



Upper Valley

Potential Electrical System Improvements

July - 2019

Desired Outcomes of Customer Outreach:

- Understand the history of the transmission system in the Upper Valley
- Share results of HDR fire risk assessment and customer impacts
- Understand the drivers of need for transmission system improvements
- Review options for hardening transmission infrastructure against fire risk and improving electrical reliability
- Community members provide direct feedback and ask questions



Lessons Learned

Applying **Lessons Learned** when Planning for New Infrastructure:

- Inform early and often
- Identify & weigh options in partnership with community stakeholders
- Proactively plan for immediate and long term needs
- Incorporate community values into planning



Your Input

Your Input Today Helps Guide the Direction of the PUD

- We want you to weigh in on our recommended approach to fire resiliency plans
- We are seeking input on potential alternatives
- Your direct feedback will be shared with PUD Board of Commission
- Your input will be shared with future stakeholder groups & shape future outreach activities



CHELAN COUNTY
www.chelanpud.org

The Electric Power System

The Electric Power System is divided into generation, transmission, and distribution.

1. Hydro Project

In Chelan County, electrical power is generated at one of the PUD's three hydroelectric projects.

2. Transmission lines.

Transmission lines leave hydro projects and transmission switchyards.

3. Transmission Switchyard

Power moves across large transmission lines to a transmission switchyard where electrical voltage is reduced by transformers.

5. Distribution lines

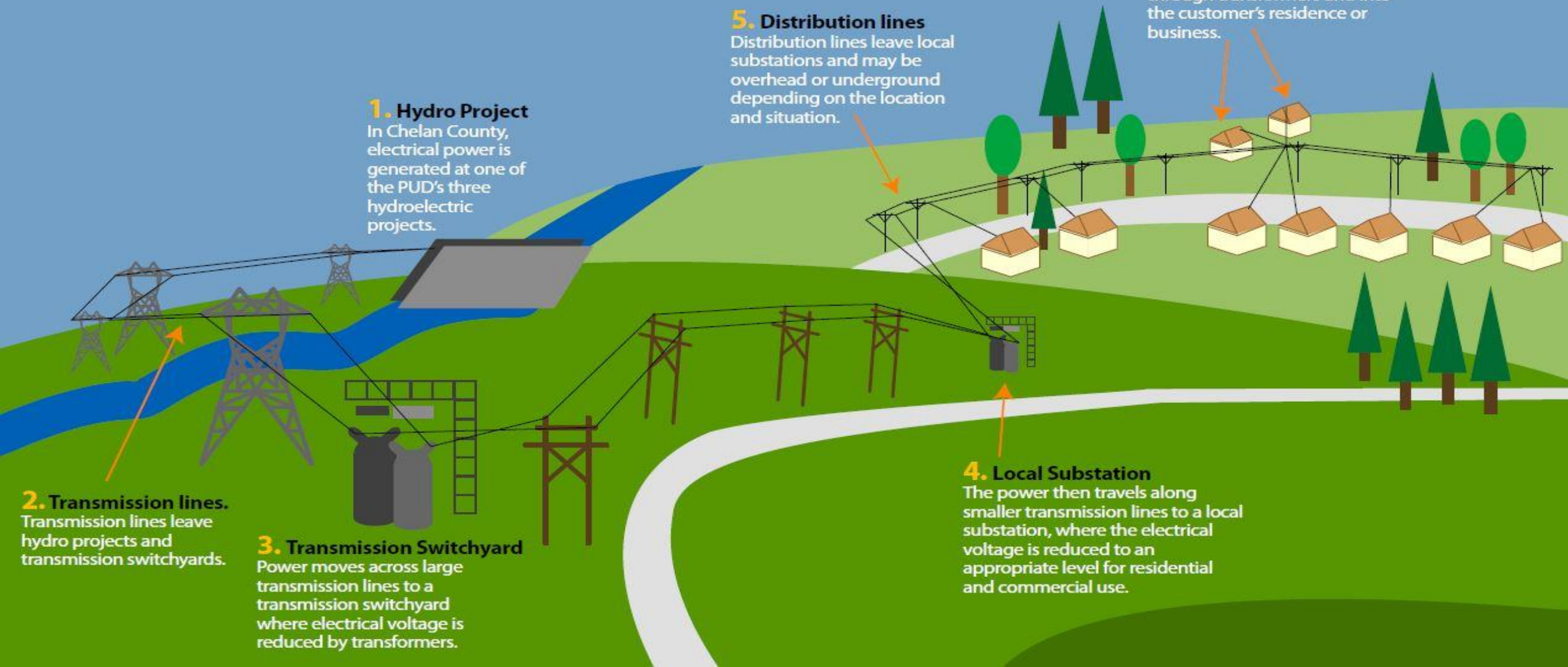
Distribution lines leave local substations and may be overhead or underground depending on the location and situation.

