

CRYPTOCURRENCY MORATORIUM PUBLIC HEARING

August 6, 2018



CHELAN COUNTY

TODAY'S DISCUSSION

Review of previous presentations

- Development of a new class
- Infrastructure availability
- Rate considerations

Public comment

Proposed next steps

Moratorium outcomes necessary to begin connecting new services

- Seek outcomes that provide service that is neutral to beneficial to existing customers
- Have reasonable assurance that costs resulting from these connections will be recovered through a mix of fees, charges, and rates
- Ensure that we can reliably serve both existing and new customers
- Inform new customers so they can develop reasonable expectations for the short and long-term
- Make decisions that support community plans
- Minimize staff impacts from unanticipated work

Challenges & Costs of Cryptocurrency and Similar Loads

- Risk of **not recovering costs of new infrastructure** over long-term due to volatility and unpredictability
- Risk of **stranded assets** due to volatility and unpredictability
- **Premature aging** of line and transformer capacity caused by heat from high load factor
- **Reliability and safety** where excessive load damages equipment
- **Planning for load growth** over time due to volatility and unpredictability
- Long-term **energy resources planning**, including hedging and marketing strategies due to volatility and unpredictability
- Availability of **transmission and distribution capacity** both for cryptocurrency loads and for organic (traditional) load growth due to tendency to seek all available capacity
- **Delay of certain District Performance Plan goals** caused by stretching staff resources across the PUD to address these issues

Examples of Similar Loads

Cryptocurrency mining (Bitcoin - BTC, Litecoin - LTC, Ethereum - ETH, Ripple - XRP, Zcash – ZEC, Dash);

Scrypt mining, ASIC mining, block chain logistics;

Block chain and other ledger development and transactions;

Etc.

Major Characteristics of Cryptocurrency and Similar Loads

- ✓ High energy use density,
- ✓ High load factor,
- ✓ Requires abnormal alterations to Electric Service Facilities in order to maintain safety,
- ✓ Units of load that are portable and distributable,
- ✓ Volatile load growth and load reduction as an individual customer and in aggregate with similar customers in the District's service area,
- ✓ Able to relocate quickly in response to short-term economic signals,
- ✓ High exposure to volatile commodity or asset prices, or
- ✓ Part of an industry with potential to become a large concentration of power demand in the District's service area.

Draft New Class Definition

Cryptocurrency and Blockchain Processing and Similar Loads

This Schedule applies to any amount of computing or data processing load related to cryptocurrency mining, Bitcoin, blockchain, proof-of-work or other loads having, in the District's determination, similar characteristics including any of the following: high energy use density, high load factor, requires abnormal alterations to Electric Service Facilities in order to maintain safety, units of load that are portable and distributable, volatile load growth and load reduction as an individual customer and in aggregate with similar customers in the District's service area, able to relocate quickly in response to short-term economic signals, high exposure to volatile commodity or asset prices, or part of an industry with potential to become a large concentration of power demand in the District's service area.

Infrastructure Availability

Transmission: We have pockets of available capacity and areas where there are severe constraints, timeline and costs are less in areas with available capacity

Distribution: There are a few areas with small amounts of available capacity but most areas of the County would require distribution system construction to serve cryptocurrency expansion

OLDS STATION

| SCENARIO | AVAILABILITY |
|----------|--------------|
| 0 | 30 MW |
| 1 | 45 MW |
| 2 | 55 MW |
| 3 | N/A |
| 4 | 35 MW |

MONITOR

| SCENARIO | AVAILABILITY |
|----------|--------------|
| 0 | 30 MW |
| 1 | 45 MW |
| 2 | N/A |
| 3 | N/A |
| 4 | 35 MW |

WENATCHEE

| SCENARIO | AVAILABILITY |
|----------|--------------|
| 0 | 35 MW |
| 1 | N/A |
| 2 | N/A |
| 3 | N/A |
| 4 | N/A |

MALAGA

| SCENARIO | AVAILABILITY |
|----------|--------------|
| 0 | 5 MW |
| 1 | N/A |
| 2 | 55 MW |
| 3 | 80 MW |
| 4 | 35 MW |

High Density Load Transmission System

ESTIMATED AVAILABILITY

SCENARIO 0: Olds Station, Monitor, Malaga, Wenatchee

SCENARIO 1: Olds Station, Monitor

SCENARIO 2: Olds Station, Malaga

SCENARIO 3: Malaga

SCENARIO 4: Malaga, Monitor, Olds Station

\$ = Interconnection Cost Estimate

Total HDL addition beyond **100 MW** on the transmission system results in a significant increase in interconnection costs for the HDL customer to pay for required system upgrades.



CHELAN COUNTY

Evaluation assumptions included Alcoa operation at both 0 MW and 265 MW.

