Northwest **Power** and **Conservation** Council

March 10, 2020

MEMORANDUM

TO: **Power Committee Members**

FROM: **Tina Jayaweera, John Ollis**

SUBJECT: **Draft Demand Response Supply Curves for 2021 Plan**

BACKGROUND:

Presenter: Tina Jayaweera, John Ollis

Summary: As part of development of the 2021 Plan, staff is developing demand response (DR) supply curves that provide levelized cost (dollar per kilowatt-year) and savings (megawatts) for each DR product. These will be used as an input for the Regional Portfolio Model for doing scenario analysis.

In developing the DR supply curves, staff has been working closely with the demand response advisory committee for estimates of costs and impact from about 20 DR products. The products can be classified into three groups: residential direct load control, non-residential direct load control, and price-based DR.

Staff presented draft results to the demand response advisory committee (DRAC) on February 20, 2020. In general, advisory committee members were comfortable with the results, recognizing the numbers reflect decisions made by the DRAC over the past year, such as including a portion of the incentive in the levelized cost. There were two decisions made at this meeting that changed the results relative to what was presented. Namely, (1) program life for controllable products was reduced from 20 years to 10 years, and (2) both transmission and distribution

deferral are now included, rather than just transmission deferral. The draft results for the Power Committee reflect these changes. Note, the inputs are still draft and will change before finalized on March 31 based on stakeholder review and an updated load forecast.

One other discussion area at the 2/20/20 DRAC meeting was around demand voltage reduction (DVR) and the interplay with conservation voltage reduction (CVR). In both cases, the utility invests in their distribution system that allows for a voltage reduction on the line to lessen resistive losses while keeping within prescribed limits. For CVR, this reduction is permanent, but for DVR, the voltage is only reduced during peak periods. The investment to do DVR is basically the same as CVR, and since CVR provides more energy savings and comparable capacity savings, it is the more economically efficient option. Thus, Council staff proposed to the DRAC that we do not include DVR in the DR supply curves to avoid double counting with CVR. However, DRAC participants from Bonneville were not in agreement with that proposal. Two other DRAC participants provided feedback: Washington UTC staff noted that all cost-effective conservation, including CVR, should be acquired through the Energy Independence Act (I-937) and a participant from Clark PUD indicated that they plan to do CVR. However, Bonneville noted most of its utility customers have been much more likely to adopt DVR than CVR, largely because both provide the benefit of reduced demand charges, while DVR is also able to mitigate negative revenue impacts. Thus, they believe the 2021 Plan should reflect this difference in historical adoption. After further discussion with Bonneville about their concerns after the DRAC, staff modified its proposal to reduce the maximum 20-year achievable potential of CVR from 100% to 85% and have the remaining customer base be applicable for DVR. Bonneville would prefer even less CVR; however, staff is concerned about excluding likely cost-effective efficiency from the 2021 Plan. Bonneville will be providing a letter that outlines their concerns for Power Committee review.

Staff will present our proposal and resulting feedback for Power Committee discussion. Bonneville staff will be providing a letter for Council members outlining their concerns.

Relevance: Development of inputs for the 2021 Power Plan

Workplan: Power Division A.3: Develop the 2021 Power Plan: Demand Response

More Info: In May 2019, staff presented the process primer on DR: https://www.nwcouncil.org/sites/default/files/2019_0507_p5.pdf

In August 2017, Council and Bonneville staff presented on the Seventh Plan Action Item MCS-2 – Distribution System Efficiency that was intended to increase adoption of CVR: https://www.nwcouncil.org/sites/default/files/2017_0815_p2.pdf

Draft DR Supply Curves

17 March 20

Power Committee

Tina Jayaweera, John Ollis

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1

Caveats Before We Begin

- These results are subject to change!
- The workbooks are currently being reviewed; there may be QA/QC findings that impact results
- Recent updates to load forecast have not yet been incorporated
  - This is primarily results in a reduction in commercial loads/potential
- DVR will need to be updated per today's discussion
- Note: Levelized costs include portion of incentive "transfer payment" (like California's total resource cost approach)

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2

2

Types of DR

- Firm/Controlled
  - Allows either interruptions of electrical equipment or appliances that are directly controlled by the utility or are scheduled ahead of time.

- Non-firm/Price-Based
  - Outside of the utility's direct control and are driven by pricing.

