IN SUPPORT OF WESTERN REGIONAL RESOURCE AND TRANSMISSION PLANNING COORDINATION

OCTOBER 2021

GRIDWORKS

CENTER FOR THE NEW ENERGY ECONOMY
COLORADO STATE UNIVERSITY

EXECUTIVE SUMMARY

Over the coming decade the Western Interconnection will require new power and transmission resources to meet state-level energy policy goals, including renewable energy and GHG targets, changing customer expectations, and growing customer demand. To meet the needs of the changing energy landscape, resource planning across the West must improve through enhanced regional coordination with, and focused approaches to, transmission planning that lead to the development of the efficient and effective transmission capacity needed for the future.

A diverse group of stakeholders and policy leaders are collaborating to address these challenges under the *WIRED Transmission Planning and Development Working Group*.[1] The November 2020 report of this working group identified that the solution rested in "establishing a West-wide process to inform both resource planning and transmission planning and development."[2]

During the Summer of 2021 a series of discussions, facilitated by Gridworks, focused on the interplay between utilty- and state-level resource plans and goals and regional-level transmission plans and operations. The general objective was to identify areas of agreement regarding resource and transmission incompatibility and specific steps forward.

The observations, conclusions and recommendations presented in this report reflect the results of these discussions. They are not intended to be a consensus position of the participants. Rather, they capture areas of general agreement and opportunities for voluntary, participant-specific actions.

In this report, the participants identify a vision for coordinated regional resource and transmission planning and make recommendations to begin realizing the opportunity. They envision a planning process that is:

- transparent, independent and fair, with adequate representation of the whole region and respect for both state and federal authorities; and
- supported by analytics which are based on clearly defined criteria, based on valid data, and use a risk-based approach.

The envisioned outcomes for their coordination include:

- achieving state goals for energy and the environment, economic development, environmental justice and economic equity,
- developing transmission and generation resources to support reliable, affordable, and safe service in a cost-effective manner, and
- allocating costs for transmission development consistent with cost causation principles.

1 https://cnee.colostate.edu/
2 https://cnee.colostate.edu/wp-content/uploads/2021/01/final-review-draft-WIRED-transmission-work-group.pdf

RECOMMENDATIONS

Participants proposed and evaluated a series of recommendations to kick-start coordination of resource and transmission planning across the region. Their recommendations include:

- The need for better coordinating resource planning and related transmission planning, as a step toward achieving state-specific energy needs and policy objectives. For example, Governors could consider the following ways to promote increased regional coordination:
  - Encourage (as appropriate) utility commissions and jurisdictional utilities to explore:
    - the sufficiency of current resource planning practices to transparently factor in regional market data and information;
    - the costs and benefits of synchronizing utility resource planning and regional transmission planning cycles; and
    - the concurrent initiation of non-litigated ("investigatory" or equivalent) proceedings by each state commission interested in exploring discrete steps that can be initiated to improve inter-state, and ultimately, regional coordination concerning resource and transmission planning. (Note: some states have already initiated such, or may want to consider adding this focus to ongoing proceedings.)

In the past, many transmission projects were developed to optimize resources that were already developed and in service to serve each jurisdiction's loads independently. Here participants emphasize a change: future collaboration in times of unparalleled fleet transition to renewable energy calls for coordination of resource planning and transmission planning to achieve potential shared interstate benefits. A transmission planning exercise at an interconnection scale would assess the capabilities and points of congestion of the existing transmission system informed by the resource needs to meet state goals through 2045.[3]

- State energy officials should consider reviewing the potential for WIEB[4] to serve as a platform supporting regional engagement regarding transmission and resource planning among member states, as detailed in Section 6. Concurrently, the WIRED Transmission Planning and Development Working Group should put forth a list of tasks that a regional entity such as WIEB should undertake, in support of increased regional collaboration concerning transmission and resource planning. At a minimum, the task list could include:
  - Establish and maintain a repository of resource plans5 (as discussed further on page 6 of this report);
  - Similarly, establish and maintain a repository of transmission plans; (Note: engagement with the 3 FERC jurisdictional transmission planning entities was not discussed, yet, merits equal attention. The simulation discussed in the Appendix offers an opportunity for WIRED to engage with the three transmission planning entities.)
  - Analyze the feasibility of the western grid to fully accomodate state resource portfolio goals and utility resource plans, within the constraints of the current and anticipated transmission plans and operations. (A simulation of this feasibility analysis is discussed further in this report; see the Appendix.)
  - Based upon the results of this regional system analysis, identify where interstate coordination concerning any and all aspects of resource and transmission planning would resolve identified constraints.

