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November 9, 2021

MEMORANDUM

TO: Power Committee

FROM: Gillian Charles

SUBJECT: Energy Storage in the Draft 2021 Power Plan

BACKGROUND:

Presenter: Gillian Charles, John Ollis, Ben Kujala

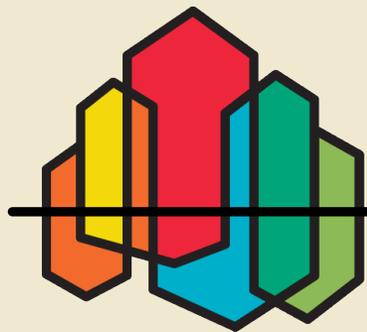
Summary: Staff will present a summary of the energy storage findings from the draft 2021 Power Plan. While none of this information will be new, it is evident that there is some stakeholder uncertainty regarding the role of energy storage in the power plan and in the analysis. Staff will clarify the major findings of energy storage as a new resource – both within the region and across the West – and provide the underlying rationale.

Relevance: The comment period for the draft 2021 Power Plan concludes on Friday, November 19.

Energy Storage in the Draft 2021 Power Plan

Power Committee

November 16, 2021



THE 2021
NORTHWEST
POWER PLAN

FOR A SECURE & AFFORDABLE
ENERGY FUTURE

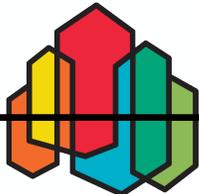
Energy storage findings in the draft 2021 Plan

What are we talking about today?

- Staff recognizes that there is confusion about the role of energy storage in the draft 2021 Plan
- Opportunity to provide a review of the significant findings regarding energy storage, help connect the dots of analysis from the plan supporting materials
 - ❖ No new information presented today

Draft 2021 Power Plan analysis of resource needs over the next two decades shows that **energy storage is a necessary component of the future electric grid;**

- However, the needs in the region differ substantially from what we anticipate will be needed by our neighbors in the rest of the western interconnect



