, the 1900 Building, the Bureau of Emergency Communications, and the Justice Center. Essential for the City of Portland means necessary for continuity of operations. This definition is from the *2010 City of Portland Natural Hazards Mitigation Plan*.

Essential functions – The critical activities performed by organizations, especially after a disruption of normal activities. There are three categories of essential functions: national essential functions (NEFs), primary mission essential functions (PMEFs), and mission essential functions (MEFs). This definition is from *Federal Continuity Directive 1 (FCD 1) Federal Executive Branch National Continuity Program and Requirements*.

Functional annexes – Include Support, Emergency Phase, and Agency-Focused Annexes. These are tailored to the Emergency Operations Plan (EOP) format used by the jurisdiction. They all focus on critical operational functions and who is responsible for their execution. These annexes clearly describe the policies, processes, roles, and responsibilities that agencies and departments implement before, during, and after any emergency. This definition is from *Developing and Maintaining State, Territorial, Tribal, and Local Government Plans*.

Hazard mitigation – As defined in Title 44 of the Code of Federal Regulations (CFR), Part 201, Section 201.2, is “any sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.”

High potential loss facilities – High potential loss facilities are facilities that would have a high loss associated with them, such as nuclear power plants, dams and military installations. In Portland, this would include the hazardous materials sites in the NW Industrial Area, the inner city dams operated by the Portland Water Bureau and critical infrastructure. This definition is from the *2010 City of Portland Natural Hazards Mitigation Plan*.

Lifelines – Lifelines include utility systems (potable water, wastewater, oil, natural gas, electric power facilities and communication systems) and transportation systems (airways, bridges, roads, tunnels and waterways). Communication facilities are also important lifelines. This definition is from the *2010 City of Portland Natural Hazards Mitigation Plan*.

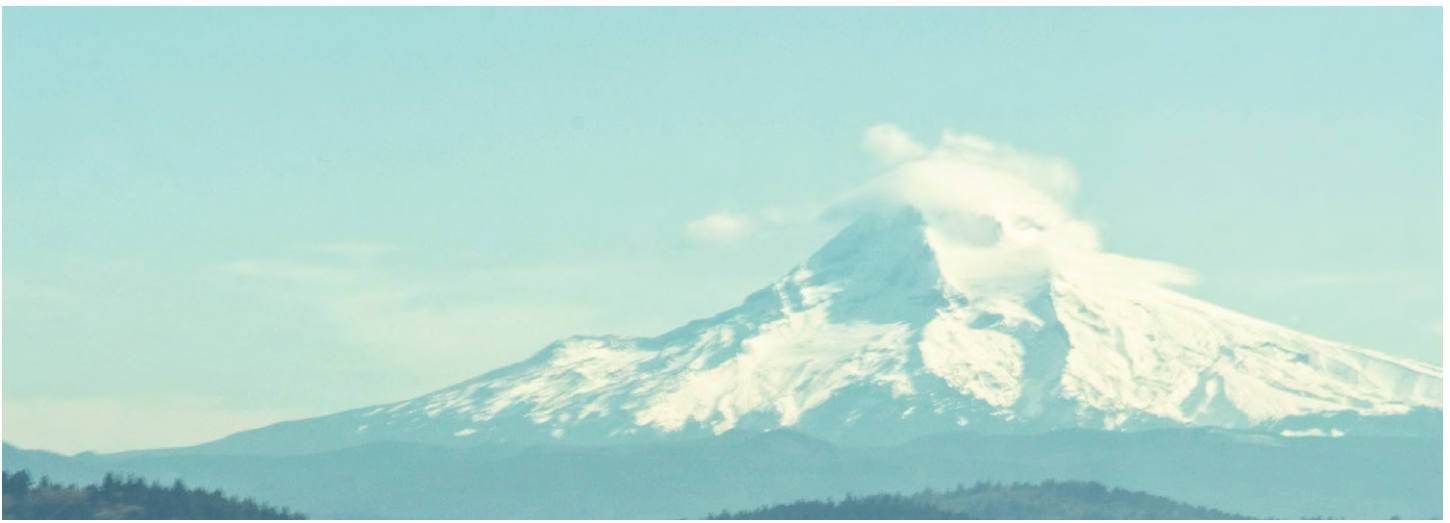
Mitigation – Mitigation, also known as risk reduction, is comprised of strategies and actions to lower or lessen the impacts of a disruption or disaster. These strategies and actions occur before, during and after a disaster.

Regional hospital – A dispatch center for medical services in the Portland area – currently located at Oregon Health & Science University (OHSU). Ambulances are directed by the regional hospital to take patients to a hospital depending on several factors including bed availability, geography, and the medical needs of the patient.

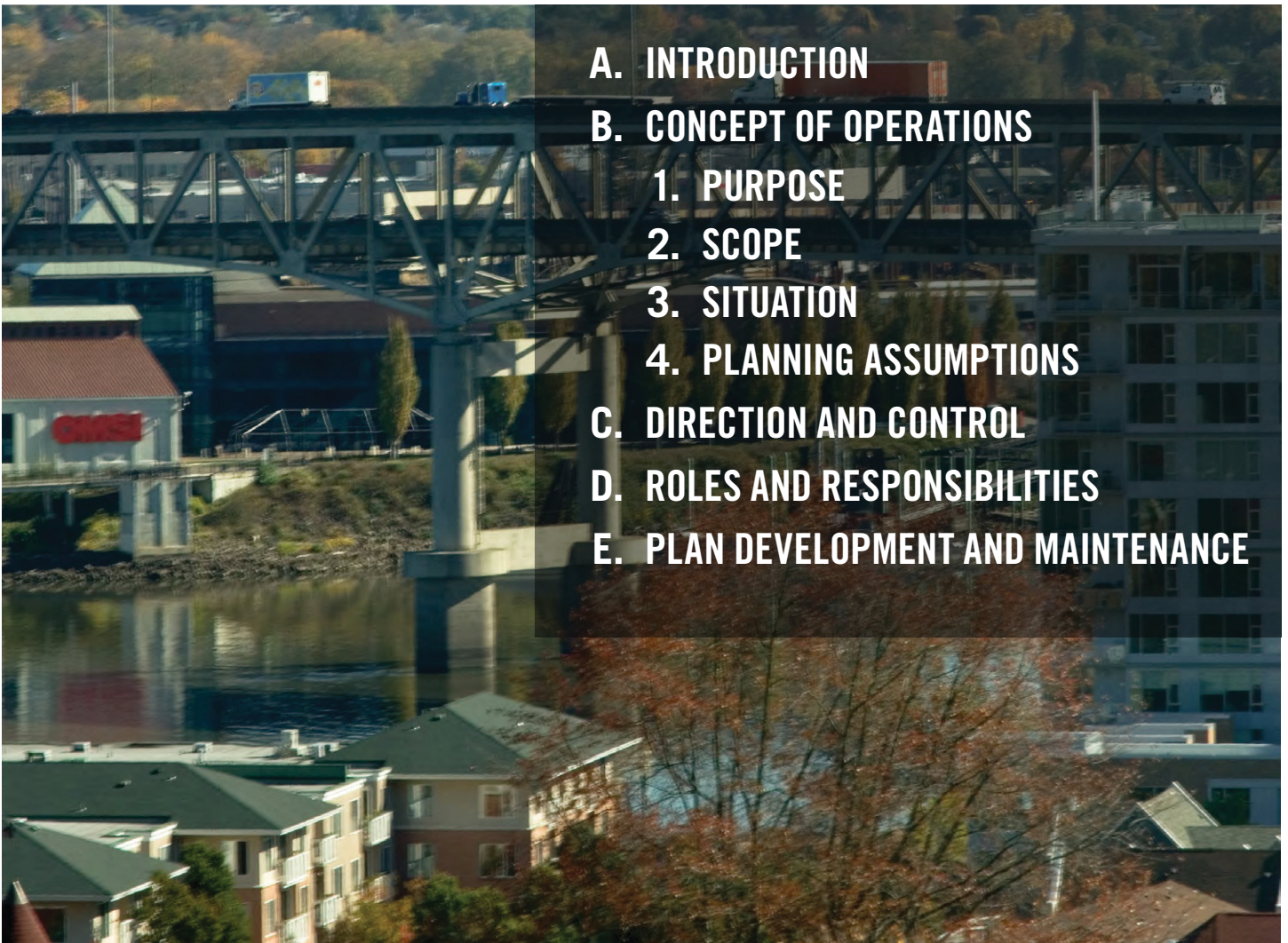
Resilience – Resilience is the ability to respond and to recover quickly from damage; it is the ability to “bounce back”. A resilient system is not necessarily damage-resistant. Rather, a resilient system is able to operate at some level when damage occurs. Since energy systems are not 100 percent damage-proof, prioritization of essential functions and services is a major element of resilience.

Risk – The potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences. The extended definition of risk is the potential for an adverse outcome assessed as a function of threats, vulnerabilities, and consequences associated with an incident, event, or occurrence. This definition is from the *Risk Steering Committee: DHS Risk Lexicon* published by the U.S. Department of Homeland Security in September 2008.

Vulnerability – Vulnerability is the degree to which people, property, resources, systems, and cultural, economic, environmental, and social activity is susceptible to harm, degradation, or destruction.



II. ENERGY ANNEX



- A. INTRODUCTION
- B. CONCEPT OF OPERATIONS
 - 1. PURPOSE
 - 2. SCOPE
 - 3. SITUATION
 - 4. PLANNING ASSUMPTIONS
- C. DIRECTION AND CONTROL
- D. ROLES AND RESPONSIBILITIES
- E. PLAN DEVELOPMENT AND MAINTENANCE

A. Introduction

Purpose

The purpose of the *Energy Annex* is to provide a consistent and flexible framework within which City of Portland government can work in a coordinated manner to respond to an energy disruption.