3 2045 is the latest horizon for adopted state electricity resource goals.
4 The Group acknowledged that WIEB is well-positioned and has the experience support regional coordination. Yet, the Group did not formally conclude that WIEB should perform these functions.
5 If such a repository can not readily be achieved via voluntary efforts, then Governors should champion such efforts.

The working group also identified expectations that are important to confirm from participating states.

- As a part of its collaboration, each state must come to the table with a general view of their state's position on three fundamental questions:
  - Is transmission development of interest to achieve economic efficiencies and economic benefit from the existing resource fleet and the fleet planned to meet their own state's needs? While this may seem obvious, building long haul major transmission facilities for primarily economic purposes can be challenging and politically unpopular in the course of the siting process.
  - Is the state willing to support the development of resources in their own state for purposes of economic development and employment benefits — for export purposes for a neighbor meeting its economic and environmental priorities? This question assumes the neighboring state is funding and contracting for those resources.
  - Is the state willing to achieve overall capital cost reductions through higher levels of interdependence with its neighbors?

Further, the working group identified the value (particularly to the simulation exercise, outlined in the Appendix) of gathering information on the status of proposed transmission projects. To assist with this information gathering, a detailed evaluation, by willing organizations, of specific transmission projects seeking off-takers could be undertaken. (This is an additional task that could be added to the task list assigned to the regional coordinating entity.) The review would likely include a detailed discussion regarding proposed transmission projects which are either permitted, or are in late-stage permitting, such that an in-service date prior to the mid-2020s[6] is achievable. There are several projects that meet this hurdle, and they touch nearly all balancing authorities in the Western Interconnect.

ORGANIZATION OF THE REPORT

- Section 1: **The Western Interconnection Will Need New Resources and Transmission**, an overview of the recent analyses demonstrating the need for new resource and transmission to achieve state goals across the West
- Section 2: **Collaborating to Meet the Challenge**, an overview of the process and participants leading to this report
- Section 3: **Transmission Development Is Not Well Coordinated with the Current Resource Planning Framework**, an overview of the current state of resource and transmission planning in the West
- Section 4: **Benefits and Challenges of More Coordinated Regional Planning**, an assessment of the reasons to pursue more coordinated regional planning developed through this process, and challenges facing their pursuit
- Section 5: **Envisioning a Coordinated Resource and Transmission Planning Process**, an outline of the envisioned coordination process developed through this process
- Section 6: **Recommendations**, the recommendations of participants in this process to move toward the envisioned regional planning coordination

6 Various dates for conducting analyses were proposed during the discussions. Any dates used in the report are illustrative, not definitive.

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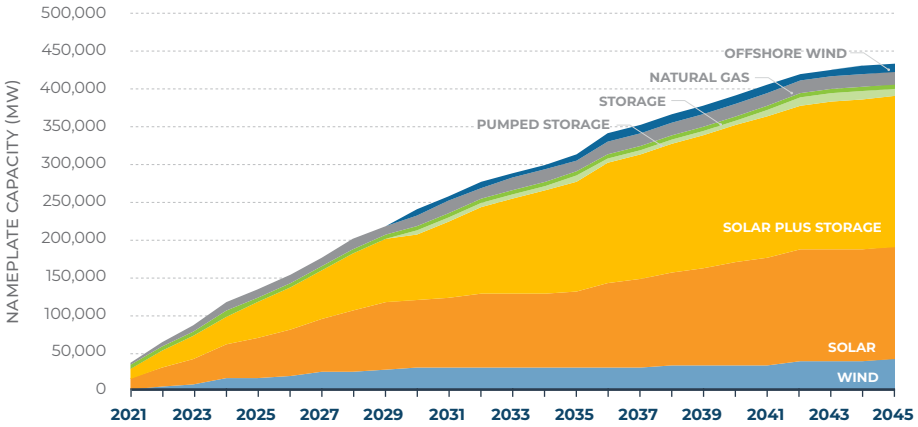
THE WESTERN INTERCONNECTION WILL NEED NEW RESOURCES AND TRANSMISSION

Aggressive new state clean energy and environmental policies, as well as changing resource economics, are driving a massive shift in how electricity is supplied across the West. A recent analysis prepared by the Northwest Power and Conservation Council (NPCC) as part of its draft 2021 Northwest Power Plan shows roughly 200 GW of new resources, mostly renewables and storage, being acquired across the Western Electricity Coordinating Council (WECC) area by 2028 — as compared with a total installed nameplate capacity in 2020 of about 270 GW.

