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Oregon's Energy Resilience Challenge: *Statewide Disaster at the CEI Hub*

Senate Energy and Environment Committee's
Informational Briefing
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Overview and Key Points

- DOGAMI report (2013) identified energy sector vulnerabilities
Fuel disaster during Cascadia magnitude 9 earthquake in Oregon's **Critical Energy Infrastructure Hub** (aka **CEI Hub**), located in Portland
- ****Oregon Energy Disaster Resilience (Security) Plan*** needed
- Testimonies from stakeholders

State leadership on:

- 1) **High risk situation at Oregon's CEI Hub**
- 2) ***Increase fuel storage capacity in communities** (to create safety net during disasters)

Testimonials

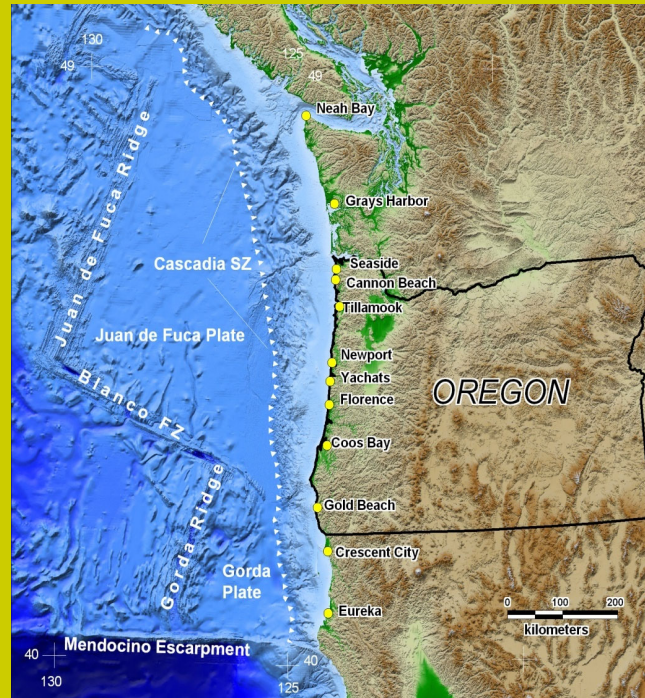
- **Deanna Henry**, Oregon Department of Energy (ODOE). Emergency Preparedness Manager
Topics: ODOE fuel planning; existing gaps as supported by recent disasters; and, 2019 OSSPAC recommendation
- **Andrew Phelps**, Oregon Emergency Management (OEM), Director
Topics: OEM's concerns on CEI Hub vulnerabilities includes statewide consequences
- **Jonna Papaefthimiou**, City of Portland, Chief Resilience Officer and Interim Director of the Portland Bureau of Emergency Management
Topics: City's concerns and actions on the CEI Hub
- **Alex Lopez**, NAACP Critical Energy Infrastructure Hub subcommittee member
Topics: Vulnerable populations in close proximity to CEI Hub
- **Allison Pyrch**, Hart Crowser, Senior Geotechnical Engineers
Topics: CEI hub is not resilient because "all eggs are in one basket" and lack of adequate state oversight

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“The Really Big One An earthquake will destroy a sizable portion of the coastal Northwest. The question is when”