Scope

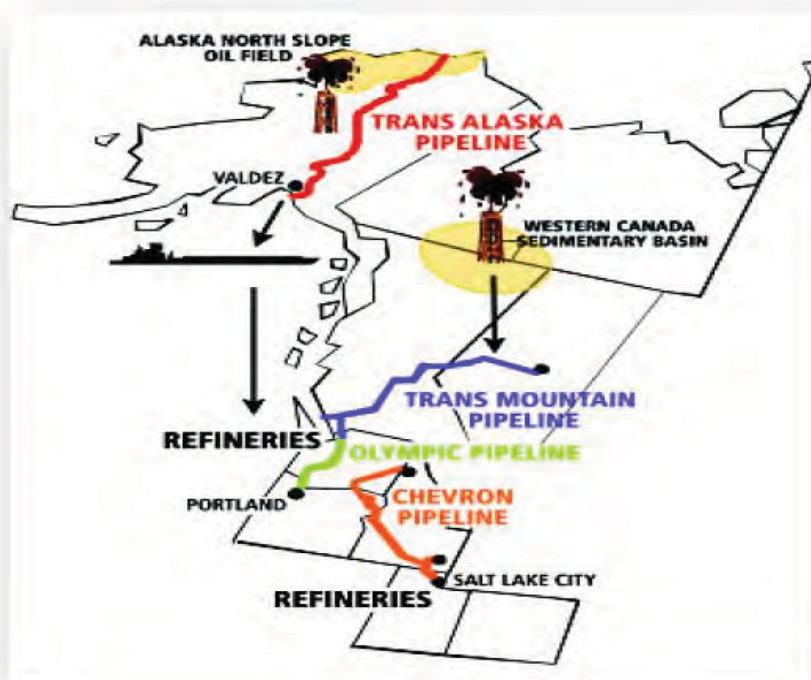
This *Energy Annex* supplements the *Basic Emergency Operations Plan* by providing considerations for response and short-term recovery to an energy disruption that has a significant impact on the City of Portland. The City of Portland acknowledges that an energy disruption will require a coordinated response by a combination of local, regional, state, federal, private sector, non-profit, and other non-governmental entities.

Situation

Portland's Critical Energy Infrastructure Hub (CEI Hub) is located in the heart of a high seismic hazard area along a six-mile stretch of the lower reach of the Willamette River in Northwest Portland. This area includes marine oil terminals, fuel tank farms, liquefied natural gas, natural gas, ports and riverfront facilities, pipelines and high voltage electrical transmission systems. The CEI Hub sits on top of soils that are highly susceptible to earthquake-induced ground deformation, liquefaction and other hazards.

Portland is dependent on the stability of energy resources in states adjacent to Oregon, and the infrastructure systems that traverse through them. Oregon's energy sources are primarily imported from states adjacent to Oregon. Petroleum facilities in the CEI Hub receive liquid fuel via liquid fuel transmission pipelines or marine vessels.

- There are no refineries or crude (unrefined) oil resources in Oregon.



- More than 80 percent of the crude oil eventually used in Oregon originates in the Alaska North Slope oil fields.
 - Oregon imports 100 percent of its petroleum (refined oil) and 100 percent of its natural gas. Of that 100 percent imported refined petroleum, the Puget Sound refineries provide more than 90 percent of Oregon's refined petroleum products.
 - One lateral pipeline transports gas from Washougal, Washington to the Portland area and another from the Willamette Valley to Grants Pass.
 - Williams Northwest Pipeline brings natural gas from British Columbia and the Rocky Mountain region.
 - British Columbia gas enters the U.S. near Sumas, Washington and roughly follows Interstate 5.
 - Gas from the Rocky Mountain region comes into Oregon near Ontario.
 - 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 California and Nevada.
 - A lateral line transports natural gas from Klamath Falls to Medford, Oregon. The GTN pipeline connects with the Williams Northwest pipeline in Stanfield (Umatilla County), Oregon.
 - Critical high voltage transmission lines and distribution substations sit at the Willamette River crossings in the CEI Hub.
 - Much of the Portland Urban Area's (PUA) electrical power supply is managed by the Bonneville Power Administration's control center located in the PUA.
- Oregon produces about one-third of the energy it uses. Oregon produces 414.8 trillion BTU a year; most of it is classified as renewable energy, with the majority of that being hydroelectricity. Hydro and coal make up the bulk of Oregon's electricity supply. Natural gas typically fills in when conditions to produce hydroelectricity are poor.
 - An energy disruption can occur as a result of several factors including extreme weather conditions (wind storms that knock down utility poles/wires, heat waves that increase demand on the energy grid and sag power lines), other natural hazards (landslides, earthquakes, flooding) or adversarial threats including cyber security and sabotage/terrorism. Fuel interruption can impact the transportation of goods, services, and the ability of government agencies and utilities to provide essential services.
 - Most of the City's transportation, water, sewer and telecommunications infrastructure as well as private sector energy transmission and distributions systems may be considered vulnerable depending on factors such as age, location and maintenance.
 - Having a clear understanding of what Oregon's energy resources are and the amount of energy used provides us with knowledge of what resources we rely upon, how much of that resource we use typically, and what options we have when one or more of the resources are not available. Energy assurance planning allows jurisdictions to better anticipate and meet fuel needs during an energy disruption.

- ORS Chapter 176, Section 809 authorizes the ODOE to develop and maintain the *Oregon Petroleum Contingency Plan*, which 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* identifies four levels of fuel supply conditions – these four levels are consistent with the National Association of State Energy Officials (NASEO) *State Energy Assurance Guidelines*:
 - Level 1: Normal Conditions – Monitor and Alert.
 - Level 2: Shortage – Mild Fuel Shortage.
 - Level 3: Shortage – Immediate Fuel Shortage.
 - Level 4: Shortage – Severe Fuel Shortage.
- During petroleum and fuel disruptions, ODOE will recommend and implement approaches to reduce fuel consumption. ODOE will first request voluntary fuel conservation. If the voluntary conservation measures are ineffective at alleviating the fuel shortage, ODOE will issue mandatory measures to reduce fuel consumption. Mandatory conservation measures require an emergency declaration by the Governor.
- In an energy disruption, the Governor may declare a State of Emergency. Should this occur, ODOE could implement the Fuel Allocation Program and the Set-Aside Priority Program. ODOE is responsible for working with the petroleum suppliers and wholesalers to implement the set-aside volume for use by the State of Oregon.
- The volumes designated in the Set-Aside Priority Program are established for a level that will minimally interfere with the market while satisfying hardship and emergency cases. All fuel delivered through the program will be purchased at the market price, and if 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 upon the amount of fuel already in the state in storage and the amount estimated to enter the state from the prime suppliers each month.

The Priority Fuel Users in the Fuel Allocation Program are set up in a tiered system.

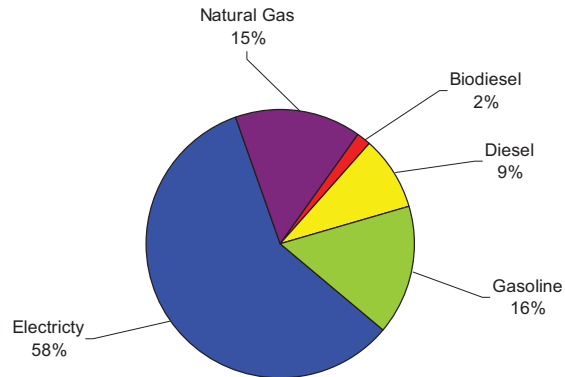
Fuel Allocation Tiers	
Tiers	Description
Tier 1	Emergency services sector [law enforcement, fire services, and medical services (ambulances, air transport, hospitals)]
Tier 2	Essential services sector [agriculture production and distribution, energy production (utility crews), public transit, public works (sewer, water crews), telecommunications, transportation (highways, roads, and bridge crews), sanitation, and others]
Tier 3	Community hardship sector (city, county, and other sectors as appropriate)

- ODOE can advise the Governor to implement measures such as but not limited to: odd/even day fuel allocation measures; fuel limit purchase requirement and limited hours of fuel operation by motor fuel retailers.
- The *Oregon State Energy Assurance Plan* identifies Oregon's consumption by energy source (from greatest to least) as petroleum, hydroelectric, natural gas, renewables, and coal.
- Oregon's renewable resources include hydropower, solar, geothermal, wave, biomass, and alternative fuels. Oregon's non-renewable energy sources are petroleum and natural gas (in compressed form referred to as liquefied natural gas or LNG). The combination of renewable and non-renewable energy sources provides some measure of assurance that energy will be available when it is needed.

Portland's Energy Profile

It is important to understand Portland's typical energy use so that more informed decisions about allocation of resources can be made during an energy disruption. Portland's energy sources include: electricity, natural gas, diesel, gasoline and other sources such as light fuel oil, green electricity, propane, ethanol, heavy fuel oil, and biodiesel. The following chart shows the City of Portland's total energy use from all sources converted to BTUs.

Energy Use in BTUs by Fuel Type, 2010-11

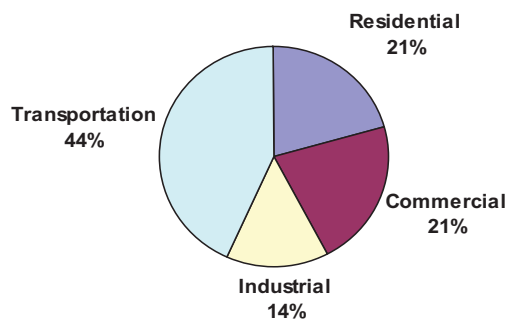


Source: City of Portland Sustainable City Government Operations Summary

Electricity use represents 58% of all energy used to perform city services and operations (lighting, water distribution, traffic lights and signals, streetcar).

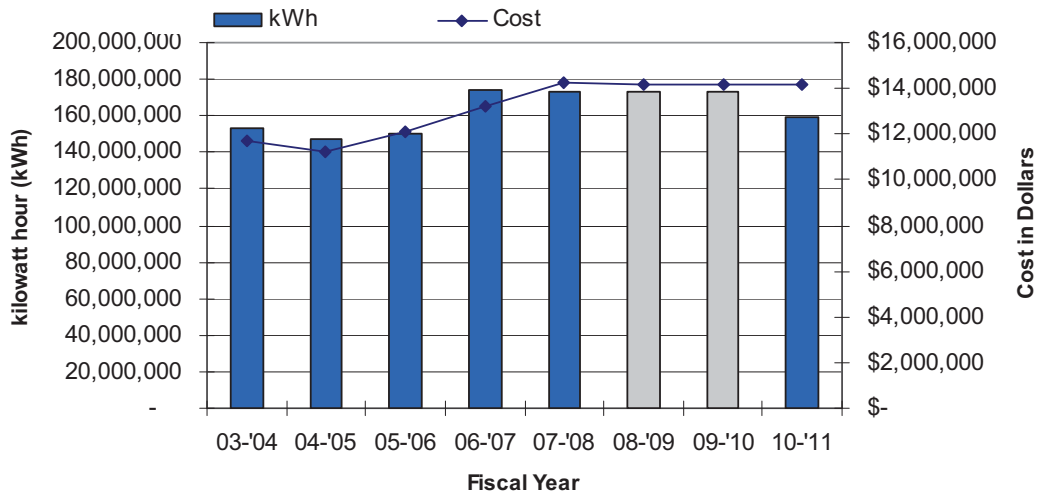
In 2010 Multnomah County used a total of 99,929,211 British Thermal Units (BTU) – of that amount: the transportation sector used 44 percent, commercial buildings used 21 percent, residential buildings used 21 percent and industrial sources used 14 percent. Portland makes up approximately 76 percent of the Multnomah County population and 86 percent by employment firms, which means that Portland uses the bulk of the energy used in Multnomah County.