3

Products Considered - Residential

Summer Only	Winter Only	Dual Season
AC Switch	Heating Switch	Bring-Your-Own-Thermostat
		Water heater (heat pump and electric resistance) – switch
		Water heater (heat pump and electric resistance) - grid-connected
		Critical Peak Pricing
		Time-of-Use

Black text indicates controllable DR
Blue text indicates price-based DR

4

Products Considered – Non-Residential

Summer Only	Winter Only	Dual Season
Irrigation Control (Large & Small)	Heating Switch (Small & Medium Com)	BYOT (Small Com)
AC Switch (Small & Medium Com)		Demand Curtailment (industrial & commercial)
		Demand Voltage Regulation
		Critical Peak Pricing
		Real Time Pricing

Black text indicates controllable DR
Blue text indicates price-based DR

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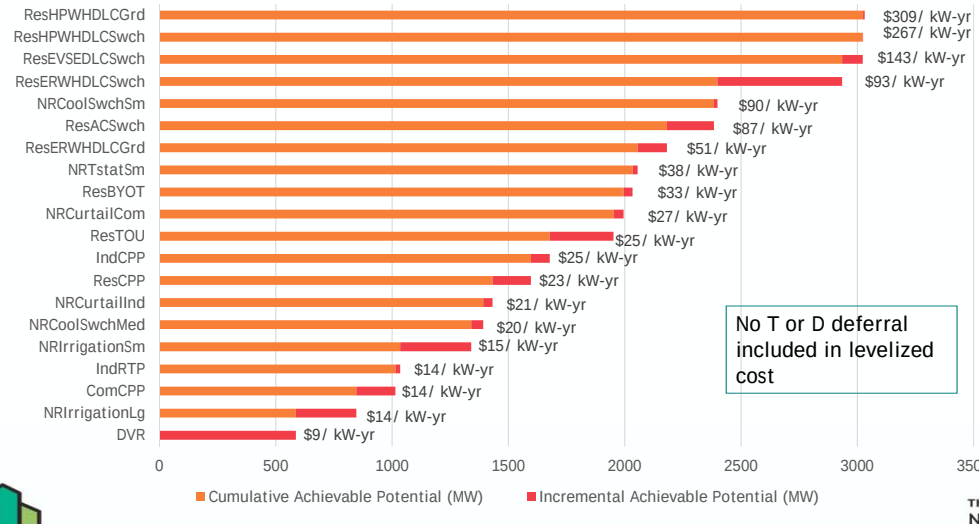
5

5

Summer



No T or D deferral included in levelized cost

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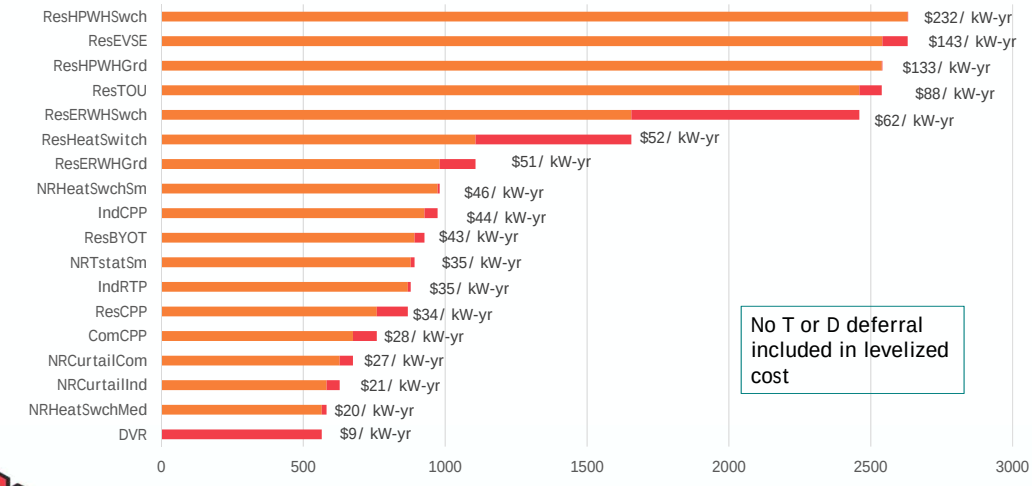
6

