



# Post-Earthquake Level of Service Goals

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# Agenda

- Confirmation of Guiding Principles
- Post-Earthquake Level of Service (PE-LOS)
  - Definition and development process
  - Examples from other agencies

## ESC Feedback Requested:

- Initial PE-LOS goals
- Restoration Times
- Criteria for Critical Customers

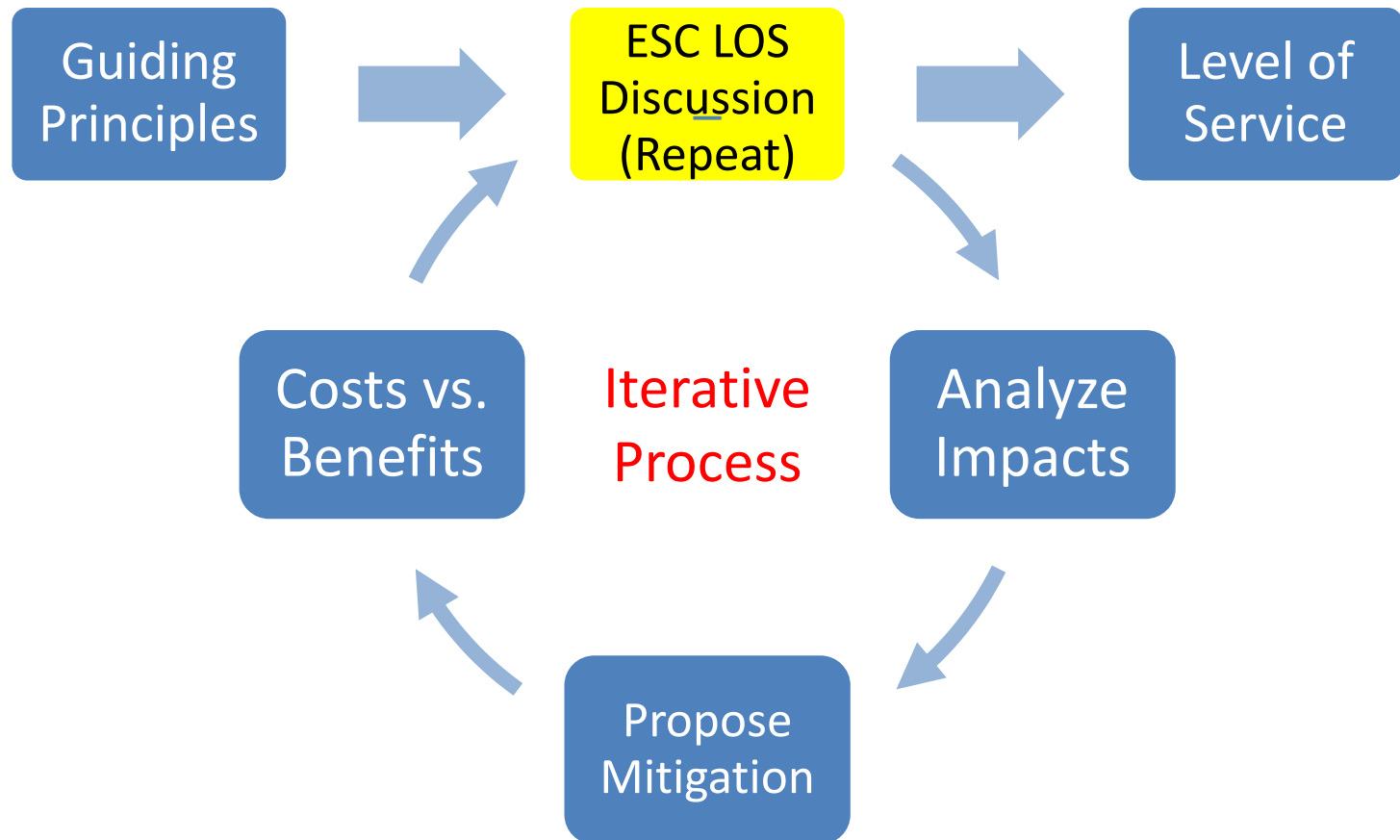
Will return with costs vs. benefits



San Fernando, CA  
1971



# Post-Earthquake Level of Service Development Process







# Guiding Principles

- Public Safety (N-2, N-3)
- Social Equity (CE-12, CF-20, HS-6)
- Economic Vitality (ED-1, ED-32, ED-33)
- Regional Preparedness (UT-20, UT-42, EN-11)
- Value (UT-10, AWWA J-100)
- Resilience (N-4, CF-8, CF-12, UT-2, UT-41, EN-7)

\* Comprehensive Plan policies in parentheses





# Post-Earthquake Level of Service

- Water Quality
- Water Quantity
- Who gets it? (critical customers)
- When (restoration time)

Level of service matters because it drives investment in mitigation and response.