2021P: Energy Storage Reference Plants



Stand-alone Battery Storage

100 MW, 4hr Li-ion

Capital cost - \$1,400/kW

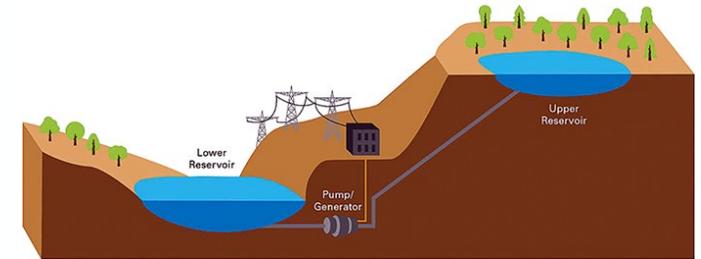


Solar PV + Battery Storage

Co-located, 100 MW

PV with 100MW Li-ion battery

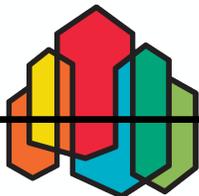
Capital cost - \$2,568/kW



Pumped Storage

400 MW, 8hr closed-loop system

Capital cost - \$2,300/kW

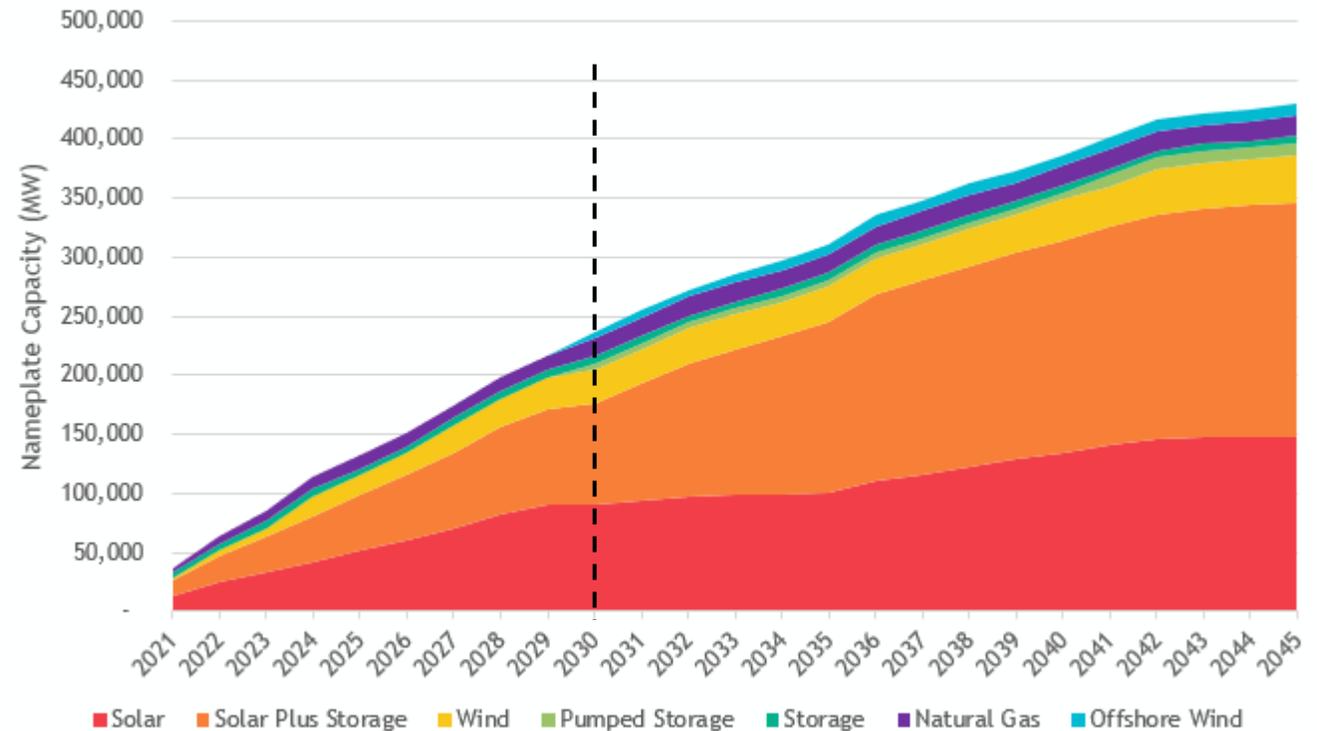


Draft 2021P: WECC-wide Buildout Assessment

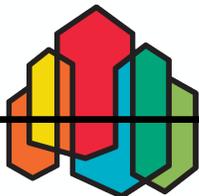
- By 2030, the estimated development of new generating resources includes:
 - ~ 6,000 MW stand-alone battery
 - ~ 87,000 MW co-located solar PV + battery
 - ~ 5,000 MW pumped storage

Energy storage is a critical resource acquired throughout the West to maintain resource adequacy and meet renewable and clean energy policies

Buildout of New Resources in the West - Baseline Conditions



Energy storage plays a significant role in the Western Interconnect over the next decade and beyond

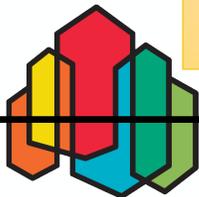


Draft 2021P: WECC-wide Buildout Assessment (2)

What value to the grid do these energy storage resources provide in a WECC-wide system?