Buildout of New Resources in the West — Baseline Conditions



Similarly, an NPCC aggregation of the latest IRPs of 13 large investor-owned utilities (IOUs) — representing about 70% of the total load in the WECC — shows cumulative new generating resource needs of about 70 GW of new capacity identified by 2024, almost ALL of which is clean or renewable, increasing to 90 GW of new capacity by 2030 and 110 GW by 2035. According to the NPCC analysis, generator interconnection queues contain over 100 GW of new resources planning to come online by 2028. And a recent report by CAISO indicates that it has over 245 GW of renewable and energy storage capacity in its queue alone. At the same time, demand for power is expected to increase, driven by electrification and more severe heatwaves. Extreme weather events and wildfires pose an increasing threat to grid infrastructure.

Other recent studies suggest that these conditions will require new transmission to deliver resources across the West to meet the demands of the next decades. The "Western Flexibility Assessment," prepared for the Western Interstate Energy Board (WIEB) by Energy Strategies in December 2019, found that a balanced set of flexibility solutions will likely be needed in order to integrate the influx of renewables. The urgency in implementing these solutions will increase over time.

Transmission limitations represent a material barrier to achieving the assumed 2035 state policy targets. Depending on where resources are sited, there is a potential need for significant transmission expansion to meet state energy and environmental policy goals.

The State-Led Market Study ("*Exploring Western Organized Market Configurations: A Western States' Study of Coordinated Market Options to Advance State Energy Policies*"), focused on examining multiple possible future market structures with varying footprints, also found that a potential transmission buildout by 2030 would help improve operational efficiency in the status quo real-time Energy Imbalance Market scenario and defer the need for generating capacity additions. The transmission buildout scenario also led to lower emissions and fewer renewable curtailments. Additional transmission also caused most states'

adjusted production costs to decline by up to 4%. According to the study, these and other benefits would be greater should a regional transmission organization (RTO) develop.

In its December 18, 2020, Western Assessment of Resource Adequacy Report, WECC found that if a subregion cannot meet its planning reserves from its own resources (which most can't according to WECC's analysis) the load serving entities in that subregion will need to import energy or build more resources. Both of these remedies have associated risks, because neighboring subregions may not have excess power or transmission available to export power, and construction projects may be delayed or cancelled. If these risks materialize, and are not mitigated, there may be hours where demand is at risk of not being served. WECC recommended that planning entities coordinate their resource adequacy planning efforts on a Western Interconnection-wide basis each year to help ensure they are not all relying on the same imports to maintain resource adequacy. This is one of the goals of the Western Resource Adequacy Program currently under development. Such coordination will help the subregions make better assumptions about import availability in the context of the entire interconnection.

In sum, these timely and well-placed analyses underscore a core challenge for the western region: over the coming decade the Western Interconnection will require a vast amount of new clean generation, as well as transmission resources, in order to meet state-level clean energy and environmental policies and growing customer demand. As shown in the "Western Flexibility Assessment," absent significant transmission development, it may not be possible to meet those collective state goals.

COLLABORATING TO MEET THE CHALLENGE

A group of stakeholders from across the West has been collaborating to meet these challenges. This initiative is called the "WIRED Transmission Planning and Development Working Group"; participating stakeholders include:

Balancing Authority of Northern California
Bonneville Power Administration
California Independent System Operator
Colorado Energy Office
Idaho Governor's Office of Energy and Mineral Resources
NV Energy
Nevada Governor's Office of Energy
New Mexico Energy, Minerals, and Natural Resources Department
New Mexico Renewable Energy Transmission Authority
Pacificorp
Public Service of New Mexico (PNM)
Portland General Electric
Puget Sound Energy
Oregon Department of Energy
Utah Office of Energy Development
Western Area Power Administration
Washington State Department of Commerce
Washington Utilities and Transportation Commission
Xcel Energy

