



# Aging Electric Infrastructure Replacement

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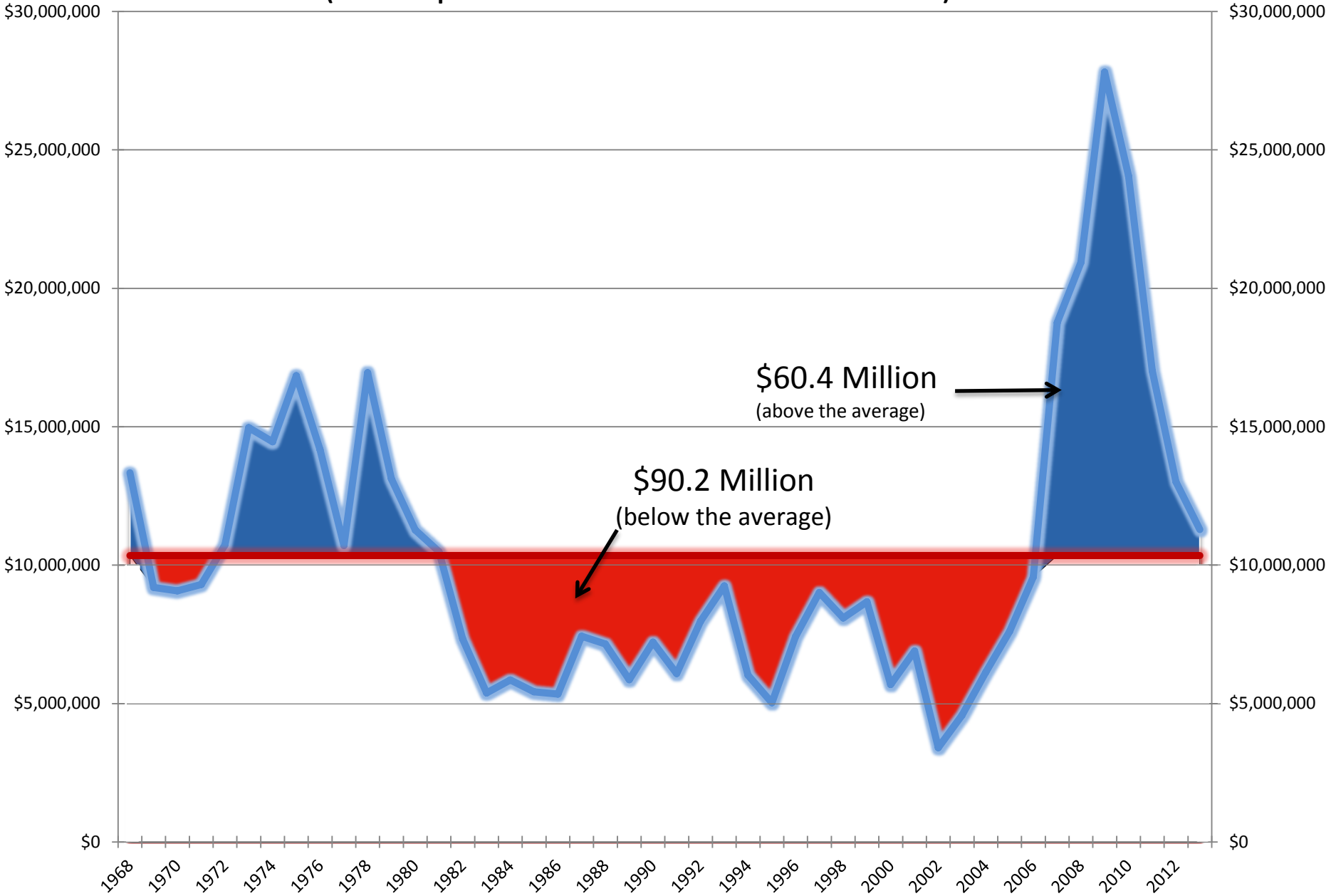
# Transmission System

(2006 timeframe)

- \* Transmission System consisted of a mix of 69kV and 115kV
- \* 115kV System
  - \* North and South county 115kV Loops. Middle age and newer assets operated as a closed loop for improved reliability.
- \* 69kV system
  - \* The PUD's electric system had not had significant investment for 20+ years.
  - \* Nearly all 69kV equipment was 50+ years old and at the end of useful life.