- **Solar PV + battery** – meets a peak need for capacity in the evening hours and brings more renewable energy credits (RECs) to the grid
- **Pumped storage** – provides high capacity, long-duration storage to capitalize on market price differentials and enable more renewable development
- **Stand-alone battery** – short-duration, battery storage can provide a capacity value, however it is less effective than co-located solar PV + battery and pumped storage

Co-located solar PV + battery and long-duration energy storage resources (e.g. pumped storage) provide significant benefits to a west-wide system building to meet clean energy policies





Draft 2021P: WECC-wide Buildout Assessment (3)

Dependent on scenario, the amount of energy storage resource development varies, from **6,000 – 190,000 MW** by 2030



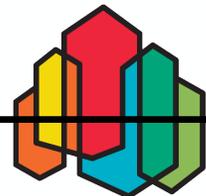
- Less storage is selected when there are no limits on new natural gas builds



- More storage is selected when any of the following is true:

- a) Markets in the west utilize a single planning reserve margin and flat wheeling rates (no price discrepancies across certain regions)
- b) Explicit GHG emissions price applied to resource dispatch
- c) Accelerated retirement of coal units

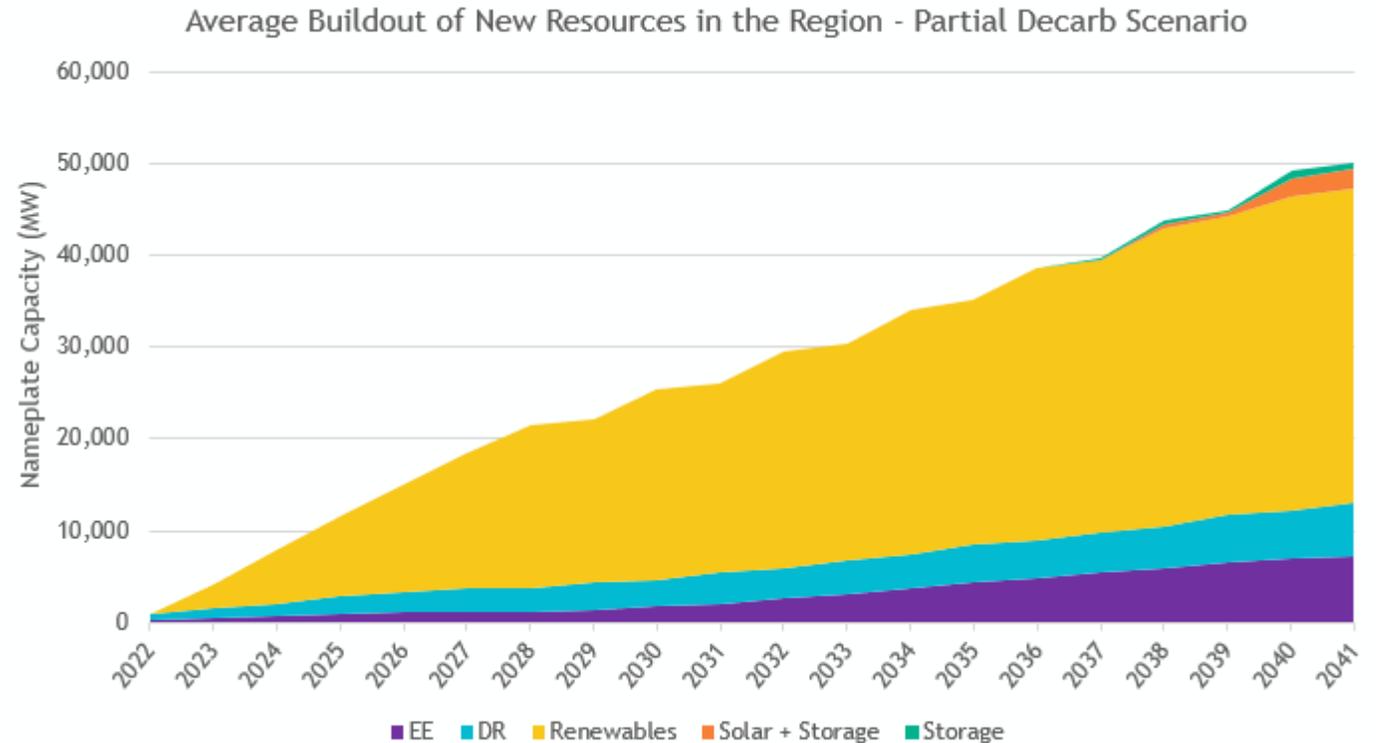
Energy storage can play a vital role in the clean energy transition across the west, in particular in a future where there are more coal unit retirements and restrictions on new natural gas resource development. In addition, utilizing an organized market and taking advantage of efficiencies like single planning reserve margins enhances the value of energy storage further.



