EXECUTIVE SUMMARY

Implications of a regional resource adequacy program on utility integrated resource planning

Study for the Western United States

Authors:

Juan Pablo Carvallo, Nan Zhang[1], Benjamin D. Leibowicz[1], Thomas Carr[2], Maury Galbraith[2], and Peter H. Larsen

[1]University of Texas, Austin
[2]Western Interstate Energy Board (WIEB)

Energy Analysis and Environmental Impacts Division
Lawrence Berkeley National Laboratory

Electricity Markets and Policy

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Resource adequacy (RA) refers to the ability of an electric power system to meet demands for electricity using its supply-side and demand-side resources (NERC, 2011). Monitoring and maintaining RA is becoming increasingly complex and challenging due to plant retirements and higher penetration of variable renewable energy resources that translate to higher uncertainty with the amount of generation that will be available during periods of peak demand. This challenge is becoming particularly acute in the Western United States due to states' environmental policy objectives and evolving resource economics that are prompting impending retirement of coal plants (NWPCC, 2018). A recent study showed that the Pacific Northwest region (PNW) could present RA issues as early as 2020 and highlighted the need for substantial reform in resource adequacy practices to meet reliability standards in the next decade (E3, 2019).

As a response challenges in the PNW region, the Northwest Power Pool (NWPP) is developing a proposal for a voluntary regional RA program. This regional program may overlap with states' existing integrated resource planning (IRP) processes that also assess and address resource adequacy issues. The NWPP proposal acknowledges this potential overlap, focusing on their differences, and how they complement each other (NWPP, 2019). States exercise control over resource planning through IRP regulations. This paper examines the impact of a regional RA program on electric utility IRP. Additional key questions are how much control over resource adequacy participating utilities will have to relinquish and what the impacts are on other aspects of state energy policy. Accordingly, this paper focuses on how joining a regional RA program may impact electric utility IRP processes and highlights key resource planning components that may be affected.

This paper covers three topic areas in its analysis. First, it documents traditional resource adequacy practices in IRP by examining plans from 11 Western and Midwest U.S. load serving entities (LSEs). Second, it develops a case study of an existing regional RA program that interacts with IRP through report analysis and interviews conducted with Southwest Power Pool staff and state officials. Finally, it presents the NWPP regional resource adequacy proposal that is the object of this work. This paper does not (1) advocate for or against a regional RA program for the NWPP, (2) make detailed design recommendations for this program, or (3) assess its benefits and costs. This paper addresses three research questions:

- How would typical IRP processes change if an LSE joined a regional RA program?
- With a new regional RA program, which RA elements would remain local (i.e. within IRP) and which would become regional (i.e. within the RA program)?
- How much control would LSEs and states retain over their utility resource mixes considering the influence of a regional RA program?

This paper is primarily written for state regulators, public utility commission staff, and resource planners from states in the NWPP footprint that are pondering how their IRP guidelines and regulations may need to adjust to operate jointly with a regional RA program. The content of this paper may also

help the NWPP RA program developer as it interacts with potential member states and utilities to understand what aspects of energy policy may be influenced by the program under development.

How would typical IRP processes change if an LSE joined a regional RA program?

IRP processes will not fundamentally change when an LSE joins a regional RA program. However, some key IRP assumptions or resource adequacy components will be impacted. This report identifies two resource adequacy components of IRP that will be highly impacted: (1) RA targets and (2) resource capacity accreditation. **Resource capacity credit** will require much more alignment between IRP and the NWPP RA program. If IRP and regional RA capacity accreditation for the same resource differ, there is a risk that an LSE would be adequate at the local-level, but not at the regional level. For this reason, the LSE would have to justify additional investment outside its IRP recommendations to comply with regional resource adequacy requirements. Furthermore, states have historically assigned different capacity credit factors for similar resources—especially for wind, solar, and demand response—which may create friction among members if some states recognize higher or lower capacity than others for similar resources. There are at least four resources that will require specific attention for their capacity credit calculation: (1) variable renewable resources, (2) demand-side resources, (3) hydropower, and (4) contracts. It will then be necessary to decide on a **RA target reliability** metric (e.g., a planning reserve margin) that is at least the minimum requirement in IRPs to ensure consistency in RA requirement calculations.

Table ES-1 IRP RA components, impact from a regional RA program on these components, and how control of these components is allocated

IRP RA Component	Report Section	Impact of Regional RA Program on IRP	Control of RA Elements of IRP
RA Reliability Targets	3.1.1	High	Regional
Net Load Forecast	3.1.2		
Load Forecast	3.1.2.1	Medium	Shared
Demand-side Resources	3.1.2.2	Low	Local
Future Resource Portfolio	3.1.3		
Modelling Approach	3.1.3.1	Low	Local
Resource Capacity Credit	3.1.3.2	High	Regional
Market Transactions	3.1.3.3	Low	Local
Transmission Expansion	3.1.4	Medium	Shared
Emerging Technologies	3.1.5	Low	Local
Load Uncertainty	3.2.1	Low	Local
Power Supply Uncertainty	3.2.2	Low	Local
Preferred Portfolio / Utility Resource Mix	Overall	Low	Local

Two IRP components will be moderately impacted by an LSE joining a regional RA program: (1) transmission expansion and (2) load forecasts. **Transmission expansion** studies typically focus on the LSE's local power system and not all IRPs include a regional analysis to gauge the deliverability of

resources outside of the LSE's service territory. These limitations of current IRP processes could hinder the pooling of resource adequacy resources across the NWPP footprint, which is one of the main sources of cost savings. From an IRP perspective, the main challenge will be how to assure that the transmission expansion assumptions built into each IRP are consistent with the assumptions made at the regional-level for RA calculations. **Load forecast** could be delegated to individual LSEs, but the regional RA program would need to standardize its statistical methods and potentially require additional information if regional coincident peak demand were used for RA requirement calculations.

Which RA elements would remain local (i.e. within IRP) and which would become regional (i.e. within a new RA program)?

This report finds that for an efficient and effective operation of a regional RA program, states in the footprint will need to defer to the program's definitions of resource adequacy targets (e.g. the PRM) and resource capacity accreditation. States would effectively surrender control over those two assumptions and let the regional program define them, incorporating them exogenously in their IRP processes. Stakeholder involvement processes will be critical to give states voice in these collaborative decision processes (see Section 7.3.3).

In addition, states will need to develop a shared agreement on the processes to produce load forecasts and to define transmission expansion. These elements could continue to be developed by the LSE under state IRP mandates, but coordination of input data, modeling assumptions, and outcomes will be needed with the regional RA program.

How much control would LSEs and states retain over their utility resource mixes considering the influence of a regional RA program?

In general, FERC guidelines for Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) strive to allow states the right to decide their resource mix. The regional RA program defines the capacity needs to ensure reliability, but does not select the resource employed to meet those needs.

However, an open question closely related to capacity credit determination is how surrendering the control over how much capacity to recognize for certain resources would affect the resource portfolio choices in IRP. As mentioned, states whose power systems are managed by an RTO retain the right to determine their resource mixes. However, the capacity contributions of resources do affect the least-cost calculation and can indirectly impact the resource selection. For example, if a resource's contribution to peak demand were adjusted from 50% to 25% it would require twice the level of investment on that resource to meet the same peak demand contribution. This adjustment would certainly affect the relative economic performance of this resource in a least-cost analysis and subsequently alter the portfolio outcomes.