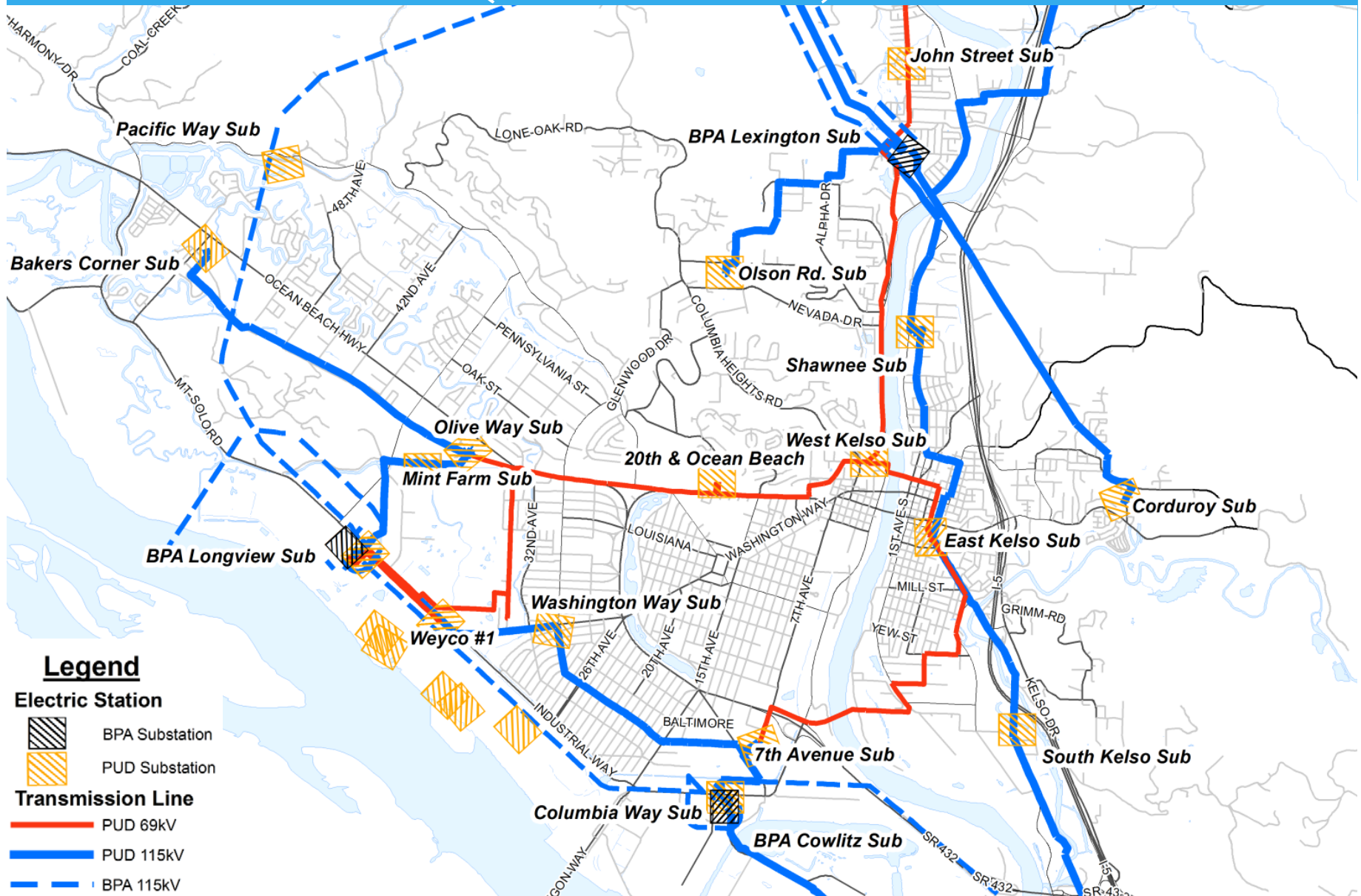
# CPI Adjusted Net Capital - 2013 Dollars

(Actual Capital Less Contributions in Aid to Construction)