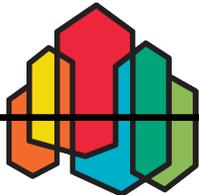
Draft 2021P: Regional Resource Strategy Assessment

Draft 2021P analysis for the region showed a very limited role for energy storage, and only in one scenario

- Limited **battery storage** and co-located **solar PV + battery** acquired in the partial decarbonization scenario
- Aggressive load growth and limited resource availability created circumstances where storage was needed to maintain regional resource adequacy



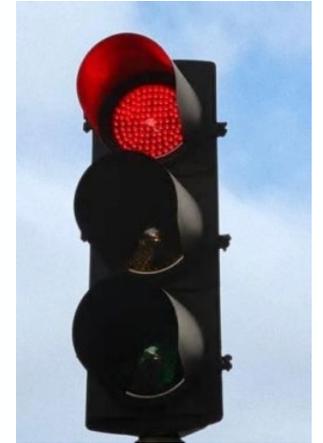
New regional energy storage resources are not a critical element of a resource strategy for the region. Why? See next slide...



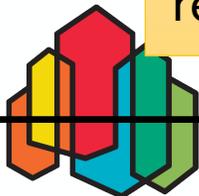
Draft 2021P: Regional Resource Strategy Assessment (2)

Why isn't there a signal for energy storage resource procurement in other scenarios?

- New energy storage technologies compete directly with the region's existing hydropower system and its ability to provide flexibility and storage
- With an expected large (and earlier) buildout of storage resources in the rest of the West, opportunities to capture market price differentials – beyond what is captured by hydropower - will be less in terms of frequency and/or magnitude
- Capacity needs in the regional analysis were served by new, less expensive energy efficiency, demand response, and renewable resources



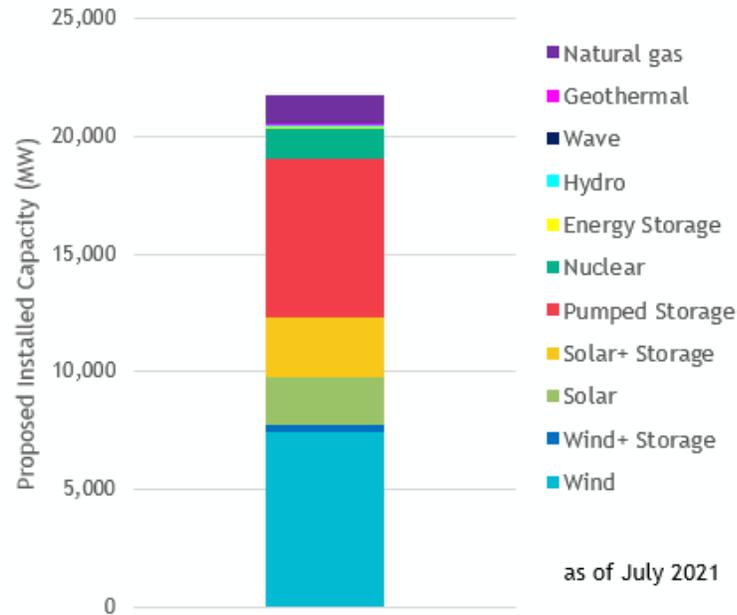
Energy storage resources thrive in scenarios where market prices vary substantially throughout the day and are predictable enough to justify the capital investment in an energy limited resource. Since the northwest is fortunate to have a robust hydropower system that is able to capture some of this value, energy storage resources may be more ideally suited for other regions in the west that have limited access to the flexibility of the regional hydropower system.