Source: DOGAMI



Source: DOGAMI

Kathryn Schulz, New Yorker, awarded Pulitzer Prize 2016

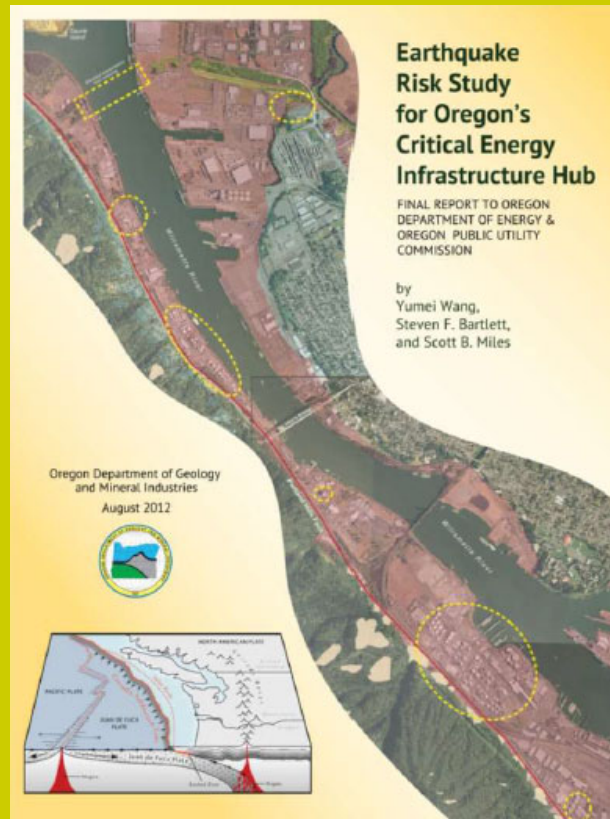
“The next full-margin rupture of the Cascadia subduction zone will spell the worst natural disaster in the history of the continent”

Magnitude 9 (M9) Cascadia earthquake and tsunami

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2013

Oregon's Energy Sector

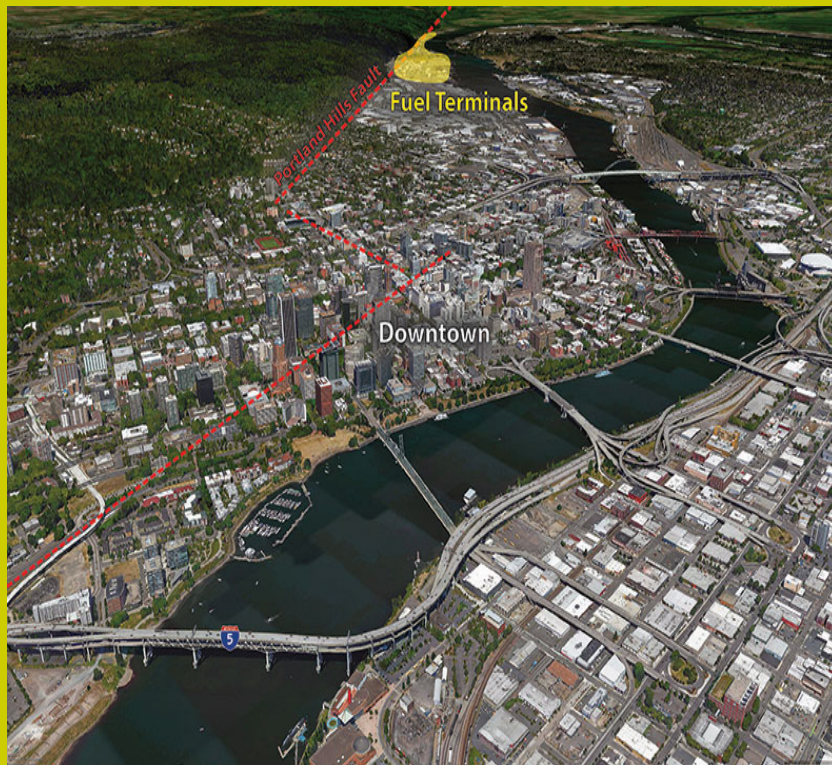


- Society relies heavily on energy
- Statewide multi-hazard evaluation of petroleum fuel, natural gas, electricity
- 5-yr State effort: DOGAMI, ODOE, OPUC
- Identified critically important area: “Critical Energy Infrastructure (CEI) Hub”
- 2013 DOGAMI report O-13-9 free at: www.oregongeology.org

Source: DOGAMI Wang et al <http://www.oregongeology.org/pubs/ofr/p-O-13-09.htm>

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Critical Energy Infrastructure (CEI) Hub



(Source: 2013 DOGAMI Energy Sector Report O-13-9) Base Map: Google Earth

6 mile stretch along lower Willamette River includes:

- Petroleum fuel terminals
- Natural Gas facilities
- Electrical facilities
- **Liquefaction Risk**
(sandy ground turns into liquid)

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Oregon's Energy Facilities in CEI Hub