4. Local Substation

The power then travels along smaller transmission lines to a local substation, where the electrical voltage is reduced to an appropriate level for residential and commercial use.

6. Your home or business

Finally, power travels along distribution lines and is converted to a standard voltage through transformers and into the customer's residence or business.



Types of power lines

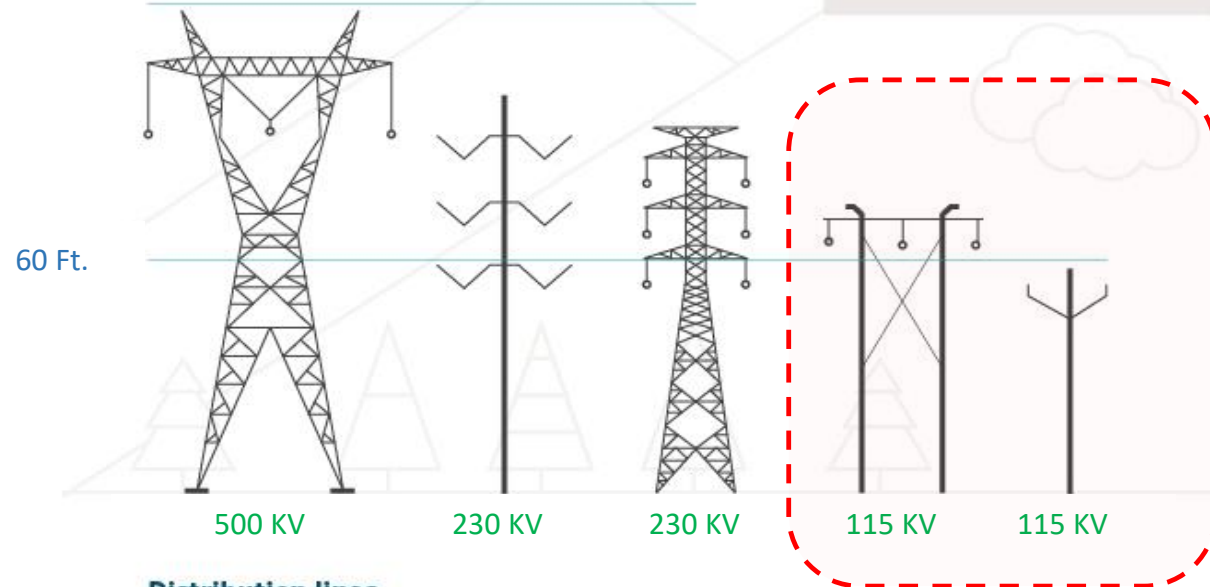
We rely on a system of transmission towers and power lines to carry the electricity produced at our hydro electric plants to the neighborhoods, homes and businesses in the County

Transmission lines

Transmission lines are the big, high voltage power lines that bring electricity from where it's made at our generating stations to substations near communities

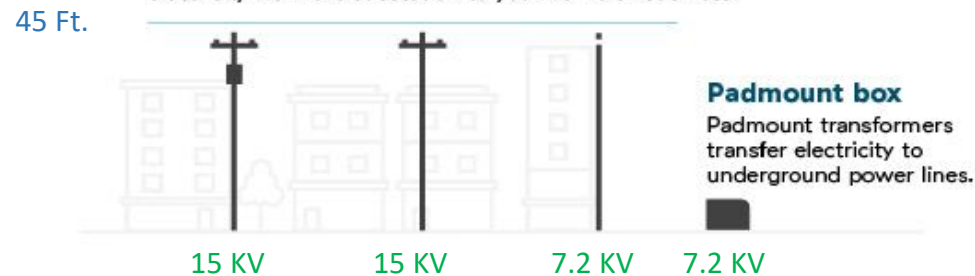
What's a kV?

kV stands for kilovolt, which is a unit of potential energy. One kV is equal to 1,000 volts.