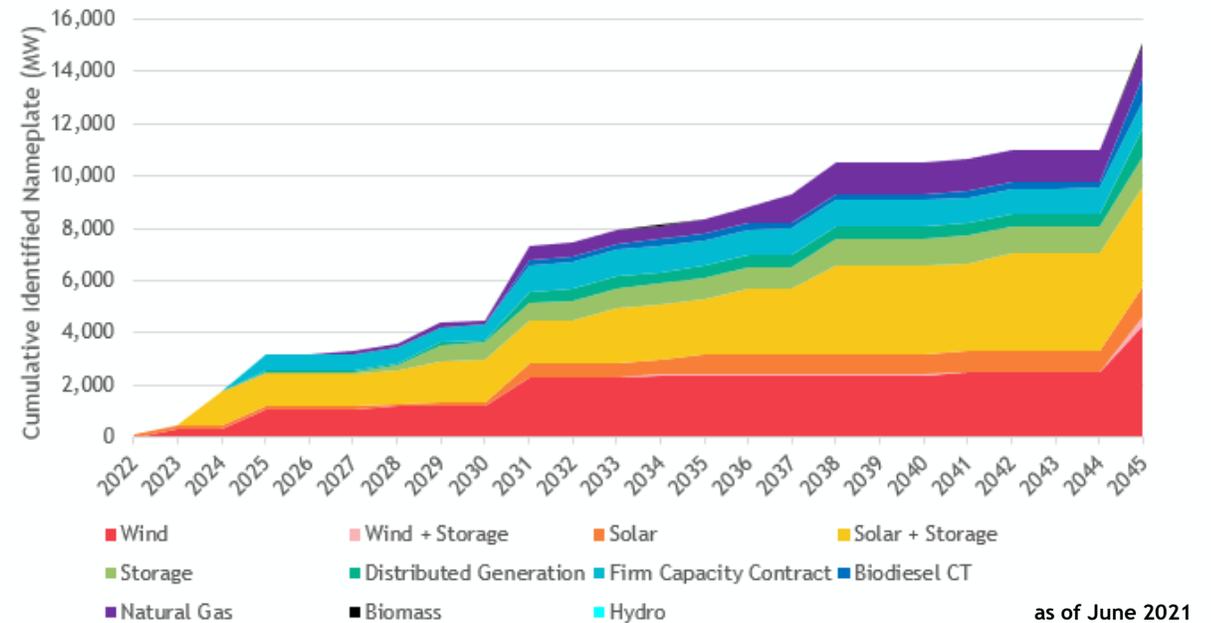
How does this compare with what the region is expected to build?

Standalone energy storage (battery and pumped storage) and renewable + storage projects are being pursued in the region, with prospective projects in the development pipeline and energy storage needs identified in utility integrated resource plans

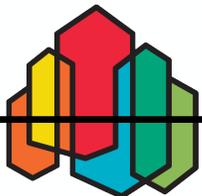
Proposed projects in the development queue*



Aggregate of regional utility IOU IRP resource needs*



The Council's power plan is a strategy for the entire region, while individual utilities will have to assess their own unique needs and strategies - and these may and will differ.



* Data from the Council's generating resource project database and the Council's aggregation of WECC-wide Integrated Resource Plans (IRPs)



Next Steps



- Staff to propose additional supporting documentation describing energy storage findings and conclusions from the power plan analysis as part of the final 2021 Power Plan
- Review comments and feedback related to energy storage that we receive through the public comment period and take them under advisement as we consider additional changes or updates, if needed

Public comment on the draft 2021 Power Plan closes on November 19.
Thank you to those who have already submitted testimony or provided comments.