# Water Quality Level of Service



- Initially non-potable
  - Boil Water orders expected
  - Potential reservoir roof damage, de-pressurization
  - Allows for sanitation, fire protection



Loma Prieta, CA  
1989



Kobe, Japan  
1995





# Critical Customers (?)

The definition of critical customers matters because it prioritizes investment and service improvements.

## Examples:

A large blue pyramid graphic is positioned on the left side of the slide, partially overlapping the text and the examples. It is a solid blue triangle pointing upwards.

### **Life Safety**

Hospitals, Fire & Police  
Stations, EOC Facilities

### **Public Health**

Emergency Shelters,  
Nursing Homes, Medical Clinics

### **Community Recovery**

Schools, Day Care, Retail,  
Banking



# Critical Customers and PE-LOS Examples from Others



Benchmark	No Loss* of Functionality	< 3-Day Recovery	< 1 Month Recovery
WAC 246-290-420	Per "Consumer Expectations"		
Seattle Public Utilities <sup>1</sup>	Hospitals	Remote Fire Supply Points (not hydrants)	
Water Supply Forum <sup>2</sup>	Hospitals	Local Utility Decision	
Oregon Resilience Plan <sup>3</sup>	Hospitals, EOCs, Police, Fire Supply Points	Emergency Shelters	Schools, Retail, Banking
National Institute of Standards and Technology (NIST), US Dept of Commerce <sup>4</sup>	Hospitals, EOCs, Police, Fire, Debris/Recycling	Emergency Shelters, Nursing Homes, Animal Shelters, Banking, Faith/Community Orgs, Gas Stations	Grocery Stores, Day Care, non-emergency Medical, essential city services, Houses of Worship, Local Business, Schools, Residential Housing
Resilient Washington State <sup>5</sup>		Hospitals, EOCs, First Responders	Grocery Stores, Schools, Government, Social Services, non-emergency Medical,
FEMA <sup>6</sup>	No restoration goals. Hospitals, Police, Fire are prioritized as Critical Facilities.		

[1] <http://www.seattle.gov/util/EnvironmentConservation/Projects/SeismicPlanning/index.htm>

[2] <https://www.watersupplyforum.org/home/resiliency.html>

[3] [https://www.oregon.gov/oem/emresources/Plans\\_Assessments/Pages/Other-Plans.aspx](https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/Other-Plans.aspx)

[4] <https://www.nist.gov/topics/community-resilience/planning-guide>

[5] <https://mil.wa.gov/uploads/pdf/seismic-safety-committee/RWS%20final%20report.pdf>

[6] <https://www.fema.gov/critical-facility>



# The Seattle Times

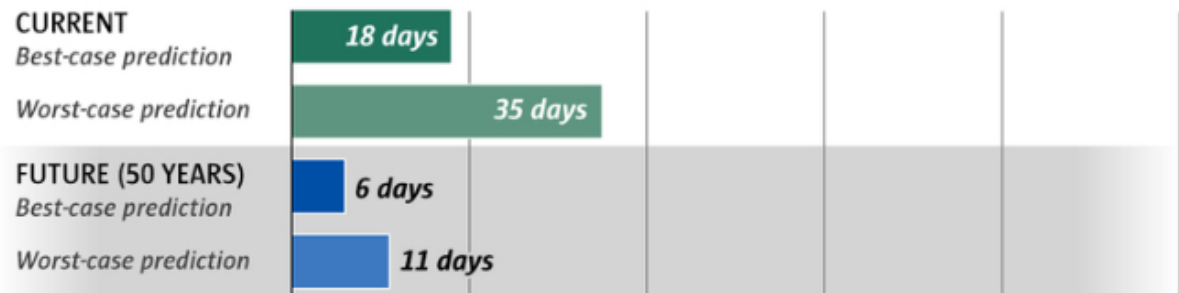
## Seattle, suburbs would lose all water pressure within 24 hours of catastrophic earthquake, city study says