Distribution lines

Distribution lines are the smaller, lower voltage lines that carry electricity from the substation to your home or business.



Transmission Line structures similar to these would be used

Transmission Fire Hardening



- The recommendation is to replace existing wood transmission poles to steel
- Steel poles reduce the frequency and duration of fire-related transmission outages because fires will burn past them
- The photo to the left is an example of a steel pole replacement



Objectives & Proposed Tactics

PUD *objectives* in the Upper Valley

Improve resiliency to fire and weather



Improve access to utility infrastructure



Provide reliable utility services



PUD *tactical* plan in the Upper Valley

Harden the transmission systems by replacing wood poles with steel poles

Relocate transmission line out of Sunitsch and Deadhorse Canyons

Create redundancy with looped transmission – new transmission line between Plain and Lake Wenatchee substations



Background

Mid 1990s

- PUD planned to construct a second 115kV line from Fox Rd to vicinity of Plain
- PUD ultimately cancels project due to opposition from Plain residents

2006

- Wind storm results in extended outages (Deadhorse Canyon)

2012

- Ice storm in the Plain and Lake Wenatchee area causes extended outages (~10 days off and on)
- Informal comments from Plain residents inquiring about the previous plan to construct a 115kV line

2017

- District assessed wildfire risk to transmission infrastructure
- Identified sections of Anderson Canyon, Coles Corner and Plain Tap at high risk

2019

- Outreach to Plain/Lake Wenatchee residents

HDR: Fire Risk Assessment

- Identified Plain/Lake Wenatchee area in **top 3 highest risk areas** of county.
- PUD has desire to **improve system resilience** to wildfire and weather events.