Total 2010 Multnomah County Energy Use by Sector in percent of BTU



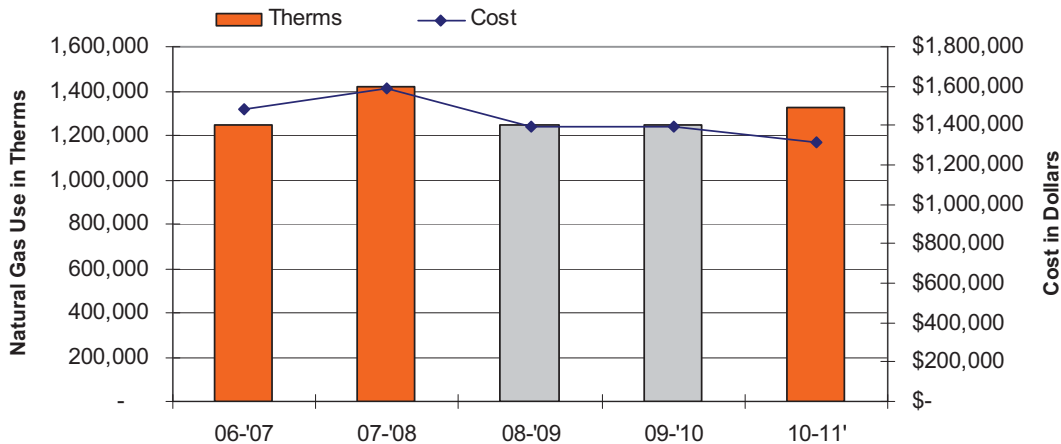
Source: Portland Bureau of Planning and Sustainability

Total Electricity Use by City Facilities



Source: City of Portland Sustainable City Government Operations Summary

Total Natural Gas Use by City Facilities



Source: City of Portland Sustainable City Government Operations Summary

Despite relatively abundant hydropower, nearly half of all electricity is from coal, natural gas, and nuclear power plants⁴. Wind power has spread rapidly in recent years, but in 2008 wind still provided less than three percent of electricity, and solar-generated electricity represents well under one percent. The transition of wind power from grid to off the grid will be necessary to be able to use wind power during an electrical energy disruption.

⁴ City of Portland and Multnomah County Climate Action Plan 2009

Sector Specific Situation Status

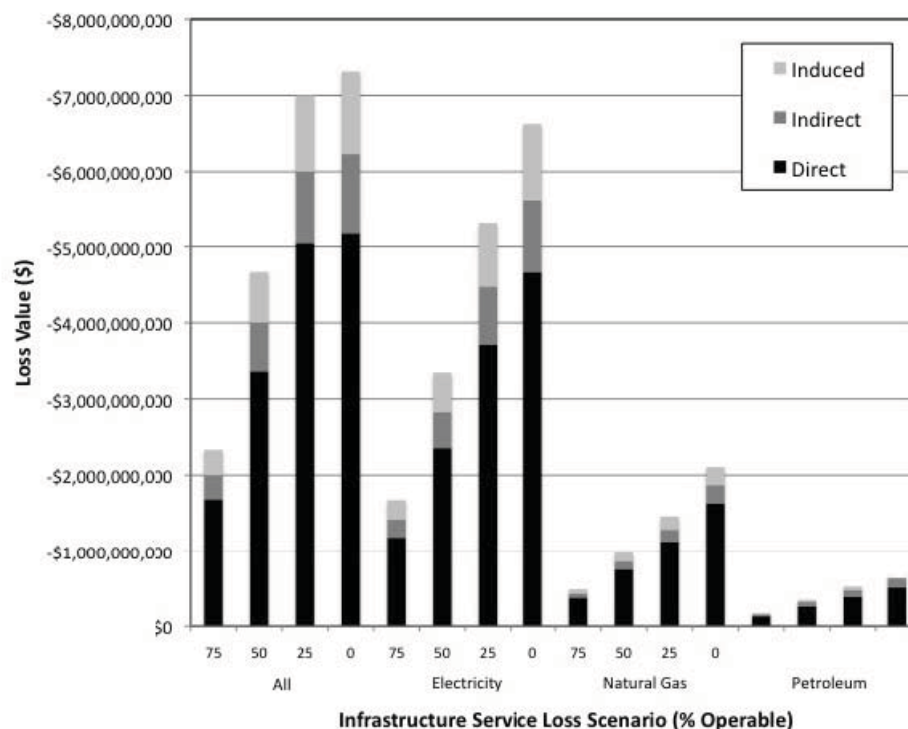
Energy and Distribution

DOGAMI found the condition of energy sector facilities varied significantly. Some facilities had 100-year old infrastructure and were built to no or antiquated standards. Some facilities were new and built to current standards of practice.

As described by DOGAMI, the energy sector facilities in the CEI Hub include: all of Oregon's major liquid fuel port terminals, liquid fuel transmission pipelines and transfer stations, natural gas transmission pipelines and a transfer station, liquefied natural gas storage facility, high voltage electric substations and transmission lines and electrical substations.

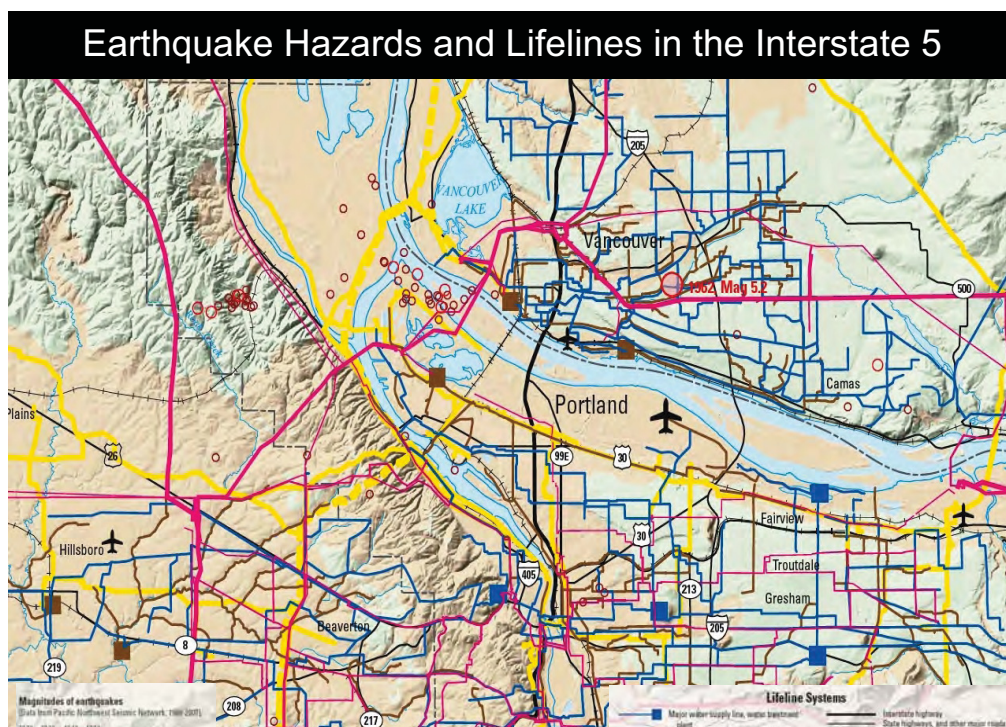
A statewide assessment of economic interdependencies of the energy sector comparing the interdependencies of electricity, fuel, natural gas and critical infrastructure with the rest of Oregon's economy (19 sectors) revealed:

- Disruptions to the electricity supply have the greatest economic impact over oil and natural gas.
- If the available electricity, natural gas and liquid fuels were significantly reduced, the direct and non-direct dollar losses would have major socioeconomic consequences to Oregon.
- If all three energy sectors are disrupted by an equal percentage, a minimum of \$0.39 of non-direct loss would be expected for every dollar of loss.
- The greatest economic impacts would be to those three sectors.
- In addition, for every job lost in all three energy sectors, a minimum of 2.42 job losses would result in other sectors.



Source: DOGAMI Preliminary Findings: Energy Sector

- There are seven petroleum terminals in Portland: British Petroleum, Chevron, ConocoPhillips, Kinder Morgan, McCall Oil, NuStar Energy and Shell. ODOE stated that two of the seven terminals in Portland have back-up generators. There is an eighth petroleum terminal in the region, owned by Tesoro, in Vancouver, WA.
- The private sector owns the majority of the critical infrastructure in the Portland area and plays a major role in the City of Portland's ability to respond to and recover from an energy disruption. Catastrophic damages to, or disruptions of, critical infrastructure will have a regional or even national impact. The City of Portland will coordinate with utility owners and operators to facilitate: the maintenance of trees located in or overhanging the street that interferes with any light, pole, wire, cable, appliance or apparatus used in connection with or as a part of the utility system; damage assessment; debris removal; emergency protective measures; repair, replacement, and restoration of damaged public facilities and infrastructure.
- Utilities will need help with access to their sites to assess the condition of their structures and to make repairs. Access, credentialing, road clearance, and debris removal will be critical to begin the lifeline restoration process.
- The use of renewable energy can provide a community with options that are less reliant on the grid. In emergency situations, bicycles, electric and hybrid cars, and trains may be used as modes of transportation. Electric and hybrid cars and trains (battery-powered) may also be used as sources of energy in an energy disruption.
- The Oregon Department of Corrections facilities, such as prisons, could be used as ODOE emergency fueling sites during an energy disruption. These facilities are pre-equipped with armed guards, large tanks for fuel, protective fencing, and other amenities that could readily transition the prison to a fueling station during an energy disruption.



Source: USGS and DOGAMI, Earthquake Hazards and Lifelines in the Interstate 5 Urban Corridor: Woodburn, Oregon to Centralia, Washington map.

Transportation

- PBOT has back-up generators and a three-day supply of fuel at their maintenance yards. They are the second leading bureau in fuel consumption.
- Portland Bureau of Transportation (PBOT) owns and maintains 157 bridges; 3,949 lane miles of roads; 992 traffic signals; eight million square yards of sidewalks; 37,352 improved corners; and 53,000 streetlights. PBOT relies on energy to maintain and operate infrastructure.
- Fifty-four percent of PBOT's bridges are considered to be in good or better condition while 18 percent are considered to be in poor or very poor condition. Damaged transportation routes could limit or prohibit access to critical infrastructure facilities.
- Emergency Transportation Routes (ETRs) is a term used for regional roads that will be inspected first after an earthquake. These roads are owned and managed by ODOT and the respective counties and cities in the five county area surrounding Portland. Established ETRs utilized by emergency responders include vulnerable bridge structures that, if damaged or impassable, will impede the City's emergency personnel and the utilities' abilities to respond to an energy disruption.
- Multnomah County owns and maintains six bridges in the Portland metropolitan area: the Burnside, Broadway, Hawthorne, Morrison, Sauvie Island, and Sellwood bridges. They also maintain over 20 smaller bridges. The Oregon Department of Transportation (ODOT) maintains the Ross Island, Fremont, St. Johns and Marquam bridges. Union Pacific Railroad owns and maintains the Steel Bridge.
- Many of the bridges also carry critical services including water distribution pipes, telecommunications and electrical lines across the Willamette River. If bridges are damaged these lines could break and disrupt service to parts of the City.
- With limited fuel or electrical outages TriMet's buses and MAX lines and the Portland Streetcar will have limited service. People may rely more on human powered alternative modes of transportation when fuel is not readily available.

