# OREGON RESILIENCE CASE STUDY
# BUSINESS CONTINUITY PLANNING: INFRASTRUCTURE

A Business Continuity Plan (BCP) ensures an individual organization can continue to perform its **essential functions**, provide **essential services**, and deliver **core capabilities** during a disruption to normal operations.

Oregon utilities have implemented a number of BCP actions related to restoring infrastructure.

## Central Lincoln People's Utility District

In the event of a Cascadia earthquake, Central Lincoln anticipates that there will be damage to its transmission, substation, distribution and communication systems. The utility sought to understand the scope of probable damage, identify areas of risk and prioritize actions for mitigation. Therefore, in 2016 Central Lincoln engineers completed a Vulnerability and Risk Assessment (VRA) of the utility's substation, transmission and communication systems. Technical papers on the 6.9 magnitude Loma Prieta earthquake, the 8.8 magnitude Chile earthquake and the anticipated Cascadia Subduction Zone earthquake were reviewed to determine how Central Lincoln's systems might respond to these scenarios. DOGAMI maps and data were also analyzed against the utility's substation, transmission and communication facilities to further identify vulnerabilities.

As a result, Central Lincoln has taken initial steps to mitigate the risks identified in the VRA report. For substations, new power transformers are bolted to concrete pads, new equipment have seismic ratings, silicon polymer bushings have replaced ceramic bushings, breakers have flexible wire connections, and dead-end structures are designed to resist external pull. Also, an auxiliary breaker will be added to a substation in 2018 while another substation will be relocated to an area outside the flood zone in 2019. For the transmission system, the utility has increased line redundancy, designed steel poles to a minimum of 120 mph, initiated mutual assistance agreements and stockpiled materials. For the communications network, Central Lincoln is looking at a multi-year timeframe to replace much of its current system. In 2018, Central Lincoln initiated a request for information (RFI) process to determine available technology followed by a request for proposal (RFP) process for professional and technical services necessary to deploy the technology. A robust RFI and RFP process gives consideration to the utility's long-term capital budget plus ensures that multiple technologies are reviewed and the selected technology will meet the utility's future needs. In 2018, Central Lincoln will also update the VRA to include the distribution system and Information Technology (IT) functional interdependencies.

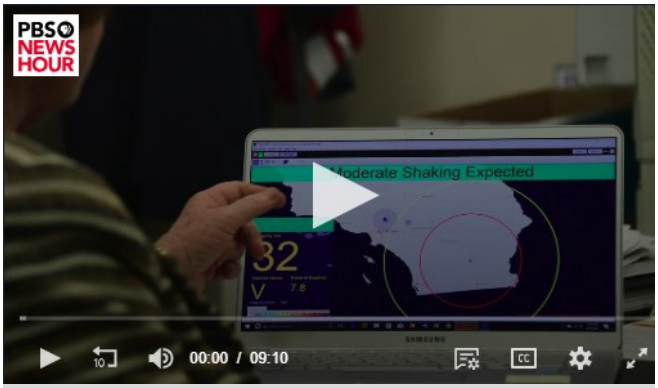
Central Lincoln recently digitized all archived distribution engineering records in an effort to enhance the

utility's ability to recover after a major event. The 1.1 million digitized documents are easily accessible to staff now and will be invaluable in rebuilding the system in the aftermath of a disaster.

The utility has equipped all fleet vehicles with Global Positioning System (GPS) devices to assist in locating employees in the aftermath of a disaster. All meters and most distribution equipment also have GPS addresses which will help to expedite recovery efforts .

## Eugene Water & Electric Board

**Earthquake Warning System:** EWEB installed two seismometers in its territory, at the Leaburg and Carmen-Smith hydroelectric facilities. The seismometers are tied in to the larger Pacific Northwest Seismic Network, the group of monitoring sites that provide input to the ShakeAlert system. ShakeAlert is an earthquake early-warning program run by the U.S. Geological Survey. The ShakeAlert warning system is in the development stage, where adding seismometers increases the accuracy and improves the quality of information transmitted to recipients of ShakeAlert warnings.




From PBS News Hour: *How an earthquake alert app could eventually give the West Coast vital warning.*

EWEB spent about $25,000 to install the two seismometers. In an earthquake, "P" waves arrive ahead of "S" waves, which are typically more damaging to structures. If the seismometers pick up P waves, it could provide valuable seconds or minutes to implement automatic preparedness procedures, such as closing headgates and opening breakers to minimize damage. The further the seismometer is from the epicenter of a quake, the more warning time it will have; even 30 miles can provide 15-20 seconds warning. ShakeAlert intends to launch a public alert system in the near future, so anyone can benefit – and receive warnings – from the information sent by EWEB's seismometers.

After additional reliability testing, EWEB will work to develop the procedures for automated shut downs or switches in the event of an emergency.

**Seismic Testing:** EWEB has more than 600 reinforced concrete transmission poles that support most of the utility's 115 kV transmission lines. Most of the poles were built in the 1960s, so EWEB is working with Oregon State University to test how the poles would respond in an earthquake.

EWEB brought two of the large concrete poles up to OSU, where civil engineering students and researchers developed models to test the poles as if they were experiencing threats like earthquakes. The testing was conducted over three years for $150,000 – the poles did pretty well, though EWEB intends to conduct additional testing through a larger condition assessment effort to identify areas of improvement for the utility's infrastructure.

The testing is part of the Cascadia Lifelines Program, a consortium of Oregon public and private partners focused on research that will improve resiliency for some of Oregon's critical service providers – like power and water. The consortium is conducting testing and considering how lessons learned can be applied in the real world.

## Springfield Utility Board

**System Flexibility:** Springfield Utility Board has been focusing on how to have more flexibility with its infrastructure, so the system can respond to typical load and peak load, as well as emergency situations.

Some utilities have switched to AMI or "smart" metered systems, which does offer flexibility. However, those systems may not function after a large-scale emergency such as a Cascadia Subduction Zone earthquake. SUB is looking at developing a more analog back-up plan, so if power on the grid is limited, it can be rationed and redirected to emergency services. This may mean physically going out and switching lines or turning valves, rather than depending on a remote digital system.

**BPA Island:** The utility is also working on a collaborative plan to get the southern Willamette Valley back on line after a major emergency. If after a Cascadia quake (or something of a similar scale) the Portland area is compromised, Bonneville Power Administration transmission service to the Willamette Valley may be compromised.

BPA could "island off" its transmission system in the southern Willamette Valley. The Eugene Water and Electric Board, which already has scheduling and dispatch from BPA lines, could dispatch federal electricity generation from the Willamette and McKenzie rivers to serve load in the local area. There are points of delivery within BPA's system that have multiple connections present, so other utilities in the area, including SUB, Lane Electric, and Emerald PUD, can also connect to those lines and deliver electricity to high priority customers like hospitals and emergency responders.