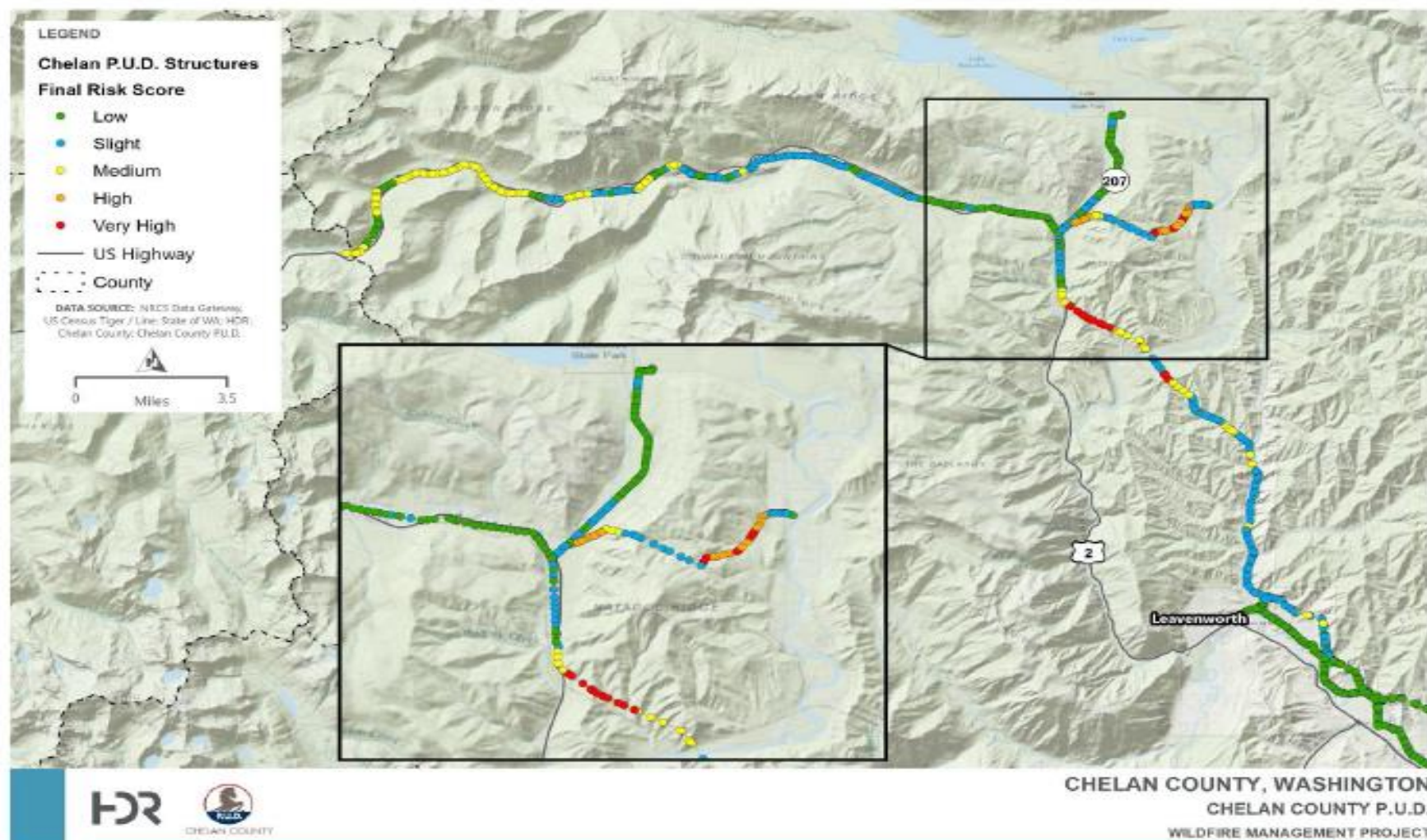
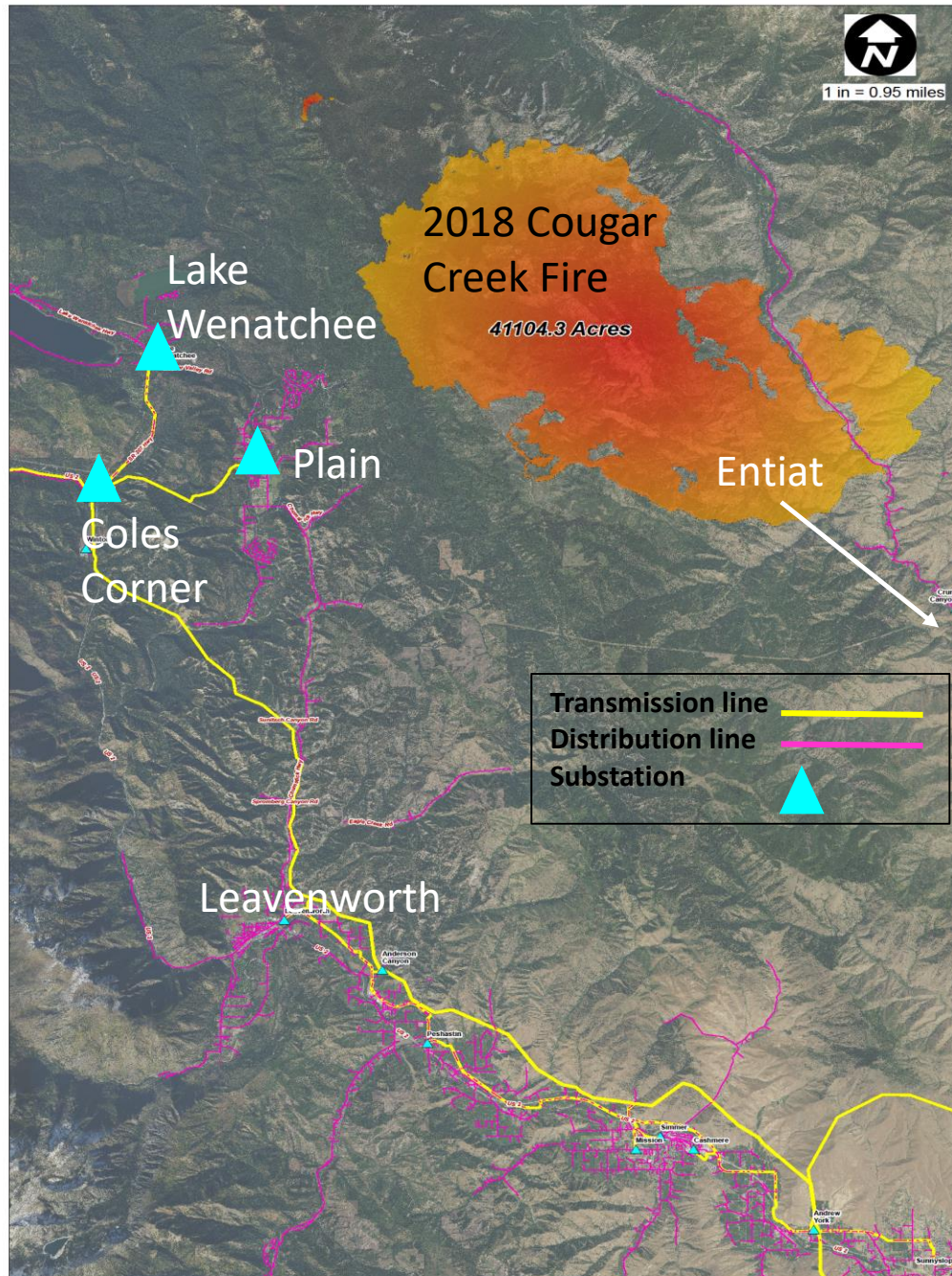