Water and Wastewater

- The Water Bureau has 220 million gallons of finished storage; 75 miles of conduits; 43 miles of mains; 2,200 miles of pipes; 1,500 culverts; two dams; 33 wells; 180,000 service lines; 44,000 valves; 182,500 meters; 15,000 hydrants; 39 pump stations; 58 active distribution storage tanks and four storage tanks that are classified as terminal reservoirs. While some portions of the system use gravity, most of the Water Bureau infrastructure system relies on energy to function.
- The Water Bureau has back-up generators and uses biodiesel to power their vehicles. Generally, back-up generators have limited capacity. The Water Bureau has the largest biodiesel fleet in the nation.
- The Hydroelectric Power Division of the Water Bureau manages the Portland Hydroelectric Project (PHP), which is located in the Bull Run watershed. Two powerhouses generate power that is sold to Portland General Electric. At the PHP, the long-term annual average amount of energy that is generated is a little more than 85.6 million kilowatt hours (kWh) per year. In PGE's power distribution system, it is estimated that the residential customers use an average amount of energy of 10,384 kWh/year. That calculation translates to the PHP providing 8,240 Portland area households with electricity every year.

- Since 1982, a total of 2.5 billion kWh of renewable energy has been produced by PHP for use in the Portland area. To produce that amount of energy from a coal plant, it would have to burn 1.01 million tons of coal (9,700 train cars full) and release over 2.6 million tons of CO₂ into the atmosphere.
- The Bureau of Environmental Services (BES) provides water quality protection; watershed planning; wastewater collection and treatment; sewer installation, maintenance and repair; and stormwater management.
- The BES infrastructure system relies on energy. BES has 450 miles of separated sewers; 900 miles of sanitary sewers; 1,150 miles of combined sewers; 100 pumping stations; two wastewater treatment plants; and many green stormwater facilities that don't use energy.
- BES has back-up generators at treatment plants and pump stations. Sources of energy include electricity, fuel, propane, and gas.

Fire & Rescue

- Portland Fire & Rescue has 30 fire stations. Each fire station has a back-up generator powered by natural gas except stations 1, 18 and 31 – which have diesel-powered generators. The new Station 21 is also being designed for a diesel powered generator.
- Most of the fire stations have amateur radio equipment, which provides redundant communication capability when telephone and computer networks are damaged or have limited service.
- Portland Fire & Rescue is exploring the feasibility of installing solar-powered battery back-up generators.
- Portland Fire & Rescue does not purchase diesel for their apparatus through City Fleet; they purchase through a contracted distributor. Fuel sites used by Portland Fire & Rescue that have generator capacity include Carson Oil, Pacific Pride and Jubitz Truck Stop.
- Portland Fire & Rescue is the third leading bureau in fuel consumption.

Law Enforcement

- Portland Police Bureau (PPB) obtains their fuel from City Fleet Services and Pacific Pride. They are the leading City bureau in fuel consumption.
- Police has a diverse portfolio of air and ground assets including: two air support unit airplanes, and many cars, trucks, trailers, motorcycles, and ATVs that rely on fuel.
- Police have diesel tanks at two locations – North Precinct and the Traffic Division.

City Fleet Services

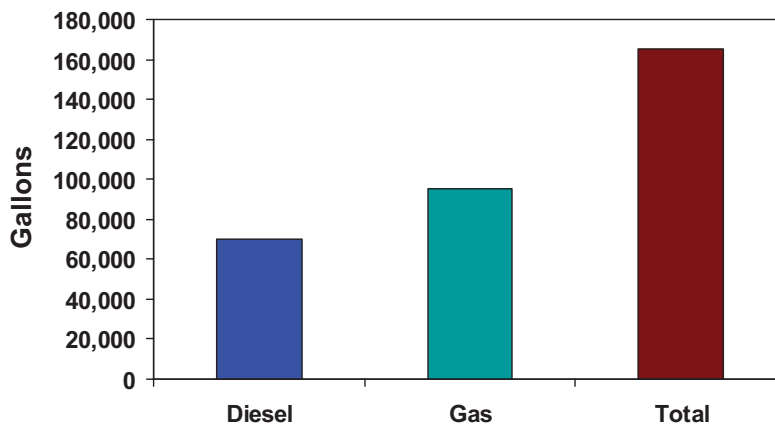
- The City of Portland typically has 30 days worth of fuel on hand (petroleum and diesel). Daily use is about 8,000 gallons per day; however, in an emergency, fuel use is estimated at 21,000 gallons per day. City Fleet noted that during emergencies, following 24/7 operational periods, the Portland Bureau of Transportation uses 26 percent of the City's fuel, followed by Portland Police and Portland Fire & Rescue.
- City Fleet Services purchases 1.8 million gallons of fuel annually, of which 1.1 million gallons is unleaded gas and .7 million is diesel – this includes fuel from both internal and external fuel stations. Sixteen bureaus or offices purchase their diesel or unleaded gas from City Fleet in addition to the U.S. Marshal's office.
- City Fleet fuel usage is, for the most part, static; however, the city's fuel type composition has changed. From 2006-2011, unleaded gas use decreased from 59% to 54% while diesel consumption increased from 27% to 34%. City Fleet has more vehicles than ever, including electric vehicles, but the newer vehicles are more fuel-efficient. City Fleet believes there will be a trend of decreased fuel usage in the coming years.
- City Fleet has two 15 Kw portable, trailer-mounted generators that are specifically for the City's fueling stations. Estimated usage is seven to ten gallons per hour of use. Three of the fueling stations have the capability of running off of the building generators adjacent to the station. The amount of fuel used by the generators is unknown.
- City Fleet has four mobile fuel trucks. The two newer trucks carry 1,200 gallons of diesel and 50 gallons of gasoline each. The two older fuel trucks carry 600 gallons of diesel and 100 gallons of gasoline.
- Twenty-four City of Portland Office of Management & Finance facilities have generators that are fueled by propane, natural gas and oil. City Fleet provides the fuel for these back-up generators.
- City Fleet notes that SeQuential Pacific Biodiesel makes fuel in Oregon and they keep 75,000 gallons on hand. A partnership with SeQuential could be established.
- The City has a total fuel tank capacity (gas and diesel) of 167,000 gallons. In an energy emergency, this fuel would be used for emergency power and transportation. Renewing this supply would be crucial for maintaining critical operations
- During an emergency the City would need an additional 13,000 gallons of fuel per day. Normal fuel use is 8,000 gallons/day vs. emergency fuel use of 21,000 gallons/day.

City Fleet Vehicle Count FY11-12

Fleet Count (FY11-12)	Vehicle or Component Type	% of Total
12	Electric Vehicles	0.4%
90	Hybrids	3%
297	Flex Fuel capable vehicles	10%
603	Components or units without fuel types (includes: bikes, trailers, snow plows, etc.)	20%
791	Diesel Vehicles	27%
1,171	UL vehicles	40%
2,964	TOTAL	100%

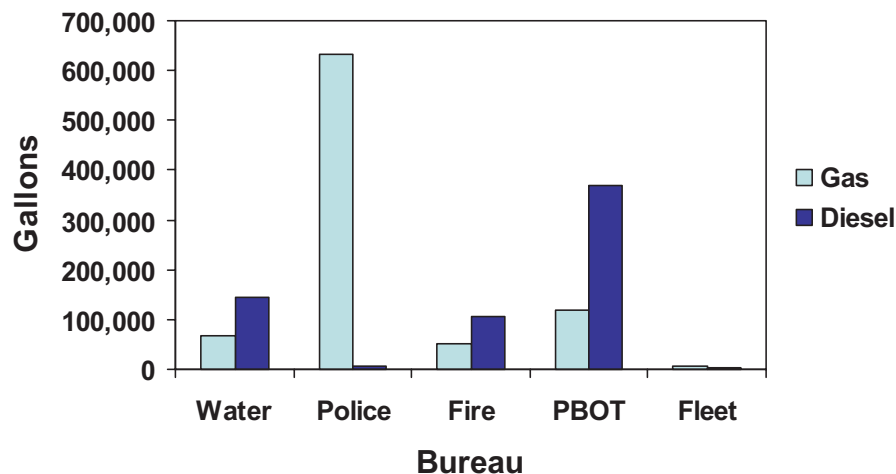
Source: City of Portland Sustainable City Government Operations Summary

City of Portland Fuel Tanks Capacity



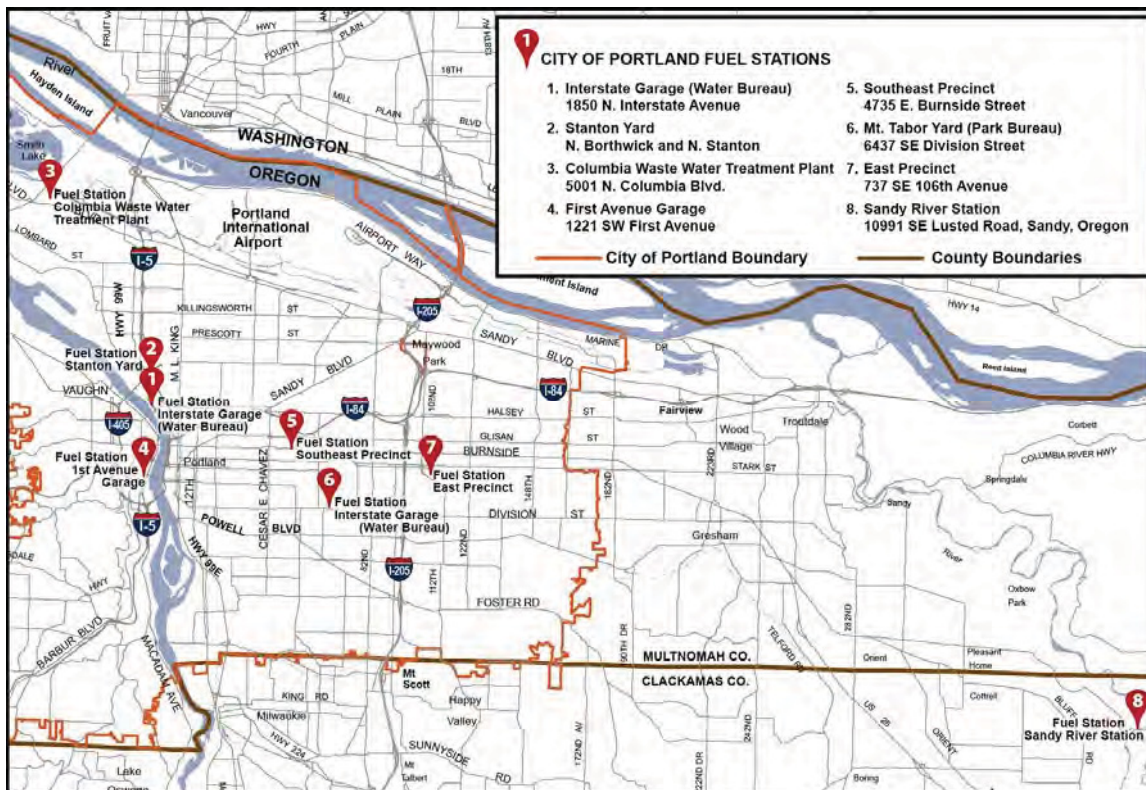
The types of fuel used by City Fleet includes: unleaded E10 gasoline (UL); 5 percent biodiesel (BA); normal 20 percent biodiesel (DL); E85 gasoline or flex fuel (FF); and Urea (UR). UR is only used by 2010 or newer diesel trucks.

