



Electric System Resiliency

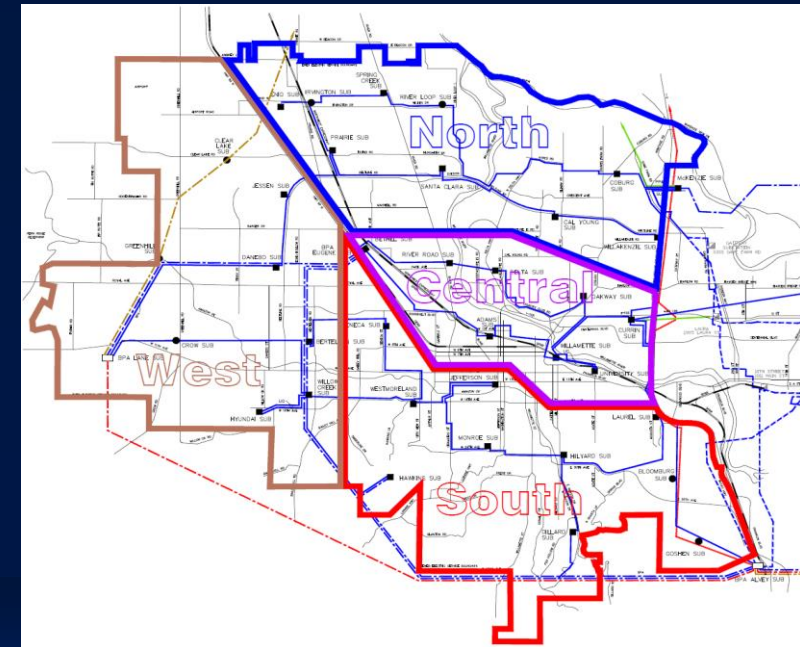
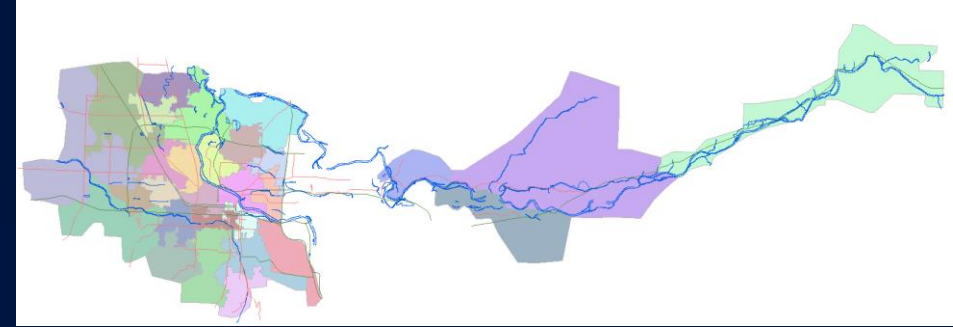
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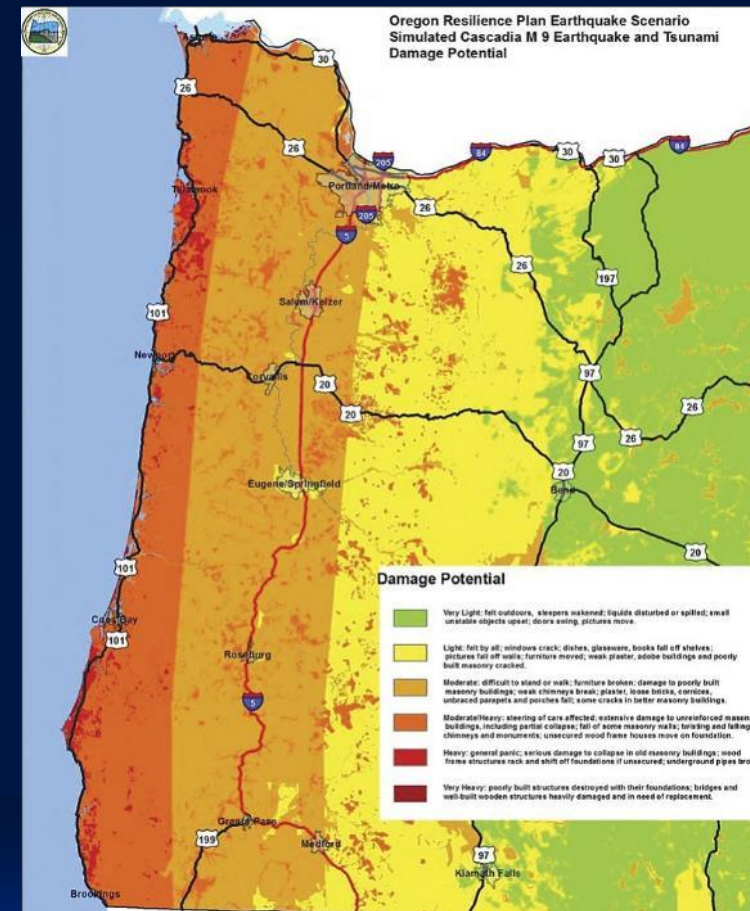
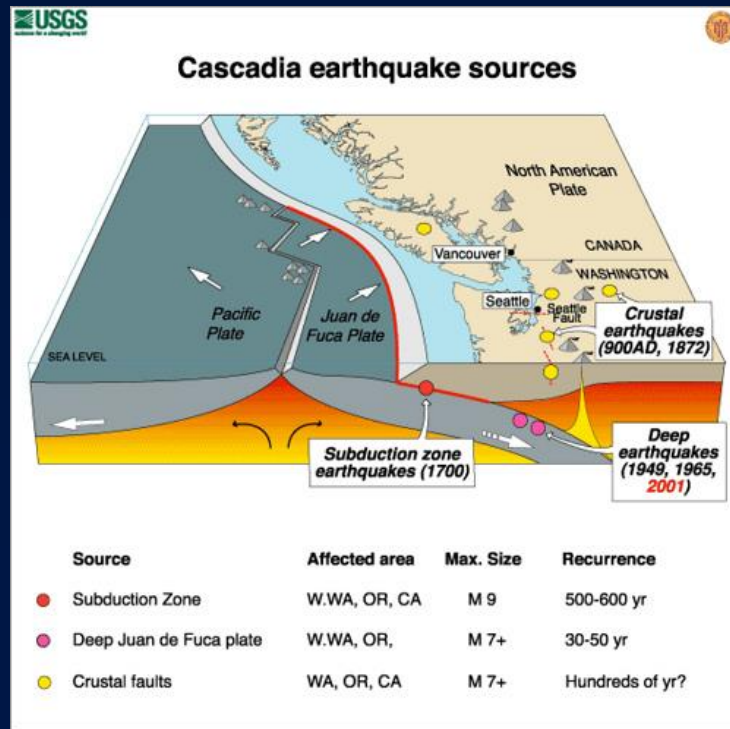
EWEB System Summary