# Transmission System

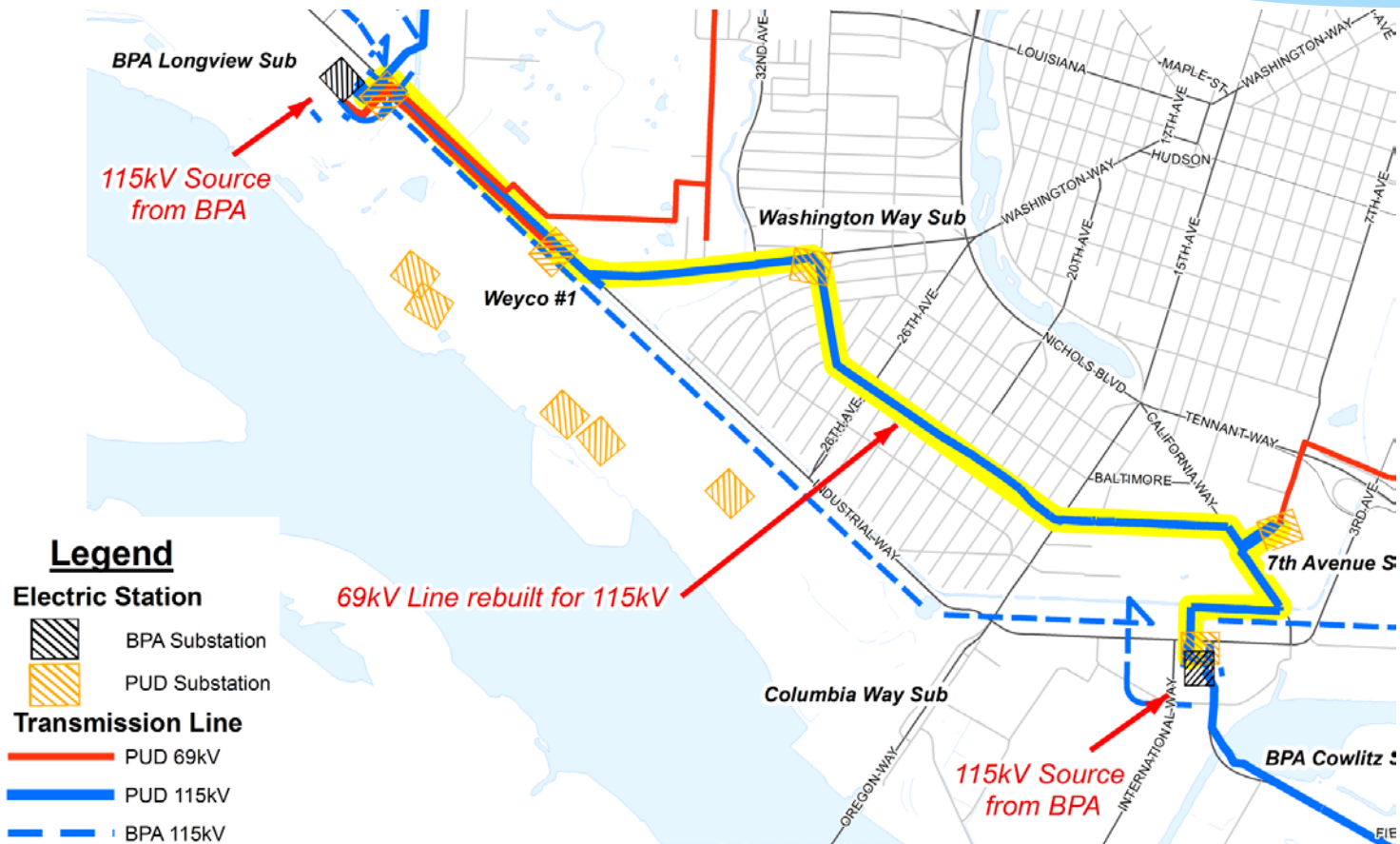
(2010 timeframe)