Substation Availability

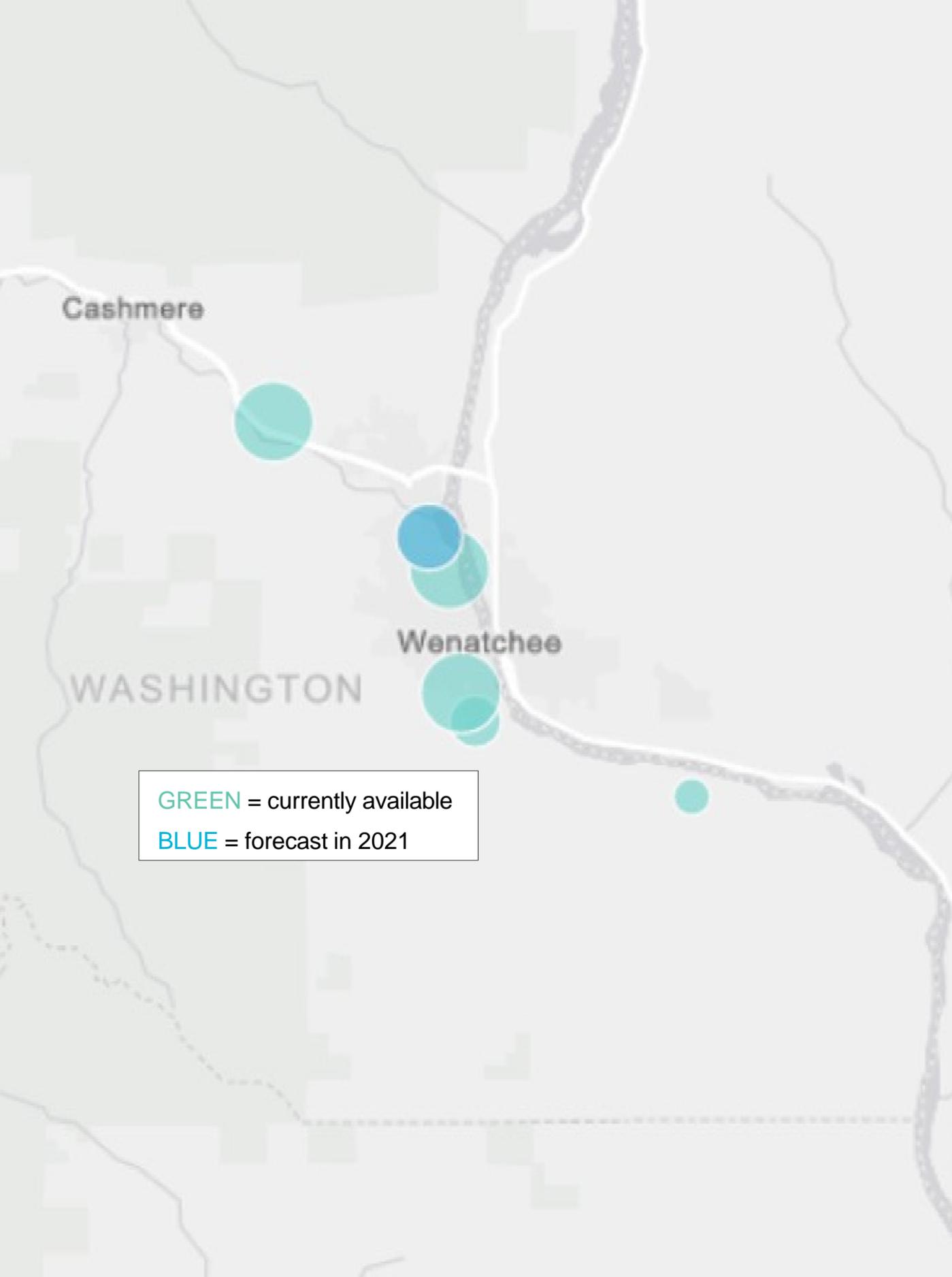
Size of dot indicates relative capacity available

No single location has more than 4 MW available

Substation capacity does not equate to a single location, locational availability subject to engineering study

All regular line extension costs and increased upfront charges apply

Load requests in excess of location availability may be required to fund or build infrastructure, including substation facilities



GREEN = currently available
BLUE = forecast in 2021

Upfront Capital Charges

Transmission Costs

- » \$55/kW (first 100 MW) in Wenatchee corridor (Monitor, Olds Station, Wenatchee, Malaga)
- » No connections allowed north of Leavenworth (Anderson Canyon-Summit Line)
- » \$400/kW - \$500/kW in all other areas, or cost based on Transmission Study