Petroleum fuel



Natural gas



Electricity



Source: DOGAMI

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CEI Hub: Liquefaction Hazards are Extremely High Facilities Built on Loose River Soils (Hydraulic Fill)



Permission from Oregon Historical Society



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Private Electricity and Natural Gas Suppliers Regulated by OPUC for Seismic Safety since 2013

2010 Chile



Source: TCLEE

2007 Japan



Kariwa Substation

Liquefaction sand boils

2011 Japan



Buoyant due to Liquefaction

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Oregon's Bulk Fuel Terminals in CEI Hub

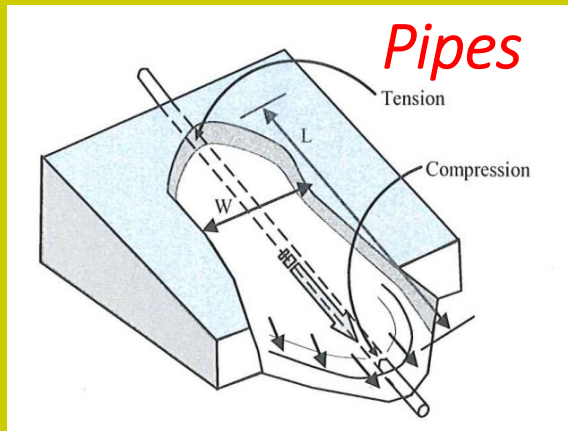


- **Not** regulated for seismic safety
- Import >90% Petroleum Fuel from WA refineries for statewide distribution
- Linear and non-redundant delivery system relies on vulnerable “aging infrastructure”



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Source: DOGAMI



Expected Damage: Fuel Supply Chain

- Transmission Pipe from WA to OR
- Columbia River Shipping Channel
 - Tsunami damage at river mouth
 - Channel damage (*e.g., slumping*)
 - Blocked waterway (*e.g., fallen bridges*)
- Fuel Terminals in CEI Hub
 - Waterfront structures (*e.g., seawalls, piers*)
 - Tanks, pipes, valves, loading racks, containment walls, control buildings, more

(Source: DOGAMI)

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Example: CEI Hub Fuel Docks are Vulnerable

Close-up



(Source: DOGAMI)

Chile (2010)



Source: TCLEE

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CEI Hub: Expect Explosions, Fires & Toxic Fumes



Fire boat response oil rig
2010 Deepwater Horizon
(Source: USCG)

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CEI Hub Damage → FUEL DISASTER

Fuel shortages harm our security and livability:
impacting response; recovery; rebuilding; economy...
not only Oil Spills into our rivers



SONS = Spill of National Significance (EPA & US Coast Guard lead)

Source: 2 1989 Valdez photos <https://commons.wikimedia.org/w/index.php?curid=57821>;

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Resources

1. **DOGAMI's Oregon Risk Study on Critical Energy Infrastructure** (Wang et al, 2013)
<http://www.oregongeology.org/pubs/ofr/p-O-13-09.htm> The State of Oregon study that first defined the 6-mi long CEI Hub area, identified the importance of facilities in the CEI hub, and the serious nature of the vulnerabilities of the facilities
2. **OSSPAC CEI Hub recommendations to Governor and Legislature** (December 2019)
https://www.oregon.gov/oem/Documents/OSSPAC_CEI-Hub_report_122019.pdf
3. **2019 Senate Bill 95** for DEQ to regulate seismic safety of bulk fuel facilities (did not pass). Webpage [SB95 2019 Regular Session - Oregon Legislative Information System \(oregonlegislature.gov\)](#)
4. **OPB Unprepared documentary** about Cascadia earthquakes. Includes CEI Hub (2015) [Oregon Field Guide | Unprepared: An Oregon Field Guide Special | OPB](#) 6 minute Trailer (includes CEI Hub):
https://youtu.be/g3NICXA6_kE
5. **OPB article 8/17/2021 on Multnomah County and City of Portland** CEI hub report including Multnomah County's Links to **2021** draft report and draft presentation
[Report says fuel spills would be massive environmental disaster in Cascadia Subduction Zone earthquake - OPB](#)

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