Comments on PJM's Capacity Performance Proposal

PJM Resource Adequacy Critical Issue Fast Track
May 30 / June 1, 2023

The purpose of the capacity market is to provide least-cost resource adequacy.

Approach

To accomplish this, RPM must:

- Credit each resource at its full resource adequacy contribution, but no more.
- Fully align incentives with resource adequacy goals.
- Assign risks to the party best able to manage them, without creating additional risks.

Incremental changes to CP

Claims Capacity Performance has failed are exaggerated.

- CP incentives appear to have been important in avoiding load shed during Elliot
- 1-in-10 means 1-in 10. An emergency once a decade does not mean the market failed.
- But, PJM doesn’t seem to be at the 1-in-100 implied by current reserve margins.

Elliot confirmed long-standing worries about the market design.

- Correlated risks, especially winter performance, are not correctly captured.
- Performance obligations for ELCC resources are incorrect.
- Payment/penalty balance still rewards non-performing resources

We agree with PJM’s approach of updates to CP rather than an entirely new market design. This presentation proposes changes to PJM’s March 29 proposal.

What is Capacity?

We suggest straightforward, consistent definitions:

Capacity is the ability to support resource adequacy.

Capacity is measured in **UCAP**, which is the equivalent resource adequacy benefit of a perfect resource. UCAP is the unit of exchange in the capacity market.

Suppliers offer the physical and operational capabilities of their resource, as defined by their technology and measured in **ICAP**.

Accreditation is the process of determining UCAP from ICAP

Real world resources

Handling the characteristics of real-world resources is a critical part of the market design. This will become more important through the energy transition.

Several approaches have currently in use. An approach that focuses on accreditation works best for reliability while managing risk in the least costly way.

Accreditation	Assign resources a UCAP value that matches their actual capabilities, performance, and risks. Evaluate resource performance against those assumptions. Example: NYISO ELCC
Eligibility	Create bright line criteria for eligibility to provide capacity. Straightforward and supports reliability, but excludes contributions from many resources, and can easily result in discriminatory treatment. Example: DR
Penalties	Ignore some risks in accreditation but penalize resource owners if those risks happen. Directionally correct but imprecise. Increases reliability and financial risk. Example: Gas fuel supply
Accreditation + Penalties	Include risks in accreditation and penalize resource owners if those risks happen. Supports reliability, but double-counts risks, increasing costs. Primary justification for must-offer exception, further increasing costs. Example: PJM ELCC
Neither	Ignore risks in accreditation and hold owners harmless if those risks happen. Example: Startup times under PJM's proposal

ELCC

We support PJM's proposal to move to ELCC for all resource types.

- Bases the market on a direct measure of resource adequacy.
    - Common measure that can be applied to all technologies.
    - PJM's ELCC method weighs resource performance against system risk for each hour of the year. The various time slice approaches appear to be second-best approximations to what we already get with ELCC.
    - 8760 hour energy is not a useful metric.
- Uncertain UCAP due to changing conditions is a real risk, and appropriately placed on the asset owner. States, public power, LSEs and developers retain the ability to manage this through planning.
- Seasonal markets can address issues ELCC doesn't, including variable transmission constraints, providing a clear winterization price signal, and improved handling of planned/maintainaince outages. Seasonal markets should be investigated post-CIFP.

ELCC Risk Modeling

Unrecognized winter supply risk is the biggest flaw in RPM. The new ELCC approach must fix that.

PJM has 86 GW of gas that experiences an unaccounted for 40% outage rate once every 8 years. That suggests RPM is overvaluing the gas fleet by around 4.3 GW and overstating IRM by ~3%.