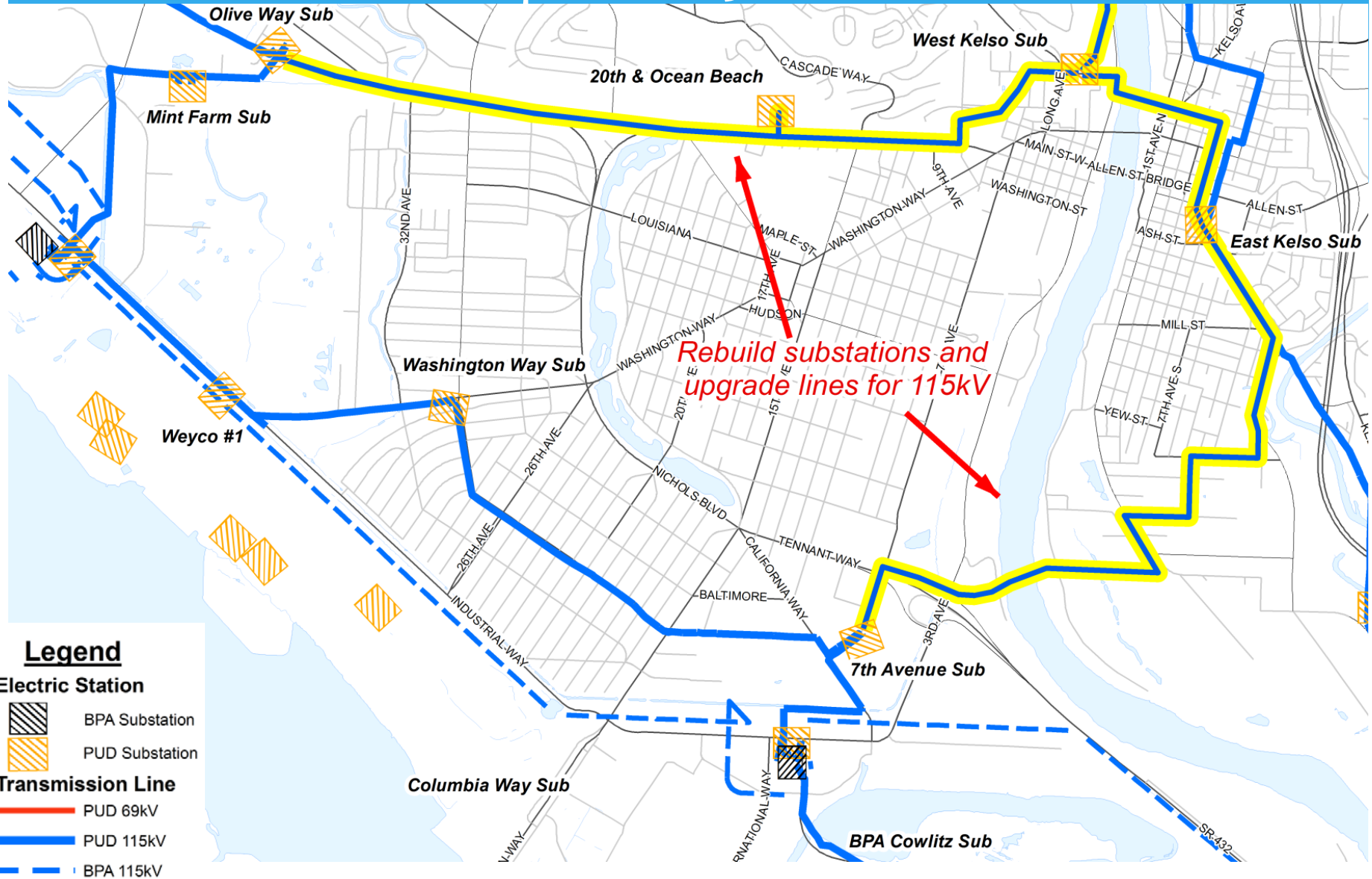
# Transmission System

(2010 timeframe)



# Transmission System

## Completed 115kV Grid



# Transmission System

## (2006 timeframe)

- \* Transmission System consisted of a mix of 69kV and 115kV
- \* 115kV System
  - \* North and South county 115kV Loops. Middle age and newer assets operated as a closed loop for improved reliability.
  - \* Completed breaker additions and relaying improvements around 2005
- \* 69kV system
  - \* The PUD's electric system had not had significant investment for 20+ years.
  - \* Nearly all 69kV equipment was 50+ years old and at the end of useful life.
  - \* Designed as a loop system, but operated radially
  - \* Not enough protection components (breakers, relaying & communication) to operate as a closed loop.
  - \* Adequate for existing loads, but not sufficient to support future loading
  - \* Reliability and capacity improvements desired

# 10 year plan

- \* A new 10 year plan was drafted to invest in the infrastructure.
- \* Upgrade the transmission system from 69kV to 115kV with these key goals:
  - \* Reliability
    - \* Replace old equipment
    - \* Operate closed loop with modern protection. (No single fault on a transmission line results in a customer outage)
  - \* Increase capacity to support future loads and economic development
    - \* Interconnect the 115kV system to complete an integrated 115kV grid in the Longview-Kelso area
  - \* Standardize equipment due to common 115kV rating. Less spares to stock and consistency for maintenance crews



# 10 year plan

## \* Components of the 10 year plan

- \* Rebuild 9 total substations from 69kV to 115kV
  - \* Add 115kV breakers and new relaying utilizing fiber optic
  - \* Replace power transformers with 115kV units
- \* Upgrade 20+ miles of transmission line.
  - \* Reinsulate and replace conductors on transmission lines. Many upgraded to 1200 Amp to support integrated system flow and mediate BPA identified system weakness.
- \* Install fiber optic communication
  - \* Primary goal system protection
  - \* Secondary benefits include SCADA communication and corporate network connectivity for AMI, security, etc.

# Capital Requirements Plan

- \* 10 year plan was introduced to the Board of Commissioners in conjunction with a new 3 year capital requirements plan.
- \* The Cowlitz PUD Board agreed with the core goal of the plan to invest in infrastructure and build a reliable local electric grid.
- \* Financing of the investment has happened through bonds and rates.
- \* Despite financial challenges, our Board has continued to see this through.