City of Portland Fuel Usage FY10-11



City Fleet has eight managed fuel stations. Six of the eight fueling sites have the ability to be hooked up to one of the two portable 15 kW generators. Only one fuel station is on the west side of the Willamette River; however, it is located in the basement of a multi-level garage. After an earthquake, it is not likely the underground facility would be useable. External fuel stations are those accessed via a commercial source using the Voyager card.

City of Portland fueling station locations are shown on the map below.



Source: City Fleet.

9-1-1 and Telecommunications

- The Bureau of Emergency Communications (BOEC) has back-up generators maintained and tested by City Facilities. The Bureau of Technology Services (BTS) functions as BOEC's technical support for telecommunications and computers.
- BOEC and the City's public safety emergency radio system simulcast sites, and IntelliRepeater sites have battery back-up (eight hours of back-up batteries) and generators on-site with a 500-gallon propane fuel tank.
- BTS is responsible for management, policy setting, strategic planning and leadership in the use of computer, radio, and telecommunications technologies, to support the delivery of government services. The stability of this system is integral to continuity of operations in an energy disruption and must be prioritized to enable other City services operational capability. Communication networks that depend on the Internet or the Bureau of Technology Services (BTS) infrastructure may be impacted and compromised. Impacts from an energy disruption such as cyber security, physical damage, and heavy traffic can impair the ability to respond to the emergency and to repair energy infrastructure.
- Telecommunications systems are owned by public and private entities.
- CenturyLink has several central offices in the Portland area that would be affected by an energy disruption. Impacts to their two tandem switches – one on the west side of the Willamette River and one on the east side – would affect local and international service.
- City of Portland's wireless two-way voice and data communications network depends on energy to operate voice, data, and microwave networks.

Health and Medical Facilities

- The majority of the state's major medical facilities are within the city limits of Portland, including both of Oregon's Level 1 Trauma Centers – Oregon Health & Science University and Legacy Emanuel Hospital.
- The Portland Urban Area is home to 17 hospitals, all of which are critical facilities.
- Most hospitals are prepared for approximately three to seven days, depending on the energy disruption. Hospitals usually have back-up generators and have resources that can be pulled from outside the region (e.g. federal). Clinics have more limited resources; not all of them have back-up generators.

Utilities

- The Oregon Public Utilities Commission (PUC) will work with the utility industry to restore energy as quickly as possible. The PUC will serve as a liaison between cities and counties and the respective utilities.
- The major electrical power provider in the Pacific Northwest is the Bonneville Power Administration (BPA); BPA sells power to the major distributors in the region. Much of the power transmitted by BPA moves through 500 kV transmission lines, and the 230 kV and 115 kV grids provide additional transmission capability.
- If BPA has limited electrical power, companies such as PGE and Pacific Power, which rely on BPA, will also have limited electrical power.

Pipeline Companies

- Olympic Pipeline operates a pipeline system that provides gasoline, diesel and jet fuel.
- Williams Northwest Pipeline operates three natural gas transmission pipelines that deliver about 12 percent of the natural gas consumed in the U.S. They can serve the needs of 30 million homes.
- Williams Northwest Pipeline provides gas supplies directly to NW Natural and other local distribution companies and to power generators who, in turn, provide gas and electrical power to local users.
- Williams Northwest Pipeline has redundant gas powered generators to power their compressor stations and the gas to fuel those generators comes from the pipeline. They have gas storage facilities throughout the system that they can tap for an emergency power supply.

Fuel Providers

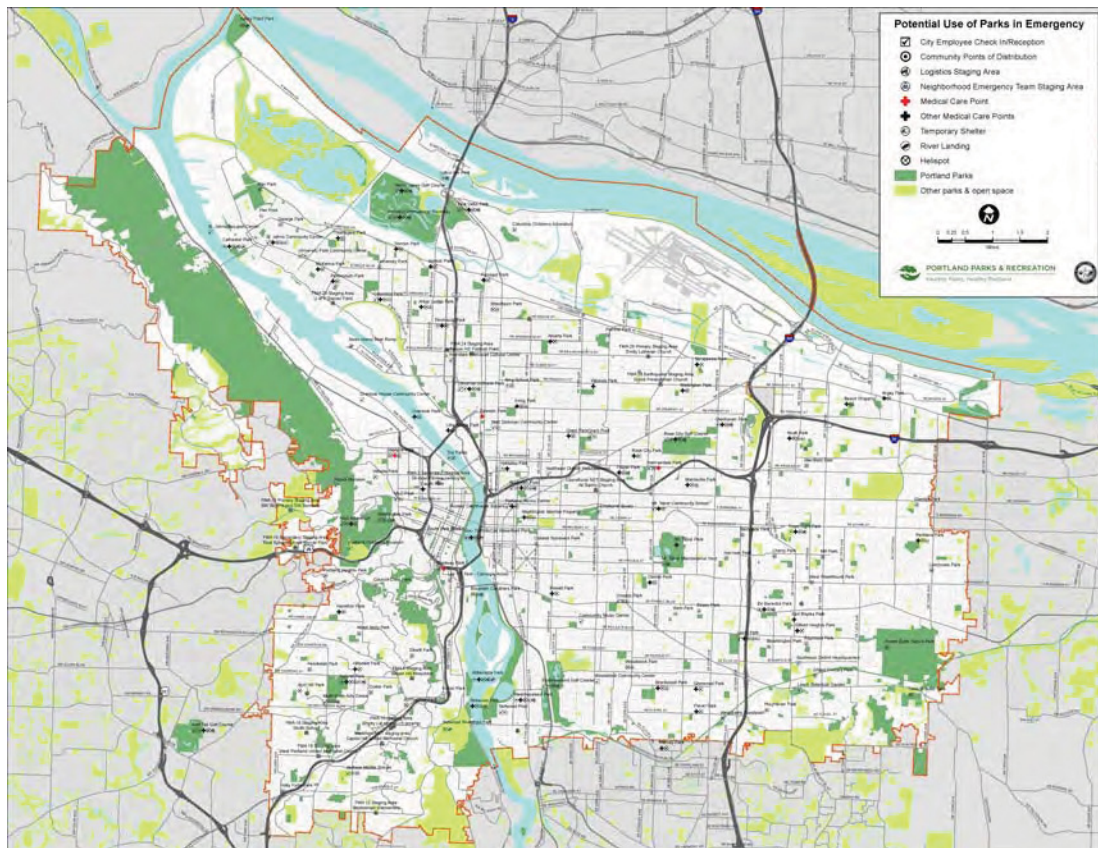
- The Oregon Department of Energy (ODOE) will work with fuel providers to restore energy as quickly as possible. If an emergency is declared by the Governor of Oregon, ODOE may implement the Fuel Allocation Program.
- Shell Oil Inc. prioritizes hospitals, police, fire, fuel distribution terminals, then residents to receive service. Without power, they cannot operate their fuel distribution system. They do not have a back-up generator at their location in the NW Industrial Area.
- Kinder Morgan transports over two million barrels per day of gasoline, jet fuel, diesel, natural gas liquids and other fuels through more than 8,000 miles of pipeline. They have a large facility in the NW Industrial Area.
- Pacific Terminal Services provides services to Chevron Marine Fuels located at the GASCO terminal in Portland owned by NW Natural Gas. Blending components are received via ship, barge, rail or truck and distributed by barge and truck.
- Pacific Terminal Services identifies fire, police, hospitals, communication and transportation as priorities to receive service. They have a diesel on-site boiler they can use that provides eight hours of power. Available vessels include: two barges, two tugboats and a boom boat.

Damage Assessment

- The Bureau of Development Services (BDS) has the primary responsibility for damage assessment inspections of buildings, both private and public. BDS Damage Assessment Teams (DATs) will assess damage to buildings to determine the structural integrity. An energy disruption will compromise assessment timelines.

Gathering Points, Shelter, and Food

- Portland Parks & Recreation (PP&R) has: 10,000 acres of parkland; 180 developed parks; 47 habitat parks; five golf courses; seven botanical gardens; an arboretum; a raceway; several stadiums; 13 pools; 12 community centers; 177 miles of trails; 142 playgrounds; 300+ sports fields; 31 community gardens; and over 100 tennis courts.
- PP&R has assessed parks facilities for emergency uses. Suitable sites were selected because they are outside of known hazard areas and clear of pipeline or electrical transmission lines that would impede the use of the parks for staging supplies or serving as distribution or gathering points.



- After a large magnitude earthquake people will likely congregate in open and public spaces such as parks, schools, community centers, and churches.
- Non-profits like the American Red Cross and the Oregon Food Bank may be limited in their ability to provide their usual services during an energy disruption.
- Local food sources, such as community gardens, will play an important role if transportation and shipping is limited by the energy disruption.
- Several Neighborhood Emergency Team (NET) staging areas have been established at PP&R sites. NETs are volunteers trained to assist the community in an emergency; some NET volunteers are also trained in the use of amateur radio. NET volunteers may assist their immediate neighbors with things like turning off utilities, damage assessment and light search and rescue. Locations near NET staging areas may be used for staging supplies or serving as distribution or gathering points.

Multnomah County Emergency Management

- When the ODOE Fuel Allocation Program is in effect, ODOE works through the 36 county jurisdictions for fuel allocation. The City of Portland will provide Multnomah County with the City's fuel needs; Multnomah County will provide that information to ODOE.