Originally published December 2, 2018

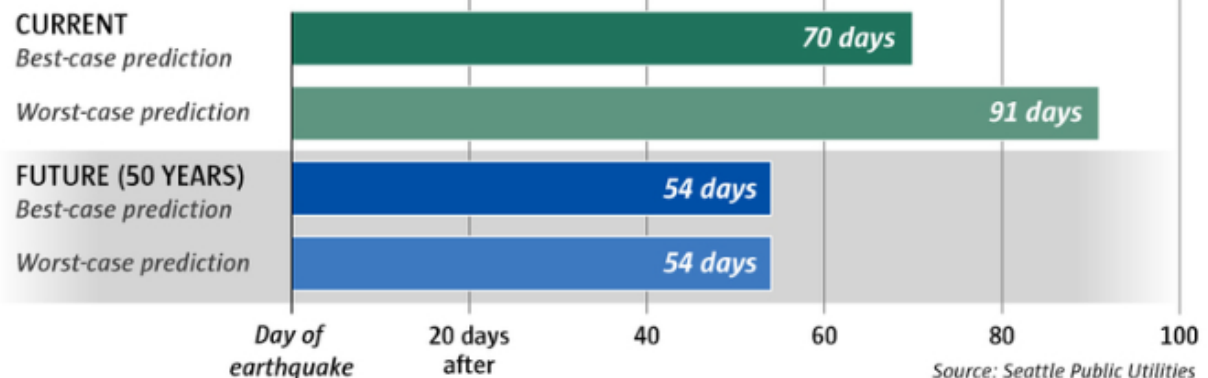
### Earthquake upgrades for Seattle's water system

A new Seattle Public Utilities study says the city should spend \$850 million through 2075 to improve the resiliency of its water system in the event of a catastrophic earthquake. The upgrades would allow the system to recover more quickly after a quake, according to the study.