Figure 14. Map showing the structure-by-structure final risk score associated with the northwestern portion of the district's serv

Fire Risk – Project Driver



- 2018 Cougar Creek fire burned approximately 41,104 acres in the Entiat Valley
- There are 3,400 customers in the Upper Valley
 - Coles Corner substation (323)
 - Lake Wenatchee substation (1,380)
 - Plain substation (1,710)
- If the transmission line serving this area were to burn with existing wood poles, it is possible customers would be without power for several months until repairs could be made



Other Project Drivers

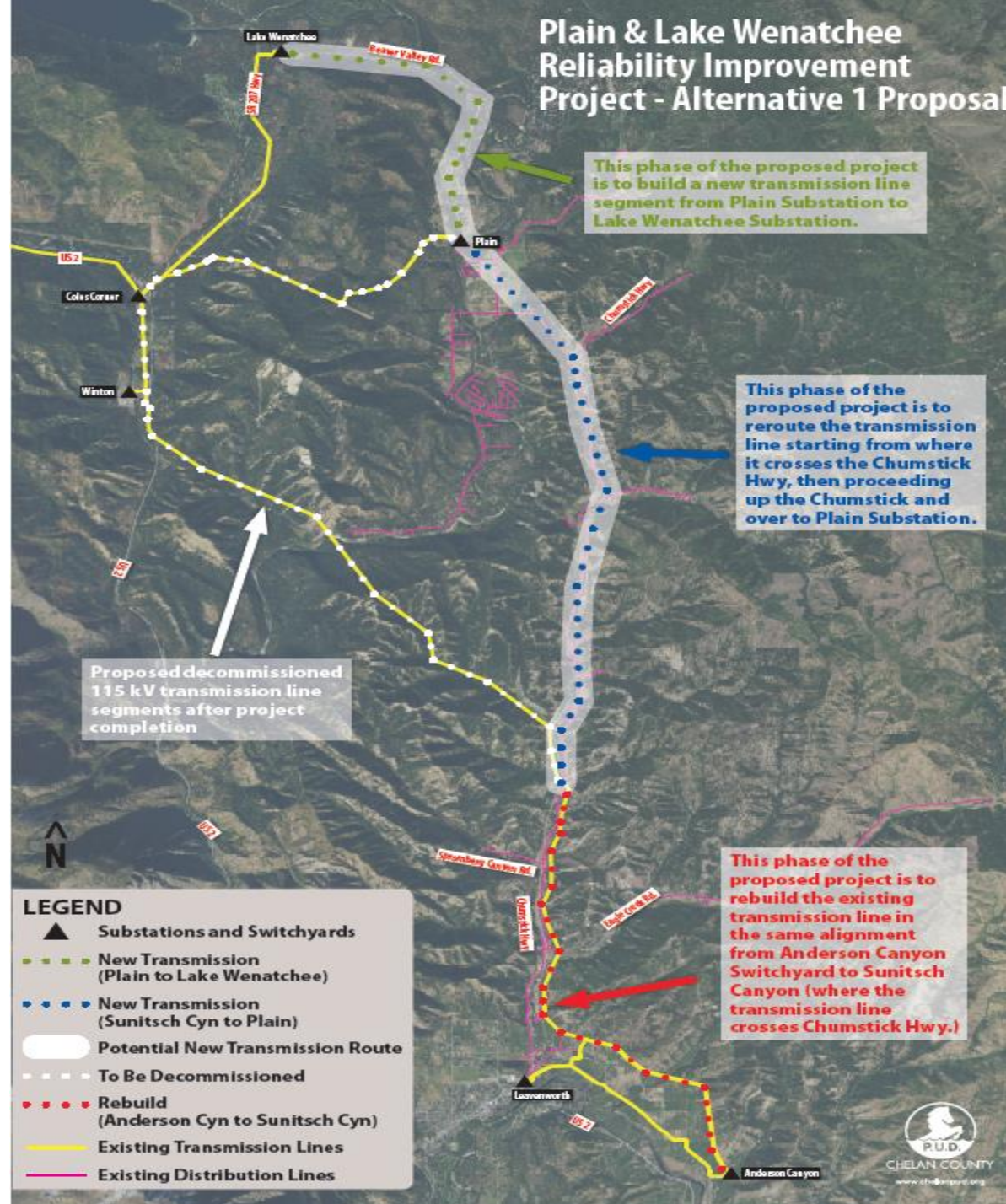
- Public safety
- Aging infrastructure
- Area of the forest that hasn't burned in recent history
- Number of customers: 3,413
- Section in Sunitsch and Deadhorse Canyons
 - Difficult access in summer
 - Requires railroad assistance to access in winter
 - Narrow Right-Of-Way, trees are taller than the transmission line



