Seasonality Construct– Jurisdictional Review

July 10,2017

Outline

- Background and Motivation
- Jurisdictional Review
- Summary: Potential Benefits

PJM Loads are Seasonal. Why?

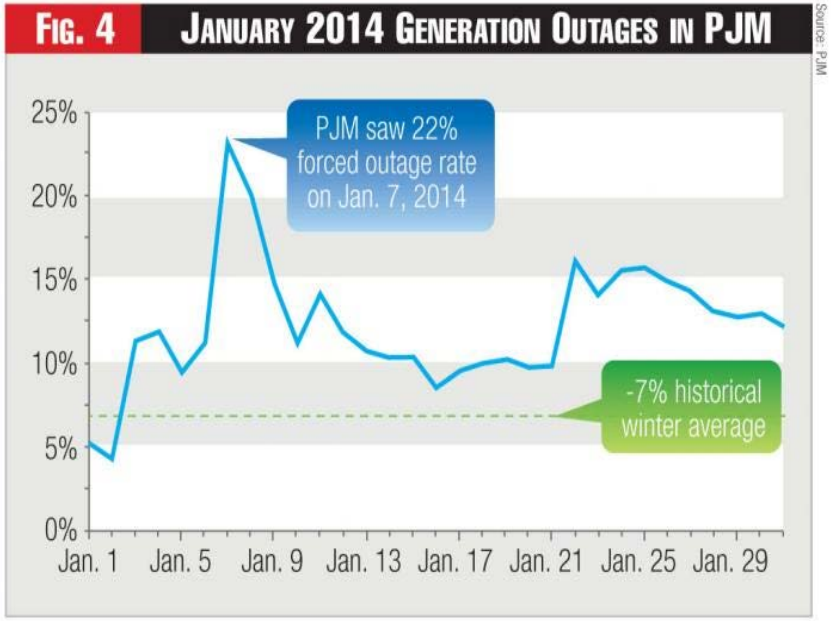
- Summer median (P50) and summer “extreme” (P90/P10) peaks are well above the Winter P50 and P90/P10 peaks
- A few zones are winter peaking
- Peaks in the Spring and Fall seasons are lower
- Seasonality construct mainly focuses on the “extreme” (P90/P10) peaks, as these values, more than the P50 peaks, determine the amount of capacity for resource adequacy

Capacity Market Objective:
Resource adequacy requires sufficient committed capacity all year (in all seasons)

Source: 2016 PJM Load Forecast Report, Tables B-1, B-2, D-1, D-2

The Seasonal Aspect Has Become More Important

- For many years, resource adequacy was based on LOLE in summer.
- More recently:
  - Polar vortex wake-up call on value of winter capacity
  - Increasing penetration of inherently seasonal resources: demand response, gas-fired generation with winter fuel challenges (do we have this challenge in Alberta?), energy efficiency, wind, solar
- Seasonal price signals are valuable to guide decisions about seasonal resources and service



PJM: Past Approach

- Constant reliability requirements/VRR curves for entire Delivery Year.
  - **Generation** may offer capacity by season, with separate offer prices for each season, or for the entire Delivery Year with a single offer price.
  - **Demand Response** was a summer product; Offered and cleared for the summer would be automatically included in other seasons at zero price.
- **Objective function** for clearing algorithm was to minimize cost, over the entire Delivery Year, of procuring capacity needed to satisfy reliability requirement.
  - **Separate Resource Clearing Prices** and Zonal Capacity Prices calculated for each season.

Source: Seasonal Capacity Market: Past Discussions in PJM- May 25, 2016

PJM Current Status

- As of the May 2017 capacity auction for the 2020/2021 delivery year, all PJM capacity resources must meet the Capacity Performance requirement of year round availability.
- Capacity Performance rules permit non-annual resources to combine their capabilities and offer into the auction as a single, aggregated Capacity Performance resource.
  - Aggregation provides an opportunity for renewable resources and demand response resources to build on each resource's capabilities to enhance the capacity value of each resource.