This group was convened by the Center for New Energy Economy under the auspices of the WIRED initiative.[7] Their collaboration was facilitated and reported on by Gridworks.[8]

As a foundation for its work, the group reviewed and agreed with the following conclusions about the likely need for future resources, based on the "Western Flexibility Assessment" and other studies:

- *The West can achieve near-term (2026) policy targets with modest curtailments and without major changes to system flexibility. However, over time, policy targets become more difficult to achieve.*
- *Regions will rely heavily on imports/exports to meet flexibility needs and transfers between regions will increase significantly in the coming years. Interregional power flows will change from historic patterns.*
- *By the 2030s, the "flexibility cost" of not having coordinated wholesale markets becomes severe and policy goals may not be attained without more flexibility to the system.*
- *A balanced set of flexibility solutions are likely needed. The urgency in implementing these solutions increases over time. Market coordination, flexibility investments, customer programs and new operational practices are all going to help and are all likely to be required.*
- *The Western transmission system is robust and dynamic, providing value in unanticipated ways. However, more transmission will likely be needed to provide capacity/flexibility to meet long-term policy goals.*

As caveats to these conclusions, some participants suggested that new transmission will definitely be needed (rather than "likely" needed). Others noted that support for these broad conclusions does not imply an endorsement of any particular transmission need or project, relieve anyone from responsibility for creating the need, or suggest any specific responsibility for recovering the costs. Most importantly, participants agreed that better coordination among the states in meeting this challenge represents an opportunity worth seizing.

7 https://cnee.colostate.edu/
8 www.gridworks.org

TRANSMISSION DEVELOPMENT IS NOT WELL COORDINATED WITH THE CURRENT RESOURCE PLANNING FRAMEWORK

DISPERSED RESOURCE PLANNING

The generating resources needed to meet loads are currently secured through a range of planning and procurement processes scattered across over a dozen different jurisdictions:

Balancing Authority	Latest IRP Filing	No. of Customers	Cycle	Service Area	Modeling approach
PNM	Jul 2019	0.525 Million	3 years	Throughout New Mexico including the greater Albuquerque Area	EnCompass, an optimal capacity expansion and production simulation model SERVM, a loss-of-load probability model
PGE	Jan 2021	0.88 Million	2 years	Portland Metropolitan area & northern Willamette Valley	AURORA, Sequioa, ROSE-E (Internal model for capacity expansion)
WAPA-UPGR TSP	N/A	N/A	N/A	MO, ND, SD, NE, IA, and MN in both the Western and Eastern Interconnects.	NERC transmission planning (TPL-001-4) assessments
PacifiCorp	Oct 2019	1.9 million	2 years, off year report	Rocky Mountain Power serves UT, ID and WY, Pacific Power serves OR, WA and CA	PLEXOS LT, TPL-001-4, FAC-013 transfer capability studies
Puget Sound Energy	Apr 2021	1.1 million	4 years, with year 2 report	Primarily in the Puget Sound region of Western WA	AURORA, PLEXOS, Resource Adequacy Model (RAM)
NV Energy	Dec 2019	2.4 million	3 years	Northern and Southern NV including Las Vegas	PLEXOS, Production cost model,Capital Expense Recovery model ("CER")
Idaho Power	Oct 2020	0.5 million	2 years	Southern ID and Eastern OR	AURORA long term capacity expansion (LTCE) model
CAISO	2020/2021	30 million	2 years	About 80% of the state, including the three large IOUs.	Various tools, including capacity expansion and other modeling through E3 "RESOLVE", SERVM and PLEXOS, and other tools
BPA	N/A	N/A	4 years, with year 2 refresh	BPA provides about 28 percent of the electric power used in the Northwest	Capacity Expansion Model, Production Cost Model
Xcel - PSCo	Mar 2021	1.4 million	4 years, unless a waiver	Colorado Front Range and I-70 Mountain Corridor	EnCompass modelling software to model its resource needs and plans

The advantage of this scattered process is that it allows for local autonomy; the challenge is that opportunities to cooperate across the region, which could yield shared benefits, are missed because the processes do not connect with each other.

