

ESIG Webinar: Redefining Resource Adequacy	
Question	Answer
Is there any data that shows the increased forced outage rates as a function of temperature?	Yes. In the ESIG whitepaper we used data from three recent events in PJM, MISO, and ERCOT which shows that the weather-driven outages are significantly higher during cold weather events than average GADs data. Another source is a paper in Applied Energy by Sinnott Murphy https://www.esig.energy/wp-content/uploads/2021/08/ESIG-Redefining-Resource-Adequacy-2021.pdf , https://www.sciencedirect.com/science/article/pii/S0306261919321117#f0015
You said that RA metrics should be more "economic" (eg, 0.1 LOLE over procures) but also that Feb. 2021 was a 1-in-50-year event. How do you square those ideas?	High impact low probability events have a very high economic cost, so they should get more weighting in our resource adequacy assessments, hence the use of something like EUE. In general my recommendation is to make the selection of reliability criterion
Do you think the load data grade will stand up to EV growth, and other electrification initiatives?	We certainly, as an industry need more data on load, especially related to trends in increased electrification. Fortunately electrification initiatives will take time to progress, and the end use loads are "smart" so data aggregation should be available. If we are going to rely on demand response and load flexibility for resource adequacy, we also need the same information on "outage rates" and availability that we assign to supply-side generators
Advice on how system planners can communicate about uncertainty and shortfall risk, as the ultimate backup is community resilience (ability to fail safely)?	System planners can provide information on the likely size, frequency, and duration of resource adequacy events, which local emergency response organizations, community developers, btm resource suppliers can use in designing local programs. However, resource adequacy is only one aspect of system reliability, and distribution related outages and storm response are likely a larger piece of the community resilience need.
In your modeling have you delved into utilization/modeling demand response in RA studies? And their capacity accreditation?	Yes, currently short-duration resources have a high capacity accreditation in most places, but this will diminish as the amount of demand response increases (similar to other resources). The important aspect of DR capacity accreditation modeling is to get specifics on the # of calls per year, duration of calls, energy available, and availability rates that vary hourly. This is a key data gap for RA analysis generally.
How does and ISO go about modeling the inability/ ability to import from a neighboring ISO in their RA analysis without a good model of neighboring ISO's?	Generally speaking we need decent representations of neighboring ISOs and balancing authorities. In lieu of that, a statistical representation can be used, but not as useful as a full modeling of neighboring systems.

How do you see the role of the reliability standards organizations like NERC and RES to support resource adequacy requirements? Need for new standards	Right now there are very few standards related to RA. Even the 1-day-in-10 LOLE criteria is a commonly used metric, not a standard. I think NERC has a role in interregional coordination on RA, but ultimately RA is a local/individual ISO/BA requirement. The ENTSO-E resource adequacy process is a good example of this.
considering all these challenges make the system very complicated. How long the simulation would take to get an accurate estimation?	Long. Computational capabilities (high performance computing, parallel processing) is increasingly important for RA modeling.
Is the work you did with the Hawaiian Electric Inst. (linking resource adequacy outputs back to capacity expansion planning inputs) available in a report?	No, but it is included in the IGP work plan, Figure 3-1 https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/20211105_grid_needs_assessment_methodology_review_point_book_1.pdf
How about any changes in thermal unit availability rates as they change their use profile (from base loading to cycling) etc...	In general, increased cycling will increased forced outage rates and planned outage requirements, but data is limited on this. Some of the work on cycling costs from NREL, EPRI, etc. have tried to quantify this. Trends in GADS data can be used as a proxy.
When will DER be fully accepted as a supply side resource and not a load modifier?	It should be today, with all of the "generator" parameters on availability, energy limitations, etc. BTM solar should also be modeled as a supply side resource
is the seasonality in the weather-year graph driven by solar?	Yes, this was from a California example, so the solar seasonality is prominent. The high values in Spring are also a result of increased wind generation.
It will be critical to understand the failure modes for what you want to model. Further what actions can be taken to reduce those failure modes.	Yes, this is one reason I advocate for doing both the probabilistic analysis on RA, but also specific stress testing of system conditions on specific failure modes to gain more detailed insight.
Wouldn't a resource that could do better than the 60mw/2hr or 100mw/2hr resources be able to meet those capacity deficits and more?	Yes, it is just a question of which resource is most economic. Now we have a diverse set of resources to mitigate resource adequacy needs, so we should identify the proper resource given the RA need and economics of the system.
Derek, In your example of solar and storage, what did you assume is charging the solar. Should this be subtracted from the solar contribution? Thanks!	Yes, this is one of the complaints I have of the over-simplified example, it should include storage charging as well.
Where do you see good models for including DERs in Resource Adequacy including demand flexibility and EV energy storage?	I don't have any good examples of this.
Do you see an increasing role for Transactive Energy using Blockchain & other Digital Ledger Technologies?	Maybe, but don't see a real need for this technology yet.