Planning Assumptions

If an energy emergency is declared, the Oregon Department of Energy may ask the public to adopt voluntary conservation measures, limit the operating hours of gas stations or the amount of fuel available for purchase, and/or allocate fuel in a tiered or staged process.

Transportation, water, sewer, telecommunication, energy transmission and distribution systems and other critical infrastructure systems may be impacted such that they have limited availability and/or are not functional for hours, days or weeks.

A wide-scale energy disruption may require a Multi-Agency Coordination (MAC) Group of local, regional and state elected officials or executives to establish strategic regional policies. This regional MAC Group may be assisted by an ECC/EOC, which will provide decision-making support via technical specialists and subject matter experts to the MAC Group.

Resources to remove debris, if needed, will initially be limited as Metro, Multnomah County and the City of Portland mobilize forces and available contractors.

The Mayor may exercise emergency powers including the authority to regulate by rationing, freezing, use of quotas, or other means the use, sale or distribution of fuel.

B. Concept of Operations

Operational Priorities

The response to a major energy disruption will be immediate. For the purposes of the *Energy Annex*, the operational priorities have been outlined in the following subsections: Immediate Goals and Objectives (first 72 hours), Short-Term Goals and Objectives (72 hours to 10 days), Long-Term Goals and Objectives (11 to 30 days) and Transition to Long-Term Community Recovery (beyond 30 days).

Immediate Goals and Objectives (First 72 Hours)

The City will implement immediate emergency response operations as described in the City of Portland *Basic Emergency Operations Plan*. The cause of the energy disruption will influence which bureaus lead unified command during the immediate response period.

Command and coordination will occur in the field with limited assistance from the City ECC/EOC until the ECC/EOC is fully activated. The Disaster Policy Council will convene as soon as possible.

City objectives will provide a starting point for the response and will be modified as needed. Immediate objectives include:

- Assessing citywide continuity of operations and provision of essential services and maintaining situational awareness for response and recovery.
- Conducting rapid assessment of damage and impacts to the community. Private sector energy partners will be contacted for situation status information (outage information, hazardous environments, asset protection measures).
- Coordinating priorities for energy restoration with utility providers.
- Turning off power in hazard areas as appropriate to minimize cascading effects.

- Ensuring outage information and restoration updates are communicated to the public.

Short-Term Goals and Objectives (72 Hours to 10 Days)

Short-term goals and objectives will focus on short-term restoration of essential city services and critical infrastructure system restoration.

Communication and coordination with regional jurisdictions and mutual aid agencies will be re-established as soon as possible. However, an energy disruption may cause communications to be limited.

- As resources arrive from outside the City, they will be integrated into local response operations to ensure a coordinated and unified response.
- The ECC/EOC will coordinate with private sector liaisons including the PUC, Multnomah County and the State of Oregon. This will be done through normal communication channels whenever possible and migrate to redundant communication technology (amateur radio, satellite phones) and in person communication when primary systems are not functioning.

The ECC will designate staging areas and begin planning to accommodate emergency personnel and resources. ECC objectives will include:

- Coordinating establishment of systems to fuel and maintain generators providing power to critical facilities and those providing essential services.
- Continuing frequent messaging to the public, utilizing all available methods.
- Establishing a Recovery Unit in Planning Section of ECC/EOC.

Long-Term Goals and Objectives (11 to 30 Days)

Identify requirements and funding sources for restoration and repair of essential services and critical facilities.

Long-term goals and objectives will focus on transition from near complete efforts of short-term goals and objectives to sustained emergency operations.

- Focus on permanent restoration of critical services and repair of infrastructure.
- In bringing systems back online, explore opportunities to harden critical infrastructure e.g., back-up generators, diversifying fuel and fuel delivery systems, and seismically retrofitting vulnerable infrastructure.

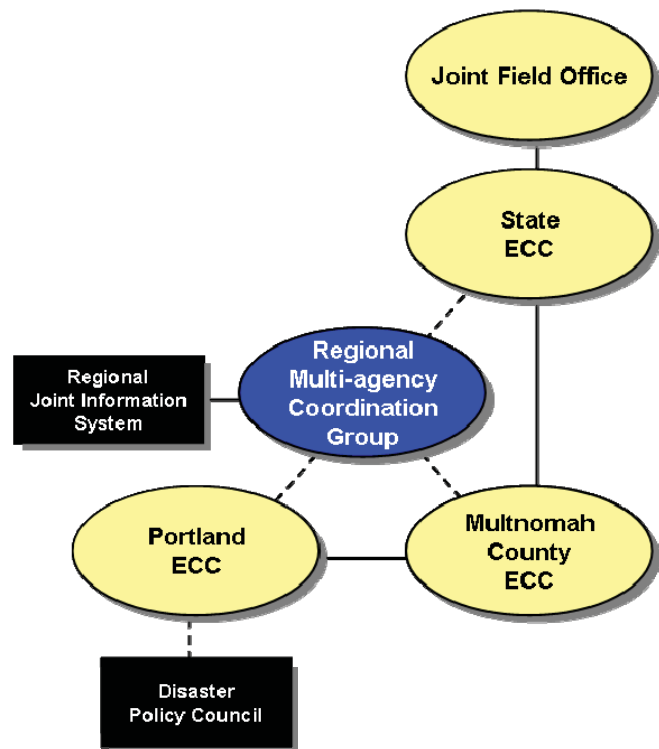
C. Direction and Control

Incident Command

The hazard triggering the energy disruption will dictate the Unified Command responsibilities, including who will staff the Emergency Coordination Center/Emergency Operations Center i.e., unified command for an energy disruption as a result of a cyber attack will look different than one caused by an earthquake.

Key City bureaus may include: Police, Fire & Rescue, Transportation, Water, Emergency Management, Emergency Communications, Technology Services, City Fleet Services, Development Services, Portland Parks & Recreation, Planning and Sustainability and the Office of Management and Finance.

As soon as possible, Unified Command will determine citywide objectives, plans, and priorities and work together to execute them.



Multi-Agency Coordination (MAC) Group

Local, regional and state officials may convene a Multi-Agency Coordination (MAC) Group to establish regional interagency policies and manage and prioritize scarce regional resources. A MAC Group is part of the Multi-Agency Coordination System and is comprised of agency representatives that have jurisdictional, functional or significant supportive responsibilities in an incident or incidents. A MAC will:

- Coordinate their respective incident-related activities.
- Share incident information and concerns regarding multi-county impacts.
- Help ensure residents throughout the region receive clear, consistent messages from trusted sources.
- Coordinate policy actions (as needed) on issues with multi-county impact.

D. Roles and Responsibilities

Introduction

City bureaus are responsible for the development of response plans that guide internal operations including standard operating procedures, Continuity of Operations Plans (COOP) and other policies or procedures that address emergency operations.

Governor of Oregon

In an energy disruption, the Governor of Oregon may declare a state of emergency. Under ORS Chapter 401, Section 035, the Governor is responsible for the emergency services system within the State of Oregon. 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 176, Section 785 authorizes the Governor to declare a state of emergency when he or she determines there is an existing or imminent severe disruption in the supply of one or more energy resources.

Oregon Department of Energy (ODOE) and Oregon Public Utilities Commission (PUC)

State agency activities are organized by Emergency Support Functions (ESFs). ODOE and PUC are the primary agencies for ESF 12 – Energy. The PUC and ODOE have a Memorandum of Understanding (MOU) for a framework of cooperation for preparedness and response to energy emergencies that impact Oregon.

The ODOE is responsible for petroleum and the publicly-owned utilities portion of the electric grid – municipalities, electric cooperatives, and public utility districts. The ODOE maintains the *Oregon State Energy Assurance Plan* and the *Oregon Petroleum Contingency Plan*.

ODOE will facilitate all information and exchanges between industry, the Governor's office, emergency response organizations, and the public in regards to events that disrupt the availability of petroleum.

The PUC is responsible for natural gas and the investor-owned utilities portion of the electric grid. The PUC maintains the *Electricity Emergency Response Plan* and the *Natural Gas Emergency Response Plan*.

The PUC works with utilities on regulatory compliance and other matters. During an emergency, the PUC will serve as the single point of contact providing direct coordination with utilities. The PUC will respond to the State's Emergency Coordination Center (ECC) to serve as the principal liaison between the state, counties and cities and utilities to ensure rapid recovery of the power and or natural gas systems.

Oregon Emergency Management (OEM)

Oregon Revised Statutes Chapter 401 requires OEM to provide for and staff the Oregon State Emergency Coordination Center (ECC) to aid the Governor and state agencies in responding to major emergencies and disasters.

General

The primary City bureaus and their private sector, regional, state and federal counterparts have roles and responsibilities for the following emergency functions.

Damage Assessment and Debris Removal

Two important areas of recovery that must be prioritized are damage assessment and debris management. Utilities have identified these as important to their ability to restore energy. (Although an energy disruption may result from a natural hazard, it is possible the hazard may not result in impacts that necessitate damage assessment and/or debris management.)

The Bureau of Development Services (BDS) has the primary responsibility for post-earthquake building inspections, both public and private. The Bureau of Development Services has Damage Assessment Teams (DATs) that will assess buildings to determine their structural integrity. Buildings are prioritized for damage assessment as follows:

- Hospitals.
- Emergency response facilities.
- Shelter areas.
- Commercial structures.
- Residential structures.

A caveat to the list is that priorities may change depending on the situation – of note, energy providers are not identified as emergency response facilities, they are classified as commercial facilities.

The Bureau of Planning and Sustainability (BPS) takes a lead role in the area of debris management due to their responsibilities for recycling and waste management. Currently, garbage haulers are mostly fueled at retail locations, and likely only have 2-3 days of fuel in their vehicles. BPS has a B20 biodiesel requirement for waste haulers in the City, and some haulers may have limited on-site fuel storage. While they do report the amounts of fuel used, BPS does not maintain a database of which haulers have their own fuel storage.

In an emergency, waste haulers would not be directed to conduct disaster debris removal since their equipment is generally designed for containerized pick-up. PBOT and their road crews and contractors would clear the public rights-of-way. Private haulers would be contracted from outside of the region to collect the disaster-generated debris and transport it to an appropriate transfer or permanent location.

Coordination, Direction and Control

Immediately following a major energy disruption the City's ECC/EOC will be activated to coordinate response activities, identify resource needs, and support emergency functions. An energy disruption may result in limited availability of IT resources and communication devices. This may complicate the ability of the ECC/EOC to execute its responsibilities.

The ECC Coordination Section – Public Works and Infrastructure Group will liaise with the State Emergency Coordination Center ESF 12 partner agencies and critical infrastructure owners. City Bureaus staffing the Public Works and Infrastructure Group include Water, Environmental Services, PBOT, and Portland Parks & Recreation.

The Disaster Policy Council will meet as required to provide oversight of citywide needs, providing policy level decisions regarding response priorities, safety and security, and continuity of essential City services.