BOTTOMS-UP TRANSMISSION PLANNING

Pursuant to Federal Energy Regulatory Commission Order 1000, the majority of transmission service providers in the West first conduct transmission planning and development processes to meet their own set of localized needs and benefits. Thereafter, they coordinate those plans within each of the current Regional Planning Groups (RPGs) (Northern Grid, WestConnect and CAISO) to identify a solution to any remaining regional transmission need. Inter-regional proposals (if any) that involve more than one of the RPGs are subsequently assessed by the three RPGs together, as a means of addressing any remaining inter-regional needs, if any are identified.

While this process achieves a baseline level of transmission planning coordination and meets the requirements of FERC Order 1000, it is not designed to provide comprehensive consideration of the resource needs across the greater WECC footprint that may indicate a need for larger-scale transmission development. This current transmission planning regime tends to result in a "bottoms-up" process, which has resulted in few, if any, regional projects, and no inter-regional projects at all within the WECC. The process is inherently incremental, and generally results in local projects that are sufficient to meet current and near-term needs. But it does not consider the WECC-wide diversity of loads and resources, or the need for greater system flexibility as the percentage of renewables on the grid continues to grow.

More coordinated planning and development across the West could provide a platform for considering West-wide needs, blending a larger, more diverse load and generation mix, and achieving the following benefits: enhanced reliability, cost savings, and the facilitation of state environmental, energy policy, and economic development goals. These potential benefits, and key challenges to achieving them, are discussed in the next section.

BENEFITS AND CHALLENGES OF MORE COORDINATED REGIONAL PLANNING

BENEFITS OF COORDINATION

The benefits of better connecting the resource and transmission planning processes might include the development of a higher-level interconnection-wide view of the most desirable (renewable-rich) resource development areas, and a shared understanding of the ability of the current transmission network to connect those resources with loads at different times of the day and year. Increased consistency in planning and modeling approaches should improve model quality and provide a more accurate picture of regional needs—including flexibility needs, improve the ability to meet actual demand under varying conditions, and reduce reliability and economic risks.

Regional coordination on resource planning could be enhanced by the creation of a central repository for proposed and approved IRPs, as well as longer-term state-by-state energy goals. Such a compilation would allow other states and utilities to more easily discern areas of overlap and opportunities for joint action. Such a repository and the work of compiling it cooperatively will be important first steps toward deeper collaboration across the region.

An interconnection-wide process would visualize the region's collective resource needs, taking the various state energy goals into account, and the general time frame associated with those needs. This would help the region understand how existing and new transmission could be optimized. The process could also look at existing permitted line routes, consider whether those lines are needed to achieve state goals, and look for synergies among the participants. The process would provide concrete input into resource plans that could translate into identification and advancement of needed transmission facilities.

Ideally, more collaborative inter-regional transmission analysis would help to determine the most beneficial set of transmission expansions and potential economies of scale or avoided capital for energy resources and transmission, and enhance the ability to meet clean energy goals more economically. While the current planning process in the West focuses on local needs first and seldom takes a broader regional view, this expanded process would make it easier to determine what transmission would be needed to serve the various individual resource plans in a more comprehensive manner.

CHALLENGES OF COORDINATION

Participants collaborating in the creation of this report identified the following factors that influence the achievement of these benefits:

- The dispersed resource planning processes summarized above.
- State preferences/independence in setting the timeline for and magnitude of clean energy goals and resource mix requirements add complexity.
- Integrated Resource Plans (IRPs) are updated frequently (e.g., usually every 2 years) and may change significantly from cycle to cycle.
- Transmission planning horizons often do not align with IRP action plans and purposes, since transmission development may take much longer to develop than generation and may thus fall outside of an IRP action plan horizon.

These factors limit the range of resources that can be meaningfully considered in an IRP solicitation to those that have near-term access to transmission. More remote resources may never have a chance to compete, even if they are economic, because the transmission takes too long to fit into an IRP action plan.

- Transmission permitting activities are duplicative and time consuming, and resource approval requirements and timing can vary both across and within jurisdictions.
- As noted above, the FERC Order 1000 planning process starts with local needs, and considers broader regional needs only when a local solution is not readily available.
- Planning policy direction is often heavily weighted based on quantifiable transmission cost information, as opposed to other more qualitative parameters such as land use impacts, permitting, and the need for resource diversity. These requirements inhibit the development of mutually beneficial transmission across wider areas.
- In the future, with a more renewables-focused supply mix, resource diversity will become increasingly important, along with the transmission capability to move clean energy across the regional network.