Distribution Costs

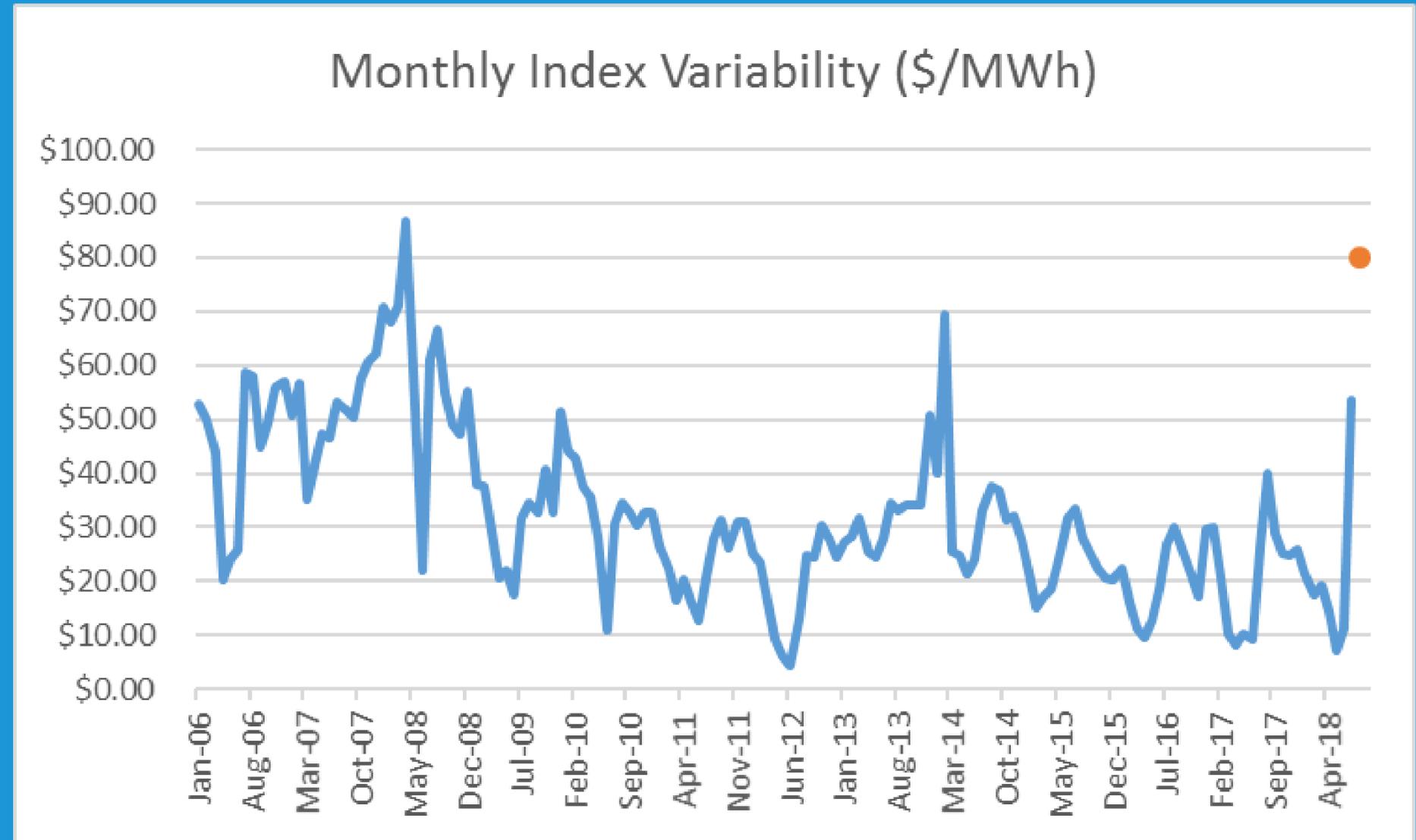
- » \$270-388/kW depending on substation capacity
- » Where substation capacity not available customer may be required to build necessary infrastructure

Willingness to pay does not guarantee service availability

Draft Cryptocurrency Rate Considerations

Evaluating market index pricing

- » Monthly energy price is subject to market volatility
- » Customers could mitigate variability through a third-party



Draft Cryptocurrency Rate Considerations

For use over 1 MW, at market monthly average index energy price over the last 24 months, averages 5.5 ¢/kWh* (through June 2018)

For use over 1 MW, future market energy, average approx. 6 ¢/kWh* for commercial or industrial services (as of May 2018), July/August 2018 estimated to be ~10 ¢/kWh

For residential services, recommend adjusting delivery charge, resulting in 7-10 ¢/kWh* (as of May 2018), also increases with market

Excess use charges apply for incidental use over authorized levels

*Includes customer charge, delivery and energy, does not include upfront charges

Summary of Findings to Date

Continued goal of keeping non-cryptocurrency customers neutral to potential impact

Cryptocurrency and similar operations have different impacts to the District; a separate rate schedule is recommended

We have identified system capacity for some cryptocurrency growth but costs will increase significantly when the capacity is spoken for

To avoid impact on other local growth we have included five years of forecasted load in determining what is available

Recommend considering cryptocurrency rates that reflect cost of purchasing market energy and increased cost of delivery in residential areas

PUBLIC COMMENT

Proposed Motion

In order to allow time for the Commission and staff to consider comments made today, move to:

Continue the moratorium adopted on March 19, 2018 and hold further Commission discussion on **August 20, 2018.**



Proposed Next Step:

MORATORIUM DISCUSSION

August 20, 2018 | Regular Commission Meeting