#### DAYS TO RESTORE SERVICE TO 70% OF SEATTLE CUSTOMERS



#### DAYS TO RESTORE SERVICE TO 100% OF SEATTLE CUSTOMERS





# Post-Earthquake Level of Service Development

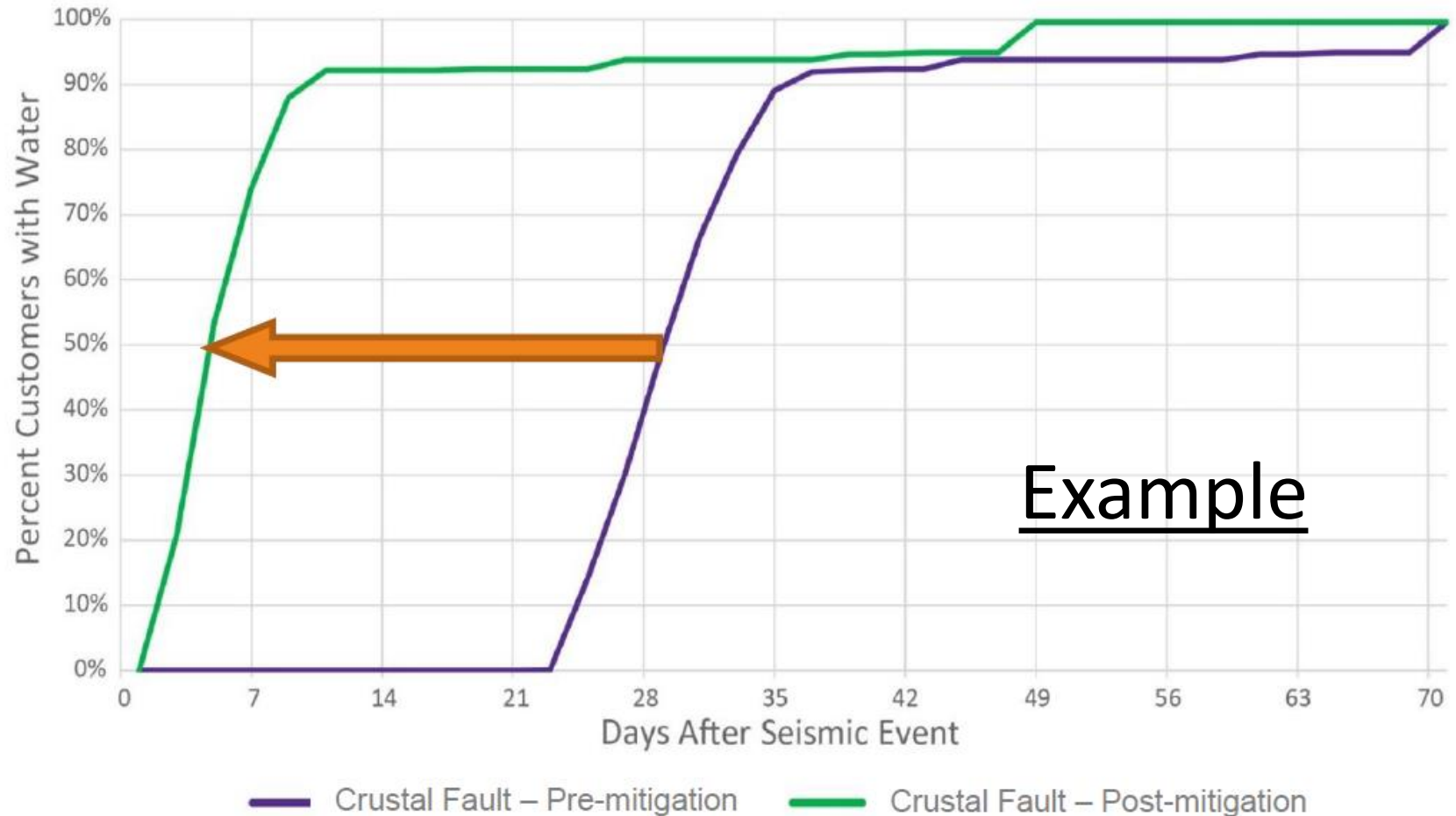


## Example

System Function	Event Occurs	0-24 Hours	1-3 Days	3-7 Days
Potable water available at supply source		●	●	
Main transmission facilities, pipes, pump stations, and reservoir operational		●		
Water supply to critical facilities available		●	●	
Water for fire suppression at key supply points		●		
Water for fire suppression at fire hydrants				●
Water available at community distribution centers/points			●	●
Distribution system operational			●	●
<div> <div>●</div> <div>Desired time to restore component to 80-90% operational</div> </div> <div> <div>●</div> <div>Desired time to restore component to 50-60% operational</div> </div> <div> <div>●</div> <div>Desired time to restore component to 20-30% operational</div> </div>				