Layered on top of these factors is the increased level of uncertainty regarding the future. The energy transition is causing the retirement of a significant number of coal-fired generating plants and the construction of new intermittent renewables. The increasing variability in the system is driving a need to change the way we analyze and plan for resource adequacy. Region-wide, the wholesale electricity market is experiencing tightening supply and increasing volatility, as resource authorizations have fallen behind needs, creating boom and bust cycles that disrupt planned, orderly development. In the Pacific Northwest, the region is starting to experience energy price spikes when there is limited supply. And forward prices at Mid-Columbia and Palo Verde have diverged significantly, which would appear to indicate that transmission constraints are preventing cheaper power from moving to where it is most needed. Finally, beneficial electrification is promising new load, but with uncertain timing and magnitude. There is also great uncertainty regarding future sources of cost-effective but non-emitting dispatchable resources.

ENVISIONING A COORDINATED RESOURCE AND TRANSMISSION PLANNING PROCESS

In November 2020, the WIRED Transmission Planning and Development Working Group endorsed the following principles, which have guided their discussions in 2021:

- Coordinated resource planning during, not after, the development of utility resource plans is critical to unlocking diversity benefits.
- Transmission planning needs to be informed by credible resource planning decisions and should be coordinated directly with those plans.
- Increased consideration of each state's clean energy policies and carbon reduction goals, and the corresponding resource plans of utilities.
- West-wide transmission planning should recognize and coordinate the varied jurisdictional frameworks – i.e., integrated resource planning, FERC-required regional transmission planning, and sub-regional planning groups.
- Cost allocation discussions will need a forum to address specific circumstances and provide mutual assurances of intent.
- New financial mechanisms to support large transmission investments will be necessary.
- While transmission planning will benefit from planning coordination across the region, this does not mean that states need to cede their procurement policy authority.

Building on these principles, the Group collaborated to define a successful western regional transmission planning coordination process as:

- transparent, independent and fair, with adequate representation of the whole region and respect for both state and federal authorities; and
- supported by analytics which are based on clearly defined criteria, based on valid data, and use a risk-based approach.

Participants also identified the following *outcomes* for a successful western regional transmission planning coordination process:

- achieving state goals for energy and the environment, economic development, environmental justice and economic equity,
- developing transmission and generation resources to support reliable, affordable, and safe service in a cost-effective manner, and
- allocating costs for transmission development consistent with cost causation principles.

Of these aims, participants find the following most challenging:

- Subjectivity of resolving cost allocation disputes;
- Successfully defining and pursuing "equity";
- Consistency between advancing equity and cost allocation;
- Respecting state authority and achieving independent outcomes; and
- Being realistic about what can and will be achieved.

Participants are *not aligned* in how they would set a criterion for determining whether a project is economically advantageous.

RECOMMENDATIONS

Participants proposed and evaluated a series of recommendations to kick-start coordination of resource and transmission planning across the region. Their recommendations include:

- The need for better coordinating resource planning and related transmission planning, as a step toward achieving state-specific energy needs and policy objectives. For example, Governors could consider the following ways to promote increased regional coordination:
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  - Establish and maintain a repository of resource plans[11];
  - Similarly, establish and maintain a repository of transmission plans; (Note: engagement with the 3 FERC jurisdictional transmission planning entities was not discussed, yet, merits equal attention. The simulation discussed in the Appendix offers an opportunity for WIRED to engage with the three transmission planning entities.)
  - Analyze the feasibility of the western grid to fully accomodate state resource portfolio goals and utility resource plans, within the constraints of the current and anticipated transmission plans and operations. (A simulation of this feasibility analysis is discussed further in this report; see the Appendix.)

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APPENDIX

WIRED

Transmission Planning and Development Working Group

Proposed Regional Exercise: Simulation of Coordination Between Resource Planning & Transmission Operations

AUGUST 24, 2021 DRAFT

PREFACE

This draft reflects a "work in process,", following the assigning of this task to the "core team" at the conclusion of the July 27 meeting. This draft reflects an unresolved struggle with (a) balancing the complexity of the task with the desire for readily accessible, yet, substantive results, and (b) the "chicken and egg" problem of attempting to describe/design a process and concurrently describe/design a simulation of that process.