6

Winter



No T or D deferral included in levelized cost

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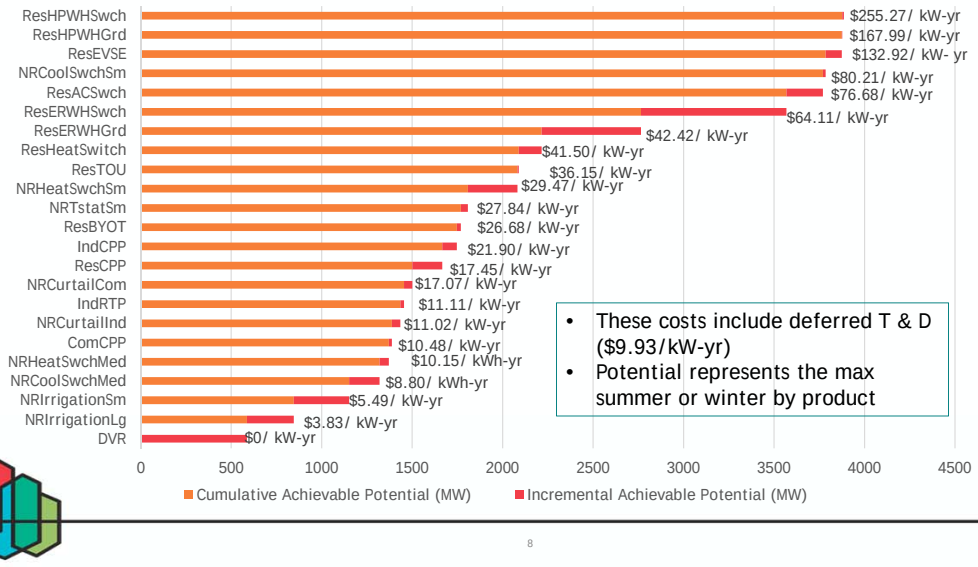
7

7

Combined



- These costs include deferred T & D ($9.93/kW-yr)
- Potential represents the max summer or winter by product

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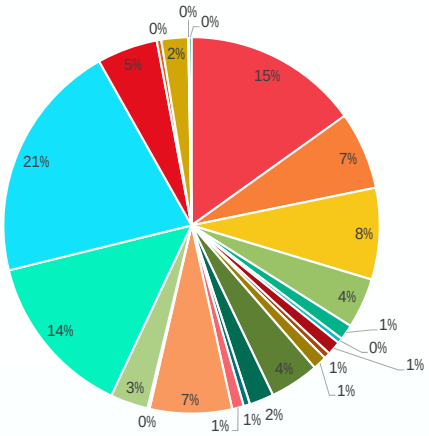
8

8

2041 Potential

Max Potential – 3885 MW



- DVR
- NRIrrigationLg
- NRIrrigationSm
- ComCPP
- NRCoolSwchMed
- NRHeatSwchMed
- NRCurtailInd
- IndRTP
- NRCurtailCom
- ResCPP
- IndCPP
- NRTstatSm
- ResBYOT
- ResTOU
- NRHeatSwchSm
- ResERWHGrd
- ResHeatSwitch
- ResERWHSwch
- ResACSwch
- NRCoolSwchSm
- ResEVSE
- ResHPWHGrd
- ResHPWHSwch

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9

9

Binning

10

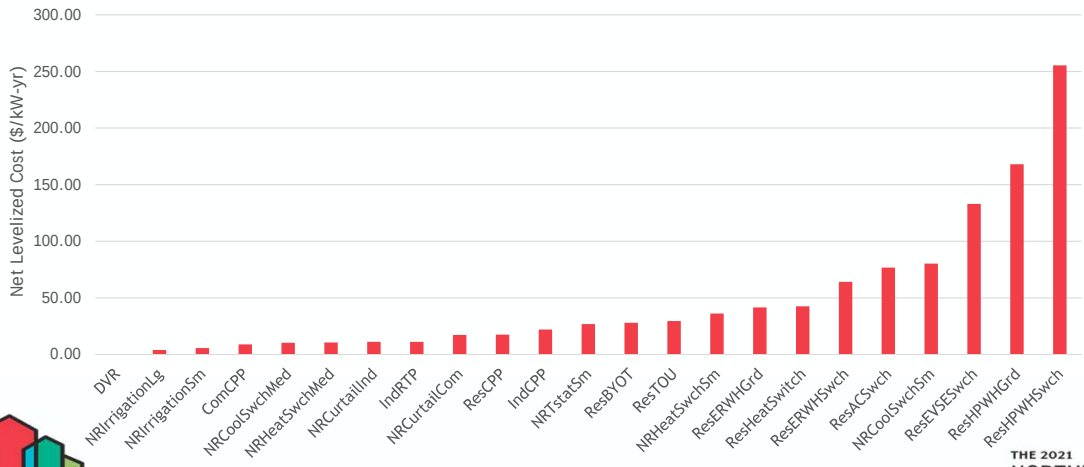
10

How to Bin?