Interoperable Communications

Communication will occur with local governments, utilities, state agencies, the general public, mutual aid partners, regional partners, business, industry, and the federal government.

Communication relies on energy to provide power to our technological resources and communication devices. An energy disruption may result in limited or no energy supplies. Back-up power and alternative energy sources will be needed; these may also be in limited supply.

The *Regional Utility Coordination Plan* identifies several methods of communication and coordination between local governments and utility providers for response and restoration activities. The methods range from simple on-scene coordination to more complicated regional coordination bodies. The simplicity or complexity of the method(s) utilized will typically track with the level of emergency. However, the manner in which a particular jurisdiction or utility is impacted by a specific emergency may dictate the use of a higher level of coordination/communication. The options include:

- On-site coordination between utility crews and emergency responders.
- The assignment of liaisons to government ECC/EOCs, utility service centers, or other utility ECC/EOCs to coordinate government and utility operations.
- Coordination between utility and local ECC/EOCs via the public switch telephone network (e.g. landline communications including phone, fax, conference calls, and bridge lines).
- Coordination between utility and local government ECC/EOCs via wireless or combined wireless/landline networks (e.g. cell phones, satellite phones, public safety and company radios, and amateur radio).

Alert and Warning

Our ability to alert and warn people will be compromised in an energy disruption. Energy is used to power the majority of our technological resources and communication devices. Even if back-up energy systems are in use, those energy resources may be limited.

Our typical alert and notification systems: Emergency Alert System (EAS), community emergency notification system (CENS), social media, and broadcast media will be compromised given an energy disruption.

Emergency information may need to be communicated door-to-door or over roving public address system. Amateur radio operators, part of Neighborhood Emergency Teams or ARES/RACES, will receive and transmit messages to and from the ECC/EOC. As necessary, the City may look to Neighborhood Emergency Team members as well as other volunteer groups going door-to-door to disseminate emergency information relayed by amateur radio operators as well as pre-identified sites where the public can go for emergency information.

Emergency Public Information

City Public Information Officers (PIOs) will collect, analyze and deliver coordinated, prompt, reliable and actionable information to the public through the use of all accessible tools. If available, Public Alerts – a regional social media website – will serve as the central website to post service disruptions and outage information.

A local or regional Joint Information Center (JIC) may be activated, to include nongovernmental and private sector partners. Regular media briefings will be scheduled to inform the public of ongoing response and restoration operations, conservation steps they can take, services available to them, and ways in which they can help.

People will be looking for a reliable source of information. It may be necessary to use community posting boards located at various sites such as parks, schools, churches and the U.S. Postal Service offices, for example, as sources of reliable information.

Energy

Energy providers (BPA, PGE, Pacific Power, NW Natural Gas, Williams Northwest Pipeline, and Olympic Pipeline, etc) will respond pursuant to organizational response guidelines for outages and reports of damaged infrastructure, and will initiate rapid repair and restoration of infrastructure-related energy services.

The City will liaise with private energy providers and critical infrastructure owners and operators to determine the extent of the damage, and to stabilize and repair essential critical energy infrastructure to support response efforts and to minimize health and safety threats to the public.

Response and restoration priorities of utility providers will typically involve:

- Worker safety.
- Damage and infrastructure system assessment.
- Restoration of critical infrastructure facilities (e.g. control centers) – transmission and pre-identified critical facility service, then distribution service followed by individual service.

State and federal resources will work with the City and private energy providers to assess the energy impacts, analyze the extent and duration of shortfalls, and identify requirements to restore energy systems. Assessment will include:

- Identifying alternative energy sources.
- Petroleum contingency planning.
- Assessing impacts of cascading effects.
- Prioritizing repair and restoration.

Public Works and Transportation

Crews and employees in the field will assess their immediate surroundings, and respond to the immediate known effects of the energy disruption as appropriate.

Damage assessment teams (DATs) from Water, PBOT, BDS will assemble and begin to perform visual assessment of critical infrastructure systems and facilities. Each bureau has identified and prioritized critical infrastructure to be assessed.

PBOT and regional road authorities will implement traffic control plans. Tasks will include:

- Clearing transportation routes to provide access and service delivery to high density, high priority sites.
- Prioritizing and designating specific routes or lanes into the city for critical relief supplies.
- Conducting damage assessments and inspections of all bridges.
- Coordinating debris removal and clearing of Emergency Transportation Routes (ETRs).

BDS DATs will coordinate with:

- The Port of Portland, Federal Aviation Administration (FAA) and the United States Coast Guard (USCG) to conduct damage assessments of marine terminals and Portland International Airport.
- Multnomah Education Service District (MESD) to determine damage assessment of all facilities for the districts within the City of Portland.
- Utility providers and City infrastructure providers (electrical, gas, water, and wastewater) to assess damage to infrastructure and obtain outage information including estimated number of people and area affected and initial restoration projections.
- Organizations in the NW Industrial Area, business organizations such as the Portland Business Alliance, and other business and community organizations to conduct damage assessment of facilities.

Public Safety and Security

For the Portland Police Bureau, the primary law enforcement responsibilities immediately after an energy disruption are to:

- Account for members – conduct a roll call for field personnel.
- Ensure on-duty personnel remain on their assignments until properly relieved.
- Once activated, provide the City EOC with a damage assessment of key installations, as well as a general damage and injury assessment of the area, including precinct or office location assessment.
- Open and maintain major ingress/egress routes for emergency vehicles.
- Provide a visible uniformed police presence throughout the city and access control and site security for damaged areas and critical facilities.

ECC Responders

Disruption or failure of communication systems may prohibit timely notification of ECC activation. If notification is received by City personnel assigned to perform ECC duties, they should respond as directed. Notification may come in the form of a page/SMS text, phone call, email or other method. It is possible that employees will be unable to respond because of an energy disruption, and that they may be unable to contact or travel to the ECC/EOC.

The Mayor and members of the Disaster Policy Council (DPC) will face challenges initiating recovery while directly addressing the immediate needs of the community and addressing employee shortages. Facilities owned by the City may be damaged or without power, hampering the ability to perform normal response and recovery actions.

Neighborhood Emergency Teams (NET)

Neighborhood Emergency Teams (NET) support the City's response to an emergency. NETs will be activated to: shut off utilities (gas, electricity, water) as appropriate, assist with rapid visual damage assessment information gathering, conduct door-to-door checks of neighbors, perform medical triage, relay information to/from the City EOC and PF&R stations via amateur radio, perform light search and rescue, coordinate emergent volunteers and carry out other duties consistent with their scope of training.

E. Plan Development and Maintenance

Plan Administration

The update of this *Energy Annex* is the responsibility of the Portland Bureau of Emergency Management. PBEM will facilitate the vetting and coordination of this *Energy Annex* with stakeholders and the community. All updates will be reviewed and approved by the Emergency Management Steering Committee and the Disaster Policy Council prior to adoption by the Portland City Council.

Record of Plan Changes

The *Energy Annex* will be reviewed and updated no less than every five years or as needed after an actual incident or exercise of the plan. After the date of the Portland City Council adoption, the updates and revisions to the plan will be tracked and recorded in the following table.

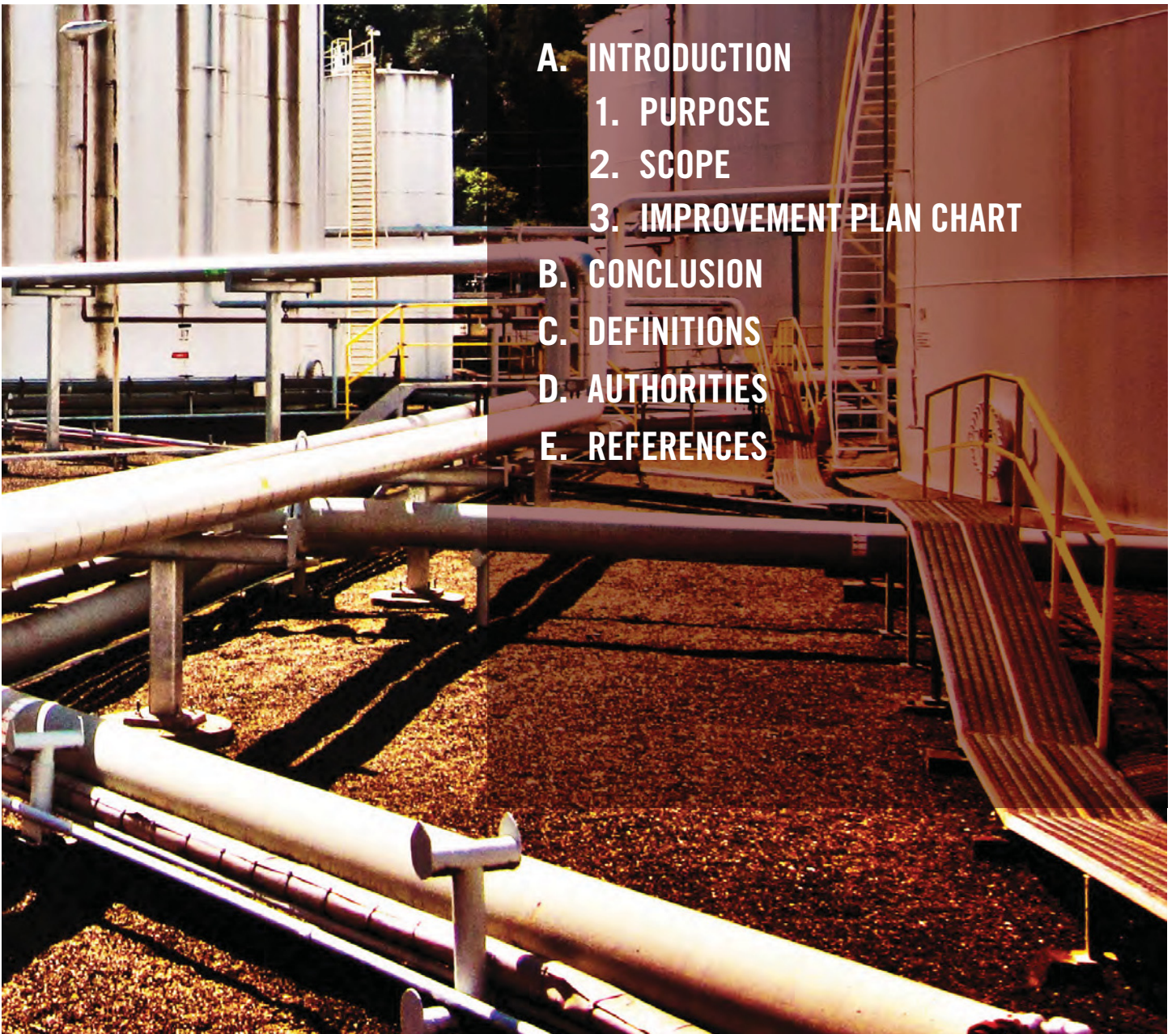
Date	Change Number	Summary of Changes
June 2012	Release of Draft <i>Energy Annex</i>	

Plan Distribution

Distribution of the *Energy Annex* will be done electronically using the current version of Adobe PDF. The *Energy Annex* will be posted on the [Portland Bureau of Emergency Management's](#) intranet website. Paper copies will be distributed on a limited basis, and will be available upon request.



