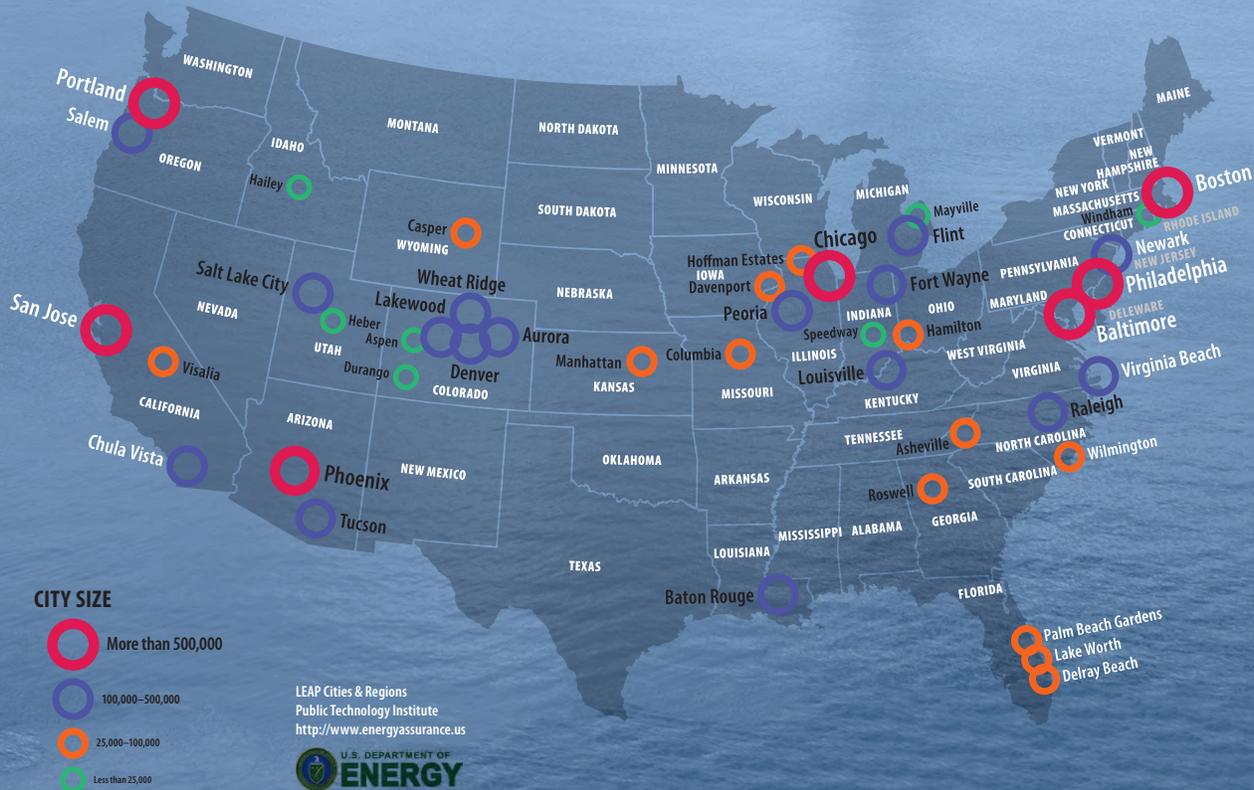




# EXECUTIVE SUMMARY

## 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.<sup>1</sup>

*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 electricity<sup>2</sup>. 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.

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<sup>1</sup> Earthquake Risk Study for Oregon's Critical Energy Infrastructure Report, Wang, Y., Bartlett, S., Miles, S.  
<sup>2</sup> 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 systems<sup>3</sup>.

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.

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<sup>3</sup> [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](http://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.