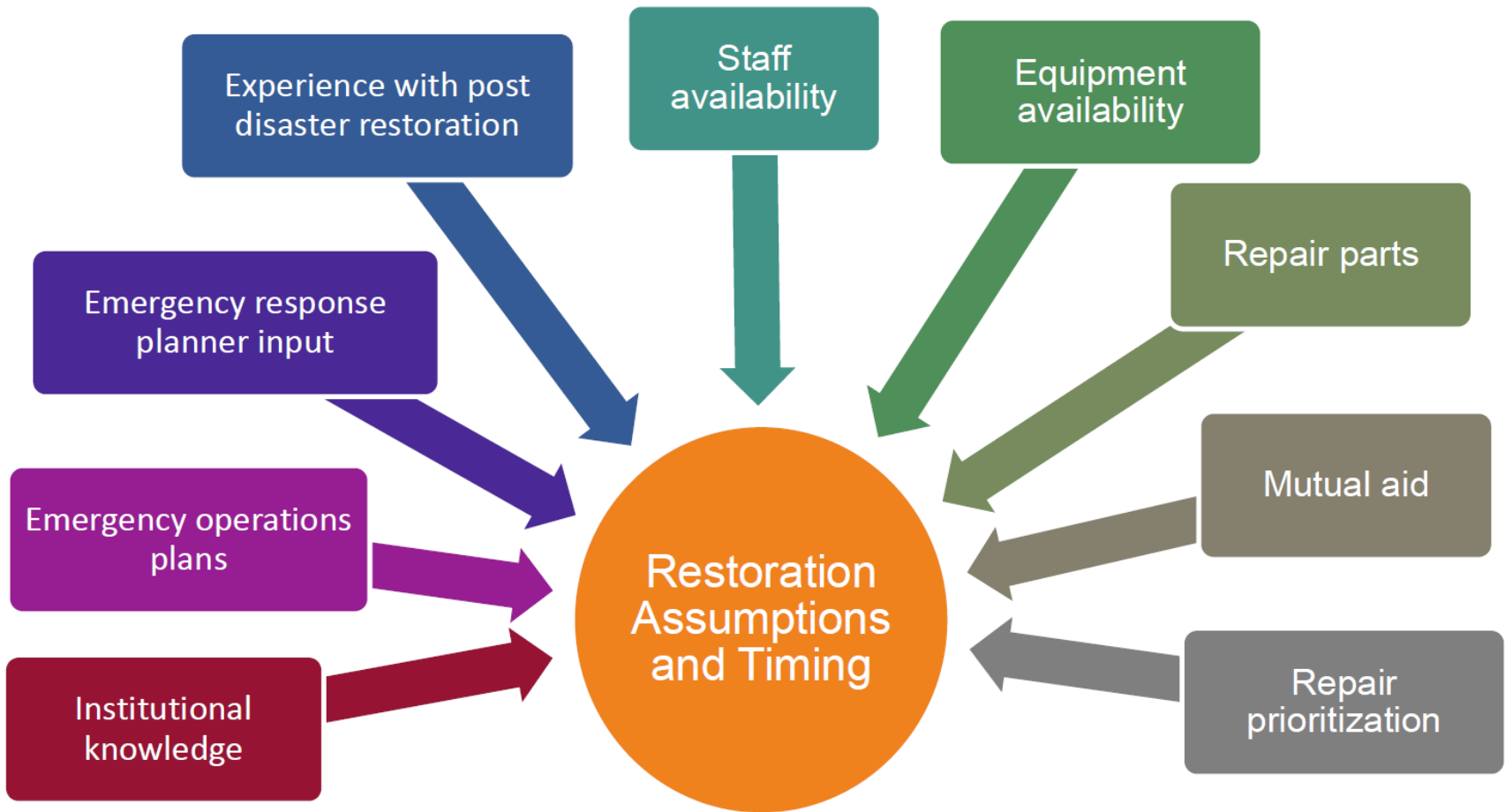


# Service Restoration Timelines





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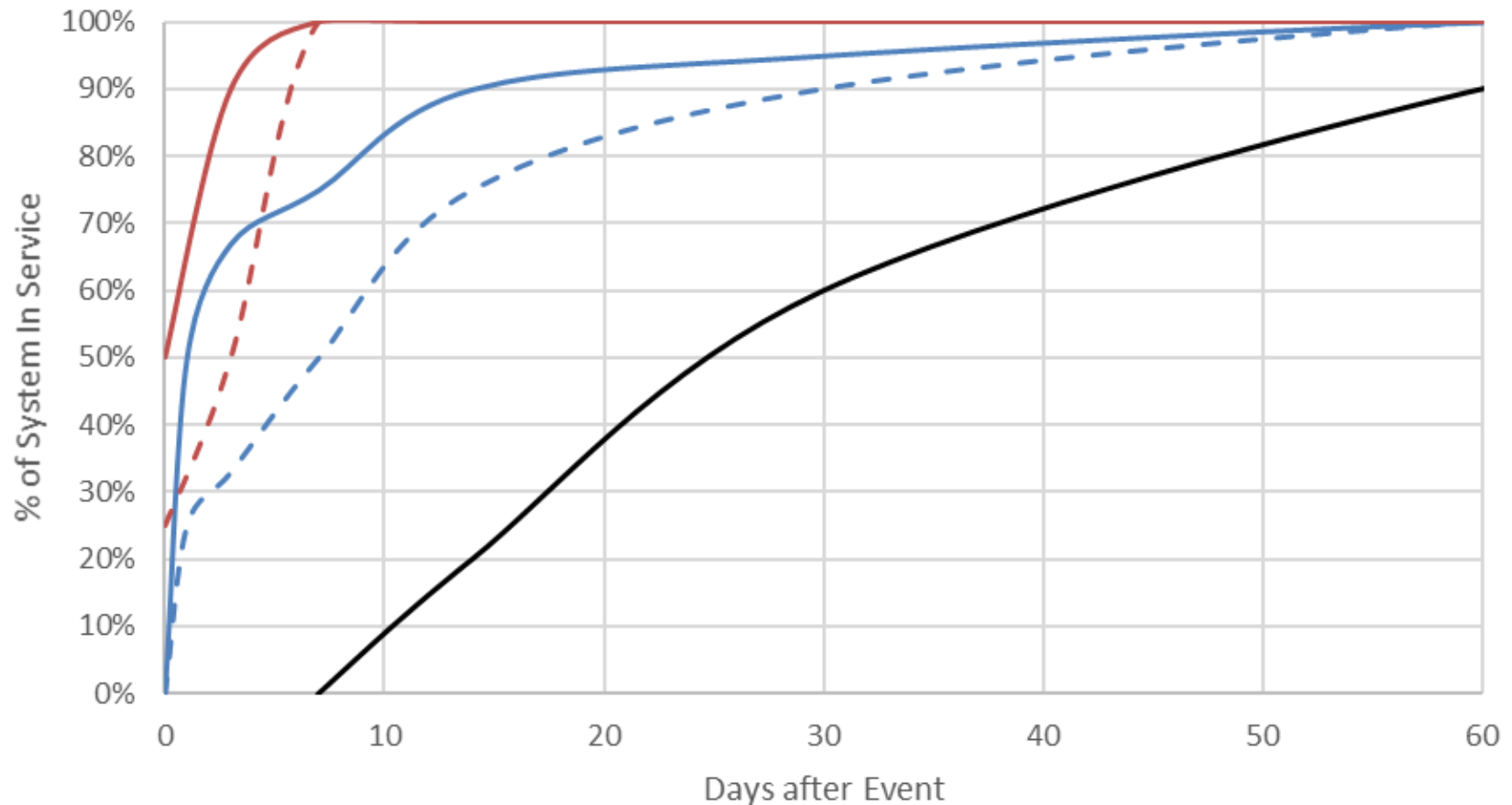