- Able to have four bins
- Cost largest driver, seasonality also important
- Want minimal variance in costs across products in a bin

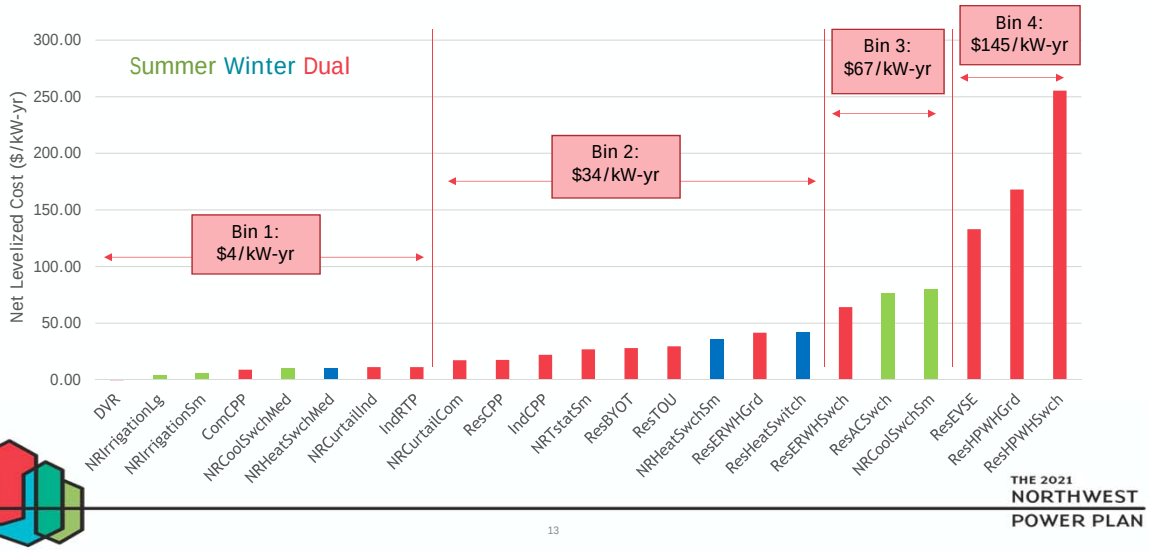
11

Products by Increasing Levelized Cost



12

Binning



13

Total Potential by Price Bin & Season

14

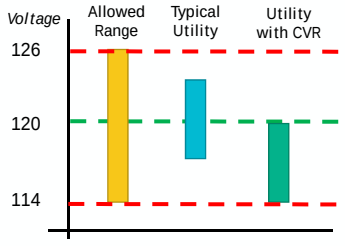
Distribution Voltage Reduction and Conservation Voltage Reduction

15

15

Background: What is CVR/DVR

- Distribution system equipment settings and/or upgrades can save energy by reducing line voltage and balancing line loading while still maintaining adequate power quality
- Energy savings come from reduced losses and lower consumption from some (but not all) devices
- Capacity savings come from these reductions during peak periods



CVR: Reducing the voltage every hour
DVR: Reducing the voltage only during select hours

16

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16

CVR competing with DVR

- Investment to do CVR about the same as DVR
- CVR results in energy savings since year-round reduction, similar capacity savings during peak periods
- Staff's question: Should we even include DVR in 2021 Plan?
  - Conservation is a priority resource in Power Act
  - Implementation of most CVR precludes ability to do DVR
- BPA response: Utilities are implementing DVR, they are not implementing CVR as much due to revenue impacts of CVR
  - Plan should reflect this

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17

Proposal

- Initial proposal: Remove DVR from supply curve, all the potential will be in CVR
- BPA thought CVR should be limited based on historic adoption – down to 20% max achievable over 20 year plan horizon
- Staff proposed compromise: Reduce CVR to 85% max over 20 years, remainder goes to DVR
  - 85% max achievable is lowest across other EE measures
  - This will significantly reduce DVR potential, but will still provide for some in DR supply curve
  - Plan narrative will include discussion of trade-off

18

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18