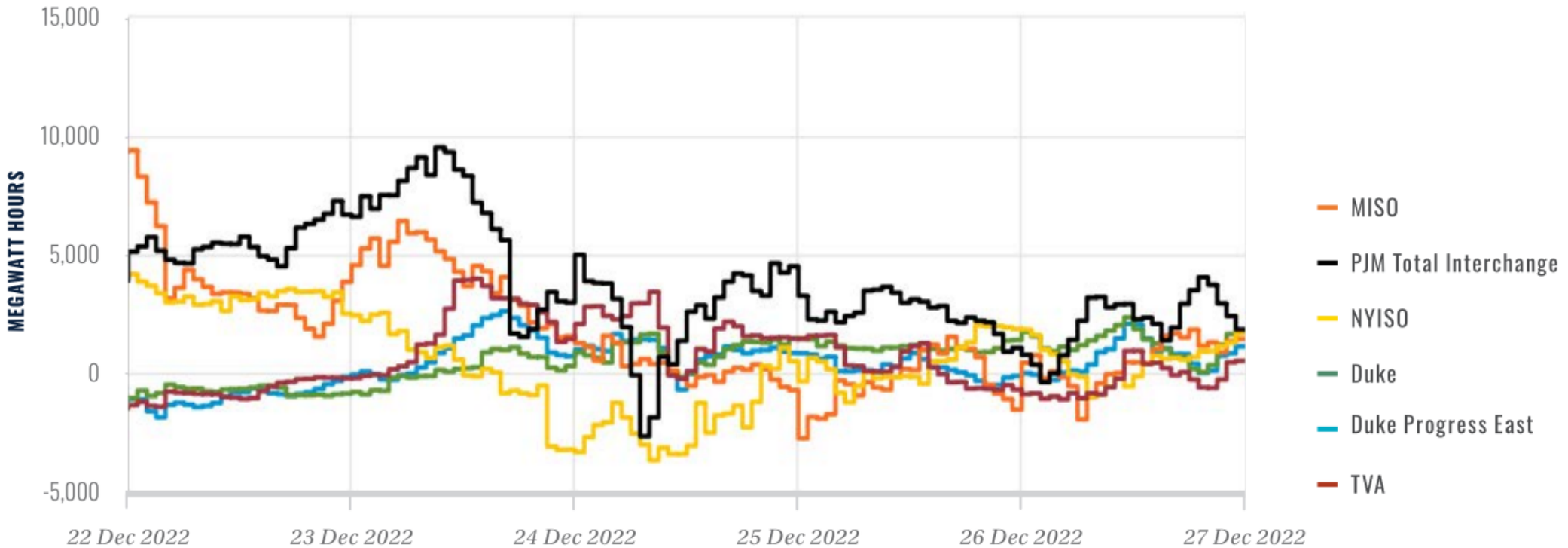
- Actual IRM around 17% more consistent with observed system performance than the nominal IRM of 19.9%
- RPM price suppression on the order of $16 - $20/MW-day.

Response to PJM's Winter Risk Proposal

PJM Proposal	Concern	Suggestion
Characterize risk as a function of temperature	Does not explicitly capture correlated fuel unavailability.	Verify that the model does produce winter days with system-wide gas outages consistent with history, and explicitly model common fuel supply issues if it does not.
Does not specify details of new ELCC categories.	April 13 PC presentation showed very different fuel-related outage rates between dual-fuel (6.9%), firm (26.4%) and non-firm (44.6%). This should be reflected in accreditation.	Create corresponding ELCC classes.
Zero winter value for unwinterized units.	Possibly too aggressive. Assumes 100% correlation between extreme weather and winter risk and 100% failure of unwinterized units.	Take a data-driven approach to winter performance, based either on individual unit historical performance or by further dividing ELCC classes into winterized and non-winterized.

Emergency Imports

Support from NYISO during critical periods of Elliot was right around the assumed 3,500 MW. Firm exports to other regions would have already been accounted for in RPM.



PJM Proposal	Concern	Suggestion
Zero capacity value of imports for planning purposes.	Overly conservative. Current planning procedures already consider diversity (or lack of diversity) between PJM and rest-of-world.	Keep existing CBM/CBOT procedures. Make any necessary adjustments to diversity models outside of CIFT.

Source: The Value of Transmission During Winter storm Elliott (Feb 2023), Goggin and Zimmerman for ACORE.

Treatment of inflexible units

Unit startup times are relevant for resource adequacy.

- In ISO-NE, 8.6 GW (30% of total committed capacity!) was unavailable due to startup time during Dec 24th emergency procedures.
- In PJM, 3 GW of long-lead units were unavailable due to startup time during Elliott.
- Additional PJM plant owners have citied notification constraints due to gas nomination timelines as their reason for Elliott non-performance.

PJM Proposal	Concern	Suggestion
Excuse units not running due to startup or ramp limitations.	This would leave startup times accounted for nowhere in CP.	Incorporate startup, notification, and gas nomination times in accreditation. In ELCC modeling, identify days where real-time load exceeds DA forecast based on historical data. For those days, place units with startup/notification/nomination times greater than criteria on forced outage based on their record of being committed DA on similar load days.

See also: The Impact of Resource Inflexibility on Capacity Accreditation in New England. (March 2023) Synapse Energy Economics for Sierra Club.

Obligations

Under ELCC, many resource performance variations are already ‘priced into’ the UCAP value. Ignoring that when evaluating performance results in either a double-penalty or a bonus for performance that was already expected.