The use of the term "simulation" regarding this project is somewhat analogous to the "tabletop" exercise envisioned by the Working Group when it reconvened in May 2021, just with more "heft" (more complete data; more active engagement from key players who can make the simulation meaningful). At a high level, it is also somewhat analogous to the WIEB flexible grid study[13], yet, (a) not meant to be as rigorous of a modeling exercise, and (b) distinct in that it is based upon a resource forecast, which represents utility resource plans and state resource goals, vs. the more comprehensive "Integration Strategies Scenarios" used in the WIEB study. It attempts to describe a sequence of assembling state-based resource assumptions through 2045 and conducting an assessment of the capability of the current Western Interconnection transmission system to support the state resource goals.

BACKGROUND

During the summer of 2021 the Transmission/Resource Planning Working Group has been exploring the need for, benefits of and pathways to improving coordination between utility- and state-level resource planning/goal attainment and regional transmission planning and operations. The exploration was based primarily upon the analysis and conclusions of the WIEB *Western Flexibility Assessment* (Dec. 2019). The Working Group determined that this analysis provided a more complete data set (regarding transmission and resources) than could be compiled quickly by the group members.

The Working Group concluded that while the WIEB report was helpful, it did not sufficiently address the objective of simulating how utility- and state-level resource planning/goal attainment can better coordinate with regional transmission planning and operations.

Thus, the Working Group desires to describe a simulation exercise, garner state government and utility support for it and then initiate the simulation.

13 https://www.westernenergyboard.org/western-flexibility-assessment/

DESCRIBING A REGIONAL COORDINATION SIMULATION

As noted, the desired outcome is to simulate an improved integration of resource-related activities with transmission-related activities. Currently, resource-related activities are (a) utility-initiated resource planning and (b) statutorily directed resource goal setting. Transmission-related activities are the planning and system oversight/operations that occur at the FERC-jurisdictional entity level[14].

Currently resource and transmission-related activities are not explicitly integrated. They occur on distinct time cycles and have different areas of focus. Transmission planning is not necessarily incorporating assumptions for the new generating resources assumed by clean energy goals.

To initiate regional coordination between resources and transmission, an appropriate starting point would be a region-wide assessment of the capabilities of the Western Interconnection grid to support the forecasted generating resources assumed by state clean energy goals. At the resource planning level, the forecast focuses upon load. For the proposed regional exercise, it is recommended that the forecast be upon resources; both in time (when needed to be online) and location (at least locations required to be within each state or that will come from elsewhere within the Interconnection?). Specifically:

- What are the resources, by type and location, anticipated to be connected to the western grid, in 2026 and 2035.15

Also of importance to this resource forecasting is gathering best-available projections concerning each identified resource, including:

- Capacity factor; projected dispatch (utilization profile); retirement date
- Other factors possibly affecting utilization, such as state renewable energy or emissions statutes/policies, or resource adequacy plans.

Much of this data and information is contained in resource plans, although some might be filed under seal. It is envisioned that, withthe support of governors this data and information could be made available to a organization representing the states, tasked with conducting the simulation planning exercise.[16]

This document puts forth an admittedly general scope and objectives. It is envisioned that the regional entity conducting the simulation will refine the scope and objectives.

- Objectives & Expectations: practice an actual engagement (simulated interaction of resource requirements informing transmission planning) between anticipated resources and anticipated transmission operations. Demonstrate this engagement on a WECC-wide level, to the extent possible.
  - Establish the future resource requirements needed to achieve state resource goals at specific future milestones and the associated geographic requirements (how much within each state and how much from elsewhere.) Confirm assumptions for retirement of existing resources.
  - Evaluate capability of current Western Interconnection transmission and estimate needs for additional transfer capacity.
  - Also for consideration: identify state- and regional-level future impediments to achieving resource plans.
  - State policy/statutory goals and a fully functional regional transmission system. One deliverable could be state-specific reports regarding feasibility to achieve combined utility resource plans and/or state resource policy goals within the existing/anticipated transmission system operations. (Similar to the

14 This pertains to the FERC Order 1000 entities in the region: CAISO, Northern Grid and WestConnect.
15 These years are proposed to coincide with the dates used in the WIEB *Western Flexibility Assessment*. Notwithstanding the times in the WIEB study, it may be more practical to use 2031 (ten years out) and 2045 (culmination of most state clean energy transition timelines)
16 This document does not put forth a specific recommendation as to the third-party organization. Given that the focus of the recommendation is the Western Governors Association, and WIEB has a close historical and ongoing relationship with WGA, WIEB might be a logical choice.