# Post-Earthquake Level of Service Goals



SPU Level of Service Goals





# Post-Earthquake Level of Service Development



## Post Earthquake Level of Service Goal Considerations

Emergency  
response and  
priority services

Regional  
factors and  
other impacts

Community  
priorities

Affordability,  
prioritization,  
implementation

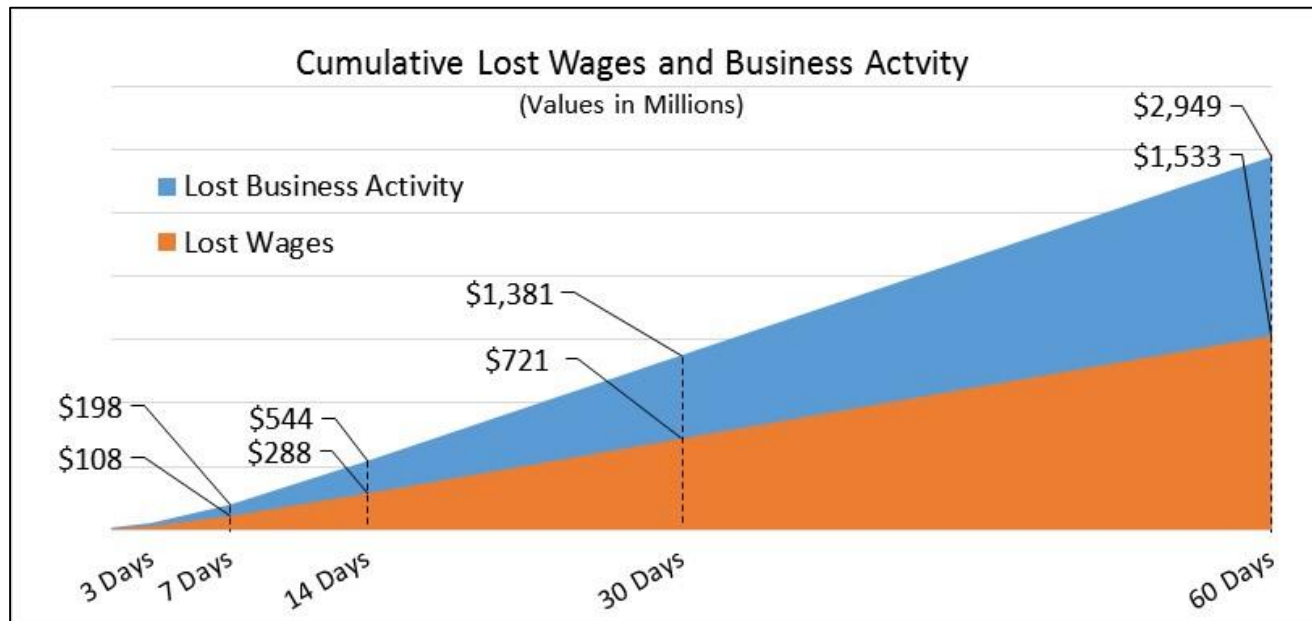
Utility  
benchmarking  
and trends

Definition of  
Critical  
Customers



# Recap/Questions

- Restoration time improvements = \$\$
- Appropriate critical customer criteria?
- Staff will evaluate costs vs benefits, report back



\* Only includes lost wages and lost business activity (not all impacts). Source: *Economic Losses Due to Potential Water Outage*. HDR (for City of Bellevue), 2018