Type	Public
Customers	200,000
Services (Electric)	90,000
Services (Water)	65,000
Employees	487
Consumption	2.4B kWh/Year
Consumption	275 MWa
Consumption (Peak)	600 MWa
Service Territory	236 Sq. Miles
Power Lines	1,300 Miles
Distribution Lines	1,132 Miles
Substations	38
Generators	7 + one customer owned (~175MW capacity)



EWEB Resiliency

- Why? Cascadia Subduction Zone Earthquake



Focus

- 1. Emergency Preparedness & Disaster Recovery*
- 2. Electric Supply Resources*



Rule of 3's

Restoration Order

3 days

Emergency Water
Distribution Sites



3 weeks

Power Critical Facilities



3 months

System Repair and
Restoration



EWEB Emergency preparedness is a shared responsibility

How much water do you need?

1 gallon PER DAY

for each: for **3** days

Minimum household emergency water storage recommended by the American Red Cross

PREPARE. REPLACE. MAINTAIN. *Relyan us*

The infographic is shaped like a large white water bottle against a blue background. It contains text and icons explaining the 'Rule of 3's' for emergency water storage. At the top left is the EWEB logo and the text 'Emergency preparedness is a shared responsibility'. The main text asks 'How much water do you need?' and answers '1 gallon PER DAY'. Below this, it says 'for each:' followed by silhouettes of an adult, a child on a tricycle, and a dog. It then says 'for 3 days'. At the bottom left is the Red Cross logo, and to its right is the text 'Minimum household emergency water storage recommended by the American Red Cross'. At the very bottom, it says 'PREPARE. REPLACE. MAINTAIN.' followed by the tagline 'Relyan us'.