WIEB study, yet, with more state specificity as a deliverable…)

- How can state-based planning for resource procurement combine at a regional scale to inform recurring regional transmission plans.
    - This would include a description of challenges for financing new multi-state transmission construction.
    - Summarize challenges for siting and permitting new transmission.

- Actors and Actions:
    - Interested Governors[17] (TBD, but ideally through a sidebar discussion convened during 2021 WGA Winter Meeting (December 9-10, Coronado, CA) call upon state government entities (commissions and policy offices) to contribute resource assumption data and requirements (in time and location)and support available for a simulation.
    - Energy Policy Advisors, commissions (staff and commissioners): recommend entity to assemble resource information and requirements to establish combined resource requirements at the 2026 and 2035, as used in the WIEB grid flexibility report, or other milestones if these are not feasible for simulation.
    - WestConnect, Northern Grid & CAISO: Contribute utility transmission planners to estimate the capabilities and needs for transmission facilities and system operations, and assisting with the simulation.
        - These entities are well-positioned to conduct a (high level) evaluation of anticipated resource forecasts against current transmission system operations.
    - State energy policy advisors and utility management participants use the simulation results to recommend improvements in planning processes
    - [State-designated entity to be determined] — compiles data[18]/informaton and conducts simulation.
        - Convenes state and utility participants to complete a representation of future transmission system needs to achieve state clean energy goals.
        - Convenes state, utility, and other interested participants to 1.) report on outcome of simulation for identifying future transmission needs and 2.) summarize policy considerations for adapting regional transmission planning and addressing issues for financing and siting.
    - [TBD]: A budget and source(s) of funding have not been determined.

CONDUCTING THE REGIONAL SIMULATION

With a region-wide forecast of generation resources, the next step is to overlay those resources on to the western interconnect transmission grid. As noted above, this task will require the FERC jurisdictional entities to assist in the simulation.

The regional simulation, at a macro-level, will overlay the information concerning forecasted resources, assumed geographical locations, energization dates, and their performance characteristics onto the transmission system, as projected to function in 2031 and 2045. This projected functioning will reflect current transmission plans and anticipated corridor modifications (generally), as reflected in approved plans and beyond[19].

17 Note that "Governors" can expand to the relevant Canadian provinces.
18 The data envisioned to be collected may not be accessible to the regional entity conducting the simulations. This may require close coordination, or even reassignment, of some analytical tasks to entities (such as the FERC jurisdictional transmission planning entities) who have access to the necessary data. State-level resource policy information and utility-level resource plans can readily be collected by the regional entity.
19 For example, the WIEB *Western Flexibility Assessment* (Figure 43 on p. 106) identifies "Assumed Transmission Additions in the Integration Strategies Scenario."

A note regarding level of difficulty: This will likely not be an easy task because of the multiple jurisdictions and lack of cohesive modeling capabilities. The regional entity selected to oversee/implement this simulation will frist need to substantially elaborate upon the general description outlined in this document. For example, the simulation modeling will rely predominantly upon proxy data yet, the simulation design will first need to address the implications of such upon the usefulness of the resulting analyese, particularly analyzing across the different jurisdictions.

The simulation will attempt to address the following:

- At a regional level, is the projected transmission system operations sufficient to support the forecasted resource configuration at the selected milestone years?
  - If not, where are deficiencies most likely to occur?
- What is the least-cost approach to achieving transmission system sufficiency (holding constant the resource forecast and associated load forecasts)?
- What alternative approaches to system sufficiency can be identified (e.g., adjusting the resource and/or load forecasts)?
  - For those identified alternatives, can pros and cons also be developed?
- How does this information comport with the conclusions presented in the WIEB *Western Flexibility Assessment* study?

As previously noted, this document functions as a conceptual outline of the envisioned simuation. The document does not begin to address the simulation methodology. That task will follow the refined scoping and agreement upon objectives referenced earlier. To be determined: baseline and milestone years; acceptable use deviations and associated analytical sensitivities.