Transmission Improvement Options – Alt. 1

- Rebuild existing line from Anderson Canyon, to Chumstick Hwy. to provide a hardened connection to the power source.
- Build new line along Chumstick, from North Road to Plain, for fire hardening and improved reliability
- Build new line between Plain and Lake Wenatchee Substations, creating a loop for improved reliability
- Estimated Cost \$40M - \$60M
- *Map on next slide – full size PDF map on our website*

Plain & Lake Wenatchee Reliability Improvement Project - Alternative 1 Proposal





Transmission Improvement Options – Alt. 2 *(see maps)*

- Rebuild existing line from Anderson Canyon, to Chumstick Hwy. to provide a hardened connection to the power source.
- Rebuild the existing line through Sunitsch/Deadhorse
- Doesn't resolve access issues
- Rebuild the existing Plain Tap
- Build a ring-bus at Coles Corner
- Estimated Cost \$40M - \$60M
- *Map on next slide – full size PDF map on our website*

Plain & Lake Wenatchee Reliability Improvement Project - Alternative 2 Proposal

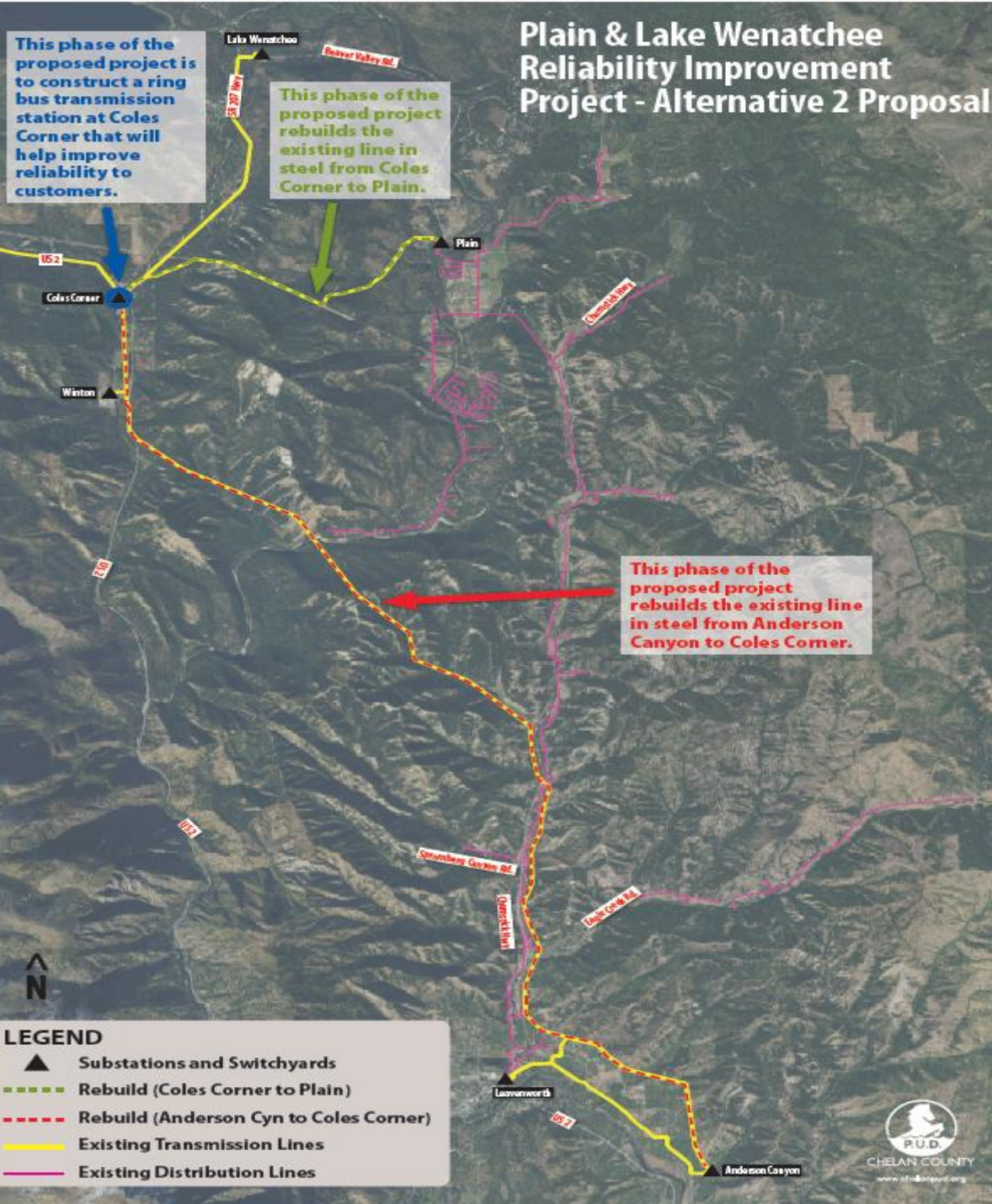
This phase of the proposed project is to construct a ring bus transmission station at Coles Corner that will help improve reliability to customers.