Neighborhood Emergency Water Sites

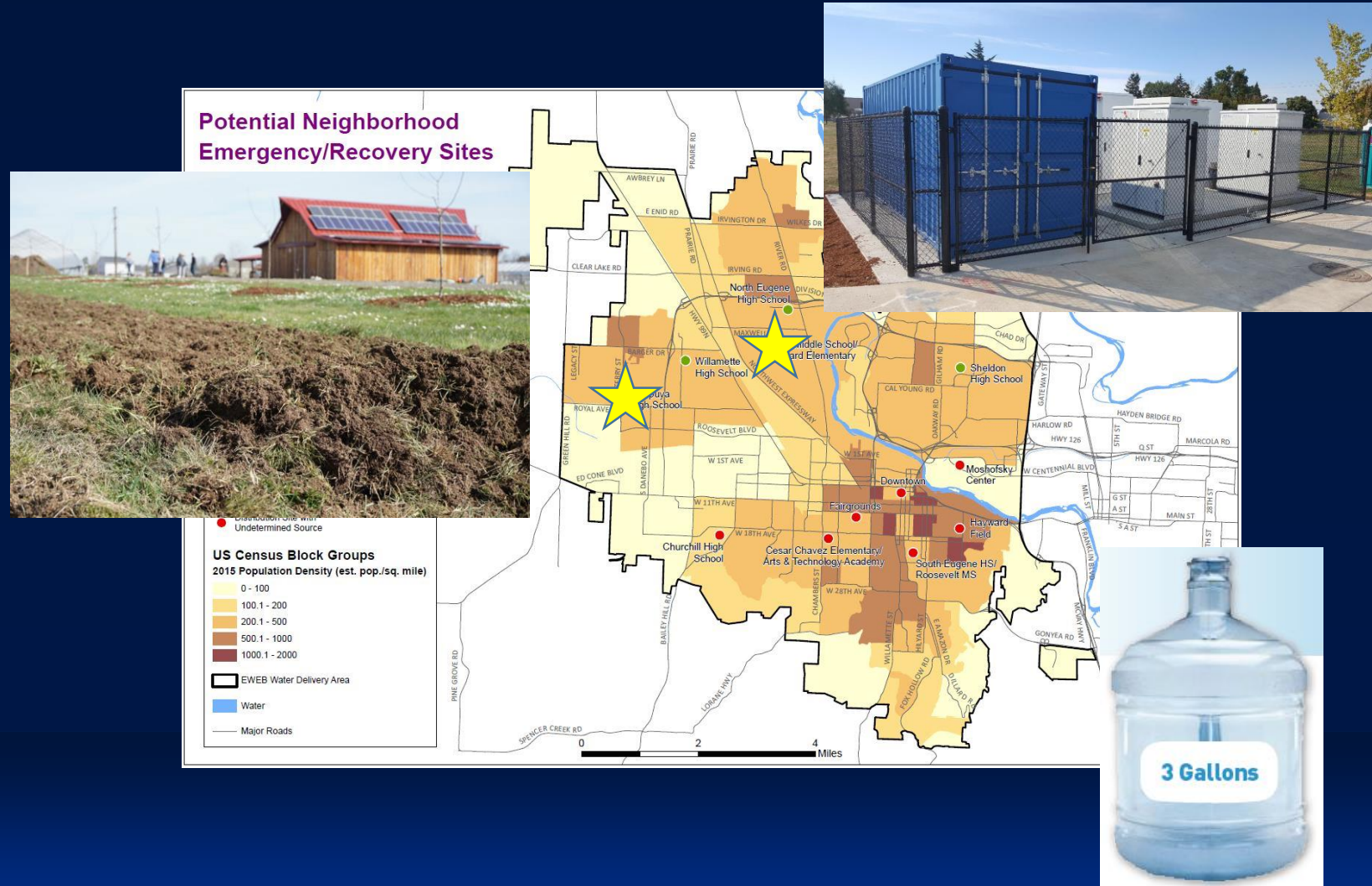
Goal: 5 sites in 5 years

Community

Focusing on schools and sites already integrated

Infrastructure

Working with local entities with common interest and facilities



Grid Edge Demonstration Project

Howard Elementary - Partners

EWEB

Sandia National Laboratories
Oregon Department of Energy
Clean Energy States Alliance
Worley Parsons
NEC Energy Solutions
Eugene School District 4J
US Department of Energy

Grid Edge Potential Use Cases Include:

- Peak Demand Reduction / T&D Deferral
- Energy Resiliency / Back-up Power
- Voltage/VAR Support
- Frequency Regulation
- Renewable energy ramping, firming
- Energy Arbitrage
- Outage Mitigation
- Reduction of Transmission Charges (reduction of utility co-incident peak)
- Reduction of Transmission Charges (generation imbalance)

Renewable Hydrogen Potential

- Mother Nature dispatches wind, solar and hydropower
 - Times of Abundance – clean cheap power – zero/negative pricing and curtailment in region.
 - Time of Scarcity – more expensive dirtier power, including imports – resource adequacy ?
 - Cold Dark Short Days in Winter and Potential for Wind to stop for days.
- Storage is Needed
 - Batteries have limited duration – hours.
 - Hydrogen could provide days, weeks, even months and seasons of clean energy storage.
 - Potential to decarbonize electricity & gas systems, heavy duty vehicles including marine and aviation.
- Resiliency Benefits
 - Emergency Loads running off fuel cells with hydrogen for extended periods.
 - Local transportation fuel alternative to relying on imported gasoline.
 - Blackstart Capability for local energy sources like EWEB's McKenzie Dams or Seneca Biomass Plant.

Questions?