Source:
http://www.pjm.com/~/media/about-pjm/newsroom/fact-sheets/20161107-view-point-filing-capacity-performance-seasonal-resources.ashx

Seasonal-Capacity should be fair…

- Under the proposed changes, summer-only and winter-only resources would be able to pair together as a qualifying bid, and aggregation of resources across the grid's footprint would be allowed.
- But because demand response resources tend to focus on summer peaking, requirements that they be available in winter as well were effectively poised to shut out some bids.

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Filing calls PJM seasonal-capacity rules unfair

January 03, 2017

Printer-Friendly Format

Next capacity auction would bar seasonal resources

American Municipal Power (AMP), Direct Energy Business and Old Dominion Electric Co-operative (ODEC) filed a complaint against PJM just before the holidays alleging the RTO's rules are unfair since the next capacity auction will effectively bar seasonal capacity resources. PJM itself filed rule changes before its next auction aimed at loosening aggregation rules (PMT, Dec-12), but that proposal did not go far enough for the complainants.

Seasonal resources include DR, intermittent renewable resources, storage, efficiency and environmentally limited resources. The 2020/2021 auction will be the first where all capacity has to satisfy capacity performance standards and – as the auctions leading up to that year have shown – most seasonal resources have been clearing as "base capacity."

The RTO's aggregation rules were meant to automatically link summer and winter capacity resources to help keep them in the market.

The complaint seeks to keep a chunk of the capacity market as base capacity so seasonal resources can continue contributing to reliability in PJM, but it is not seeking to undo the fundamental components of capacity performance for all resources, the complaint from AMP, Direct and ODEC said. "While complainants note herein the departure from reality of PJM's CP mechanism (which relies upon the myth that an identifiable set of resources that are available 24 hours, 365 days a year exists), we are not seeking here to revise those rules for all resources," it added.

Other ISOs

- **ISO-NE** has an annual construct and is implementing the **"Pay-for-Performance" feature** that is intended to support resource adequacy and improve performance during reliability events in all seasons.
- **NYISO** has separate summer and winter capability periods in its capacity market
  - The requirement in both seasons is the same, reflecting summer peak load
  - Annual, seasonal, and monthly markets

Other ISOs

- **MISO** Seasonal Market:
  - LOLE criterion (events/year) of 0.1 for summer and 0.01 for winter and establish 'separate' summer and winter Planning Reserve Margin requirements.
  - Use of seasonal outage rates.
  - Single auction to procure capacity for the entire year with seasonal offers or one offer for the entire year.
  - Expected implementation: 2018/19.

Source:
https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/LOLEWG/2015/20151202/20151202%20LOLEWGSAWG%20Joint%20Meeting%20Item%2011%20Seasonal%20Detailed%20Design%20Document.pdf

Other Design Elements That Could Be Adapted

- Two seasons, each with a separate Reliability Requirements
- In base auctions, use two sloped demand curves to acquire capacity to meet the two seasonal requirements
- Most resources likely submit “Annual” offers with no seasonal aspect
- All resources permitted to reflect seasonality in their offers
  - Seasonal rating (UCAP – unforced capacity)
  - Seasonal costs and risks – minimum summer, winter prices
  - Subject to must-offer requirement and offer price caps

Other Design Elements That Could Be Adapted

- Other Seasonal Features:
  - VRR curve parameters (especially Net CONE) for Winter season
  - VRR Inflection points
  - Pool-Wide Average EFORd

Summary

- Allows tailoring capacity quantity to seasonal needs
  - PJM Example: “Wind generators, whose capacity is greater in the winter, combined through the auction clearing mechanism with demand response and solar resources, whose capacity is greater in the summer.”
- Creates separate price signals for incremental summer, winter MW
- More consistent with seasonal capacity constructs in neighboring regions (NYISO, MISO (proposed), IESO (proposed))
- More complexity!

Thank You!

- Please contact if you have any question or comment:
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