- Creates artificial risk with no resource adequacy benefit. During Elliott, wind and solar in PJM both performed as expected, but solar will face large penalties and wind will enjoy large bonuses.
- This risk is the main justification for the intermittent capacity must-offer exception, which will become less tenable over time.
- Obligates units to provide services they are not getting paid for.

Resources obligations should match the assumptions used to determine their UCAP, excepting items under the resource operator’s short term operational control.

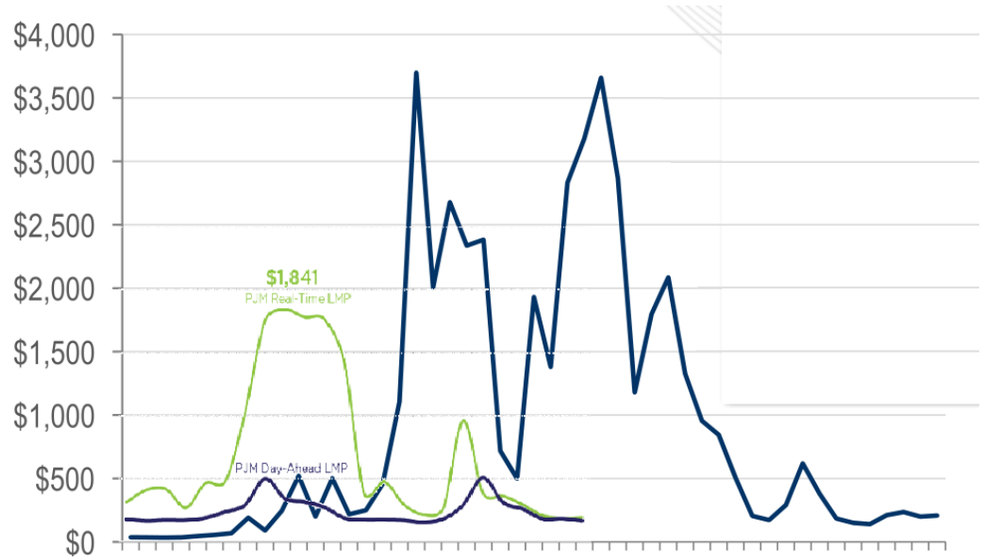
Obligations (2)

PJM Proposal	Concern	Suggestion
Monthly baselines	Imprecise, only partially addresses issues on previous slide.	Except units from most penalties already incorporated in their UCAP. Parameters: for resources discounted based on startup/notification/nomination times, excused as proposed by PJM. Fuel based on accreditation class Non-firm: Excused during pipeline offtake restrictions, but not for economics Firm: Excused during pipeline *force majeure*. Dual-fuel: Not excused. Intermittents: expected performance based on ICAP and wind/sun/water conditions during PAI. Storage: MWh corresponding to class and ICAP available for dispatch. Other forced outages: retain current eFORd and obligation at UCAP.

Penalty Allocation

We propose that collected Capacity Performance penalties be returned to load as credits to capacity charges.

- Since Capacity Performance was instituted, energy price formation has changed significantly.
- Load are the ones not getting what they paid for.



PJM Proposal	Concern	Suggestion
Status quo	Creates windfall and no longer needed to support reliability.	Collected CP penalties credited to load capacity charges: • First to LSEs that shed load up full CP per MWh penalty rate. • Remainder by LDA

Marginal ELCC

Because most marginal ELCC approaches accredit an entire resource class based on the value of the last (or next) unit, the total accredited UCAP of a class will be less than its actual resource adequacy contribution. This is similar but opposite to how marginal line losses results in overcollection.

This creates three problems for the capacity market:

- How to allocate the resource adequacy surplus? In NYISO, it is simply reflected in a reduction in system ICAP requirements. While this may be appropriate for a single-state RTO, it creates multiple problems in PJM:
    - A LSE that has arranged sufficient capacity to serve its load may end up with a financial deficit or surplus.
    - Reliability benefits of state investments in ELCC resources will be transferred to other states.
- If performance obligations remain based on UCAP, the system will be dependent on energy nobody is obligated to provide.
- If the resource mix that clears an auction is not the same as the one that was used to determine ELCC values, results will be inaccurate.
    - Similar outcomes to the DPL-S situation, but on a larger scale and with both reliability and financial implications.
    - Incorrect price signals, sometimes dramatically so. At the extreme, when the marginal ELCC of a class drops to near zero, no resources in that class with non-zero offers will clear.

We believe PJM must address all three of these design issues before recommending a marginal ELCC approach.