III. IMPROVEMENT PLAN



A. INTRODUCTION

- 1. PURPOSE**
- 2. SCOPE**
- 3. IMPROVEMENT PLAN CHART**

B. CONCLUSION

C. DEFINITIONS

D. AUTHORITIES

E. REFERENCES

A. Introduction

Purpose

The purpose of the *Energy Annex Improvement Plan* is to recommend risk reduction strategies to improve energy assurance for Portland and the State of Oregon. The *Improvement Plan* is intended to guide future planning efforts.

Scope

Improvement Plans are usually a required part of exercise after action reports. Since this is the first time the *Energy Annex* and its lengthy process of research and information gathering was conducted, it is necessary to capture reasons behind decisions and recommendations for future actions that are not a part of response but more about risk reduction strategies. Additional related background information for the *Energy Annex*, including references, is provided in the *Improvement Plan*.

Improvement Plan Chart

The following table is a compilation of recommendations, their source, and potential responsible parties for implementation. These recommendations are not prioritized. The first step in improving our City's energy assurance will be to review the *Improvement Plan*, categorize and prioritize the recommendations.

Recommendation	Source	Responsible Agency
Create MOUs and mutual aid agreements: e.g. correction facilities, business and government, barges, hazardous material workers, Oregon State Fire Marshal etc. Those that don't have fueling facilities need agreements with those that do.	Table Top Exercise, Research	All organizations should review their existing agreements and consider the need for additional ones
Create a guide for businesses and neighborhoods that could help the community during a disaster.	Table Top Exercise	Neighborhood Coalitions
Educate the public about the limits of government and non-profit emergency response capabilities and the importance of self-preparedness.	Table Top Exercise	All
Encourage critical facility owners to have back-up generators.	Table Top Exercise	Critical infrastructure owners
Prioritize damage assessment. Further coordination and training is needed. Utilities/energy providers and DATs use different regulations depending on location and structure type. Explore these distinctions and the priorities for damage assessment.	Table Top Exercise, Research	City of Portland, Multnomah County, ODOT
Establish debris management as a priority.	Table Top Exercise	City of Portland, Multnomah County, Metro, ODOT

Recommendation	Source	Responsible Agency
Conduct an ODOE exercise to orient stakeholders to the Fuel Allocation Program.	Table Top Exercise	ODOE
Develop a task force to continue energy assurance planning.	Table Top Exercise	PBEM, BPS
Explore incentives for upgrading emergency generation capabilities.	Table Top Exercise	All
Reconvene the Governor's Homeland Security Advisory Council and bring in private sector representation.	Table Top Exercise	Oregon Emergency Management, Oregon Military Department
Support funding for OEM to hire a private sector coordinator. The position has been created but OEM doesn't have the funds to staff it. Include private industry in planning.	Table Top Exercise, Research/Mtg discussion	All
Educate organizations about the Fuel Allocation Program i.e., where do organizations fit in the tiers, how they communicate needs, what do regional providers like TriMet do? What happens with existing contracts and agreements when the disaster occurs?	Table Top Exercise	ODOE, PUC, emergency response agencies
Pre-identify the most critical needs for fuel in the respective organization.	Table Top Exercise	All
Identify organizational needs and options for transportation and communication.	Table Top Exercise	All
Identify representatives of vulnerable populations including persons with disabilities, people experiencing homelessness, elderly and non-English speakers. More ADA-accessible facilities to house vulnerable populations are needed. Expand public messaging to reach other than English-speaking populations and ensure messages are compliant with Civil Rights Title VI. Consider additional groups that may be vulnerable.	Table Top Exercise	Government agencies, non-profits, neighborhood coalitions
Research best practices and lessons learned from private sector business emergency or business continuity plans e.g. Wal-Mart, Fred Meyer.	Table Top Exercise	Private sector
Reinstate City of Portland Disaster Business Registry.	Mtg. discussion	PBEM, Procurement
Identify six to ten sites in Multnomah County that can be used for fueling sites.	ODOE request	Multnomah County EM, PBEM
Assess and determine the most effective ways to communicate emergency preparedness information to the community.	Mtg. discussions, Research	PBEM, ONI
Develop access and credentialing protocols for business and industry that is appropriate for response.	Mtg. discussions	Business, industry and response agencies
Conduct a regional exercise with relevant public and private partners.	Mtg. discussions, Research	Regional government and regional agencies.
Continue to expand planning collaborations between City of Portland Bureaus of Emergency Management and Planning and Sustainability.	Mtg. discussions	PBEM, BPS

Recommendation	Source	Responsible Agency
Establish an energy and fuel curtailment plan as part of the Continuity of Operations Plan (COOP) for the City of Portland. Include information about the ODOE Fuel Allocation Program.	Mtg. discussions, Research	City bureaus
Develop policies regarding fuel use: • Prioritization of fuel use within bureaus, and within citywide use. • Prioritization of facility use if back-up generated power is needed. • Expand number and type of mutual aid agreements, solidify existing ones. • Evaluate existing locations of bureau resources, the need for alternative sites, and the need for back-up generators, batteries and alternative energy sources. • Include risk reduction as a criteria for asset management prioritization.	Mtg. discussions, Research	PBEM, Multnomah County EM, Mayor's Office
Involve the community in identifying gathering points, shelter for populations with additional needs including ADA and Civil Rights Title IV compliant, and the development of food resources. Oregon Food Bank, community food pantries, community gardens and training on food preservation should be considered as a part of neighborhood risk reduction	Mtg. discussions, Research	PBEM, ONI
Better prepare for a cyber-caused energy disruption. While the Portland LEAP process focused on an all-hazards approach that acknowledges an energy disruption can be caused by a variety of hazards, more work is needed within the region to understand cyber threats to energy infrastructure.	Mtg. discussions, Research	PBEM, BTS, Utilities,

B. Conclusion

"The destruction caused by disasters today is so large and the economic impact so far reaching that preparedness, response and recovery have become, by necessity, a community responsibility. No single government organization can do it all alone. The federal government, state governments, local governments, and the private sector each play important roles. Community resilience depends on public and private sector organizations working closely in partnership to create reinforcing links in a preparedness network that supports the entire community" Dun & Bradstreet's *Disaster Preparedness: A Shared Responsibility* report.

The purpose of this Portland Local Energy Assurance Plan was to make us better prepared for an energy disruption. Since energy is the most depended upon resource of our city, any disruption of energy availability will reduce our functional capability dramatically. By taking steps to mitigate potential impacts, with actions now and in the future, we strengthen our resilience to energy disruptions.

As a result of the Portland LEAP we now know more about our vulnerabilities, capabilities and options for managing energy resilience.

- City leaders need to identify and prioritize essential functions that must operate within the first hours of an energy disruption.

- The City should formalize our relationships with organizations such as energy providers, business, industry, and non-profit organizations, outlining our understanding of available resources, priorities, actions, and needs.
- We have to emphasize the importance of community participation in emergency preparedness, and identify ways for more effective business and industry involvement in planning processes.
- For every decision we make, risk reduction must be a criteria. We must integrate sustainability and risk reduction into community resilience building.

C. Definitions

City Fleet provided definitions of the fuel types used by City Fleet; those definitions were included in the *Energy Annex*. In addition, definitions from the *Idaho State Energy Assurance and Emergency Standard Operations Procedure Plan (Petroleum)* by the Idaho Office of Energy Resources, Office of the Governor, July 2008 are included below.

Aviation fuel – A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D 910 and Military Specification MIL-G-5572.

Barrel – A unit of volume equal to 42 U.S. gallons.

Biofuel – A renewable liquid fuel made from plant matter rather than fossil fuels. The current primary biofuels are ethanol and biodiesel.

Crude oil – A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

Diesel, No.1 – A light distillate fuel oil that has a distillation temperature of 550 degrees Fahrenheit at the 90-percent recovery point and meets the specifications defined in ASTM Specification D 975.

Distillate fuel, No. 1 – A light petroleum distillate that can be used as either a diesel fuel or fuel oil.

Ethanol – The same type of alcohol found in alcoholic beverages. It can be used as a fuel, mainly as a biofuel alternative to gasoline, and is widely used in cars in Brazil.

Fuel oil, No. 1 – A light distillate fuel oil that has distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point and 550 degrees F at the 90-percent recovery point and meets the specifications defined in ASTM Specification D 396.

Liquefied petroleum gases (LPG) – A group of hydrocarbon-based gases derived from crude oil refining or natural gas fractionation. They include: ethane, ethylene, propane, propylene, normal butane, butylenes, isobutene, and isobutyle.

D. Authorities

Much of the information about the federal role is excerpted from the document, *Developing and Maintaining State, Territorial, Tribal, and Local Government Emergency Plans: Comprehensive Preparedness Guide 101*, Federal Emergency Management Agency, March 2009 and more recent editions.

The National Response Framework provides the primary means through which federal emergency response resources are applied, with the Federal Emergency Management Agency (FEMA) taking a lead role in coordinating Federal response.

Through the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), as amended, 42 United States Code (U.S.C) 5121, et seq., Congress recognizes emergency management as a joint responsibility of federal, state, and local governments.

The Stafford Act (Sec. 404(a), 42 U.S.C 5170c (c)) also provides the legal authority for FEMA's requirement (44 Code of Federal Regulations [CFR] Part 201) that state, territorial, tribal, and local governments produce mitigation plans as a condition of receiving funding for mitigation grants. The requirement for a state mitigation plan is also a condition of disaster public assistance, adding incentives for increased coordination and integration of mitigation activities at the state level.

The Homeland Security Act of 2002 provides the basis for Department of Homeland Security (DHS) responsibilities in the protection of the nation's critical infrastructure and key resources (CIKR). The Act assigns DHS the responsibility to develop a comprehensive national plan for securing CIKR and for recommending "measures necessary to protect the key resources and critical infrastructure of the United States in coordination with other agencies of the federal government and in cooperation with state and local government agencies and authorities, the private sector, and other entities."

Additionally, chapter 1, Title 44 of the Code of Federal Regulations promulgates regulations governing emergency management and assistance and provides procedural, eligibility, and funding requirements for program operations.

As part of the ARRA grant, the City of Portland worked with the USDOE and the Public Technology Institute. More detailed information about the ARRA grant is found in the Appendix: American Recovery and Reinvestment Act (ARRA) Grant Compliance.

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