This phase of the proposed project rebuilds the existing line in steel from Coles Corner to Plain.

This phase of the proposed project rebuilds the existing line in steel from Anderson Canyon to Coles Corner.

LEGEND

- ▲ Substations and Switchyards
- Rebuild (Coles Corner to Plain)
- Rebuild (Anderson Cyn to Coles Corner)
- Existing Transmission Lines
- Existing Distribution Lines





Transmission Improvement Options – Alt. 3

- Maintain status quo – Do Nothing
- Does not address risk of aging infrastructure
- Does not address risk of extended outages due to fire or weather



Transmission Alternatives: Pros & Cons

Alternative 1*

Pros:

- Easy access to structures
- Looped service to substations
- Supports 2015-2019 Strategic Plan
- Provides greatest sectionalizing capabilities of all options

Cons:

- Requires new easements/permits
- More visible to customer owners
- Longer time to construct and energize, 8 – 10+ years

Estimated Cost: \$40-\$60M

Alternative 2*

Pros:

- Easements already in place
- Shorter time to begin construction
- Supports 2015-2019 Strategic Plan

Cons:

- Difficult access remains to Sunitsch and Deadhorse canyons.
- Does not provide “looped” service to Plain or Lake Wenatchee
- Longer repair times due to access

Estimated Cost: \$40-\$60M

Do-Nothing Alternative

Pros:

- Delays costs of upgrading to a future year

Cons:

- Risk of extended power outages due to wildfire and weather
- Risk of aging infrastructure

****These proposed resilience projects are not a revenue source***



Next Steps

- Drop-in sessions
 - July 17 – 3:30 – 5:30 p.m. – Beaver Valley Lodge
 - July 27 – 10 a.m.-Noon – Leavenworth PUD Office, 222 Chumstick Hwy.
- Email updates to distribution list – SIGN UP ON OUR WEBSITE
- PUD Commission update – Fall 2019
- Assessment of community input
- Decision on how to proceed by the end of 2019

A scenic view of a lake with mountains in the background and driftwood in the foreground. The sky is clear blue, and the water is a deep blue-green. In the foreground, there is a large pile of weathered, light-colored driftwood on the left and a long, dark, reddish-brown log on the right. Waves are breaking on the shore, creating white foam. The mountains in the background are covered in dense green forest.

Questions?

www.chelanpud.org/UVTransmission

www.chelanpud.org/firehardening

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