

LAS Meeting

November 2, 2026

CRA Charles River Associates

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Meeting Agenda

Topic
Methodology Updates
Moratorium Assessment
Results
Scenarios and Sensitivities
Break
Q&A
Next Steps & Close

PJM data center capacity & peak demand forecast

CRA's independent, hourly load forecast for PJM (2027–2047).

PROJECT SCOPE

Independent PJM-wide data center forecast with hourly load profiles and explicit uncertainty quantification, integrating bottom-up project intelligence with top-down market analysis to support transmission planning, reliability, and resource adequacy.

Horizon	**2027–2047**
Region	**PJM**
Method	**Bottom-up / Top-down**
Timeline	**May–Oct 2026**

UPDATES FROM PRIOR PRESENTATIONS

- **Updated power-availability assumptions**
- **Incorporated and reviewed the latest EDC/LSE submissions**
- **Completed top-down/bottom-up reconciliation**
- **Finalized hourly profiles and scenarios**
- **Final forecast results presented today**

METHODOLOGY STEPS

1. **Top-down Demand and Constraint Modeling.** Start with unconstrained demand but forecast what can materialize. National AI and non-AI demand is tested against semiconductor, infrastructure, and supply-chain constraints. The PJM share of national demand is then estimated over time using third-party data on data center load share by geography.

2. **Bottom-Up: Site-level project pipeline scored on siting favorability and developer readiness.** CRA reconciles PJM/EDC/LSE and commercial project data, distinguishes project maturity based on contractual stage and permitting status, and evaluates whether any projects are under moratorium. PJM headroom for supporting new load at 1-in-10 reliability, along with on-site generation build limits for hybrid or off-grid data centers, are quantified to identify how much load could realistically come on the system.

3. **Reconciliation: Data center demand is the blended average of top-down and bottom-up forecasts.** The load that is ready to come on the system, adjusted for PJM headroom, is blended with the PJM share of projected national AI adoption to set a demand. Projects are then allocated to meet demand. Top-down determines scale; bottom-up determines location and timing. We assume that existing projects receive priority to ramp before new projects are added when the PJM headroom constraint is binding.

4. **Hourly forecasts** translate forecasted data-center capacity into hourly demand profiles by zone and power configuration type, incorporating stochastic variation and changes in load factors and operating patterns over time. BTM generation and other supply-side effects are not netted from the hourly data-center demand forecast shown here.

5. **Scenarios** capture alternative paths for data-center growth. Scenarios test different assumptions around AI adoption, efficiency, power availability, infrastructure, and supply-chain constraints to show how demand could evolve under different plausible futures.

CRA is independent and unbiased across utility and data center clients — rigorous screening, neutral data sources, and top-down/bottom-up reconciliation ensure transparent, defensible results.

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Updated power-availability assumptions in PJM

Updates apply through 2031; long-term methodology (LTCE with build limits) is unchanged

Updated Topic	August LAS Assumption	Updated Forecast	Rationale
Reliability Resource Initiative (RRI)	RRI projects treated like other Transition Cycle projects, with technology-specific dropout rates applied	All active RRI projects included at full listed capacity, with no dropout applied	RRI projects were selected through a reliability-focused screen and have continued to advanced with PJM-provided CODs, which supports treating all remaining projects as fully committed
Expedited Interconnection Track (EIT)	Not included; no project-level detail was available	Four EIT projects included, adding about 2.6 GW ICAP in 2029	Capacity, zone, and COD available for specific projects; these projects demonstrate certified schedule to meet COD within 36 months of application
Homer City	Treated with other Cycle 1 submissions, with additions after 2030	Commercial operation assumed in late 2029	Active construction and public project milestones support a COD before 2030

CRA reviewed EDC/LSE submissions and adjusted the pipeline for project materialization risk using key development criteria

Project Risk Assessment



Contractual commitments: Status and extent of financial backing



In-service date (ISD): Near-term versus longer-term project timing



Binding agreements: Signed customer ESAs/LSAs and extent of binding obligations



Permitting: Potential constraints from local restrictions and zoning requirements

Increasingly important risk

Resulting Pipeline Adjustments

The adjusted pipeline groups projects into the following tiers based on assessed risk:

Tier 1 (Early-Stage) – Projects not fully permitted but with signed LOA and in areas with local moratoriums, or with an in-service date (ISD) beyond 2035

Tier 2 (Advancing) – Construction commitments (ISD: ≤2035) or ESAs (ISD: 2030-2035). Permits may not be fully issued (in state or local review)

Tier 3 (Deployment-Ready) – Permits issued, high probability of materialization, signed ESA, imminent ISD

Tier 4 (Operating) – Existing / already constructed data centers

Removed - *Projects not fully permitted or in review, no firm contract, or in areas with active local moratoriums*

Top-down market analysis is combined with project-level EDC/LSE data and PJM power constraints to determine an annual demand

EDC/LSE Submissions › Project likelihood screening › 1-in-10 PJM headroom screen

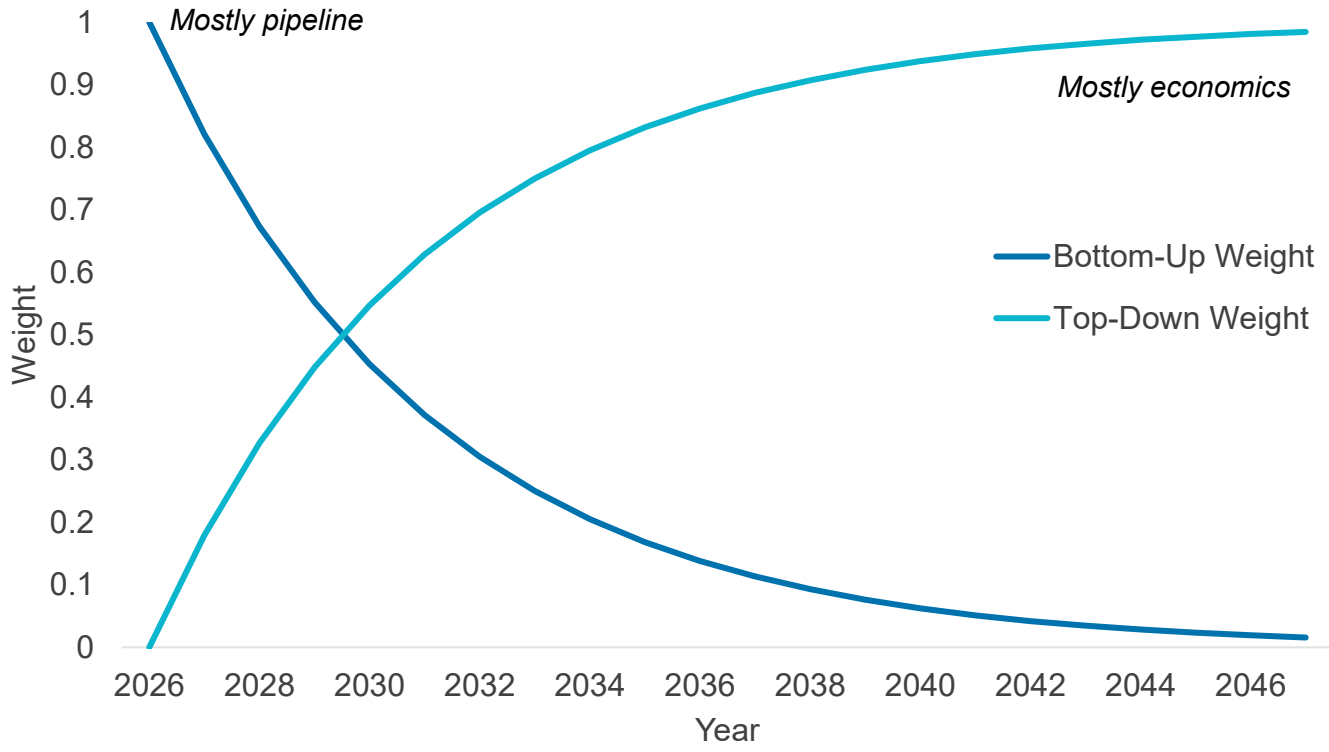
- Planned data centers are input from EDC/LSE submissions
- Projects with an ESA/CC and progress on permits are kept
- Given the assumed 99.999% reliability preference in the hard-constraint case, bottom-up demand is constrained by PJM headroom for 1-in-10; load with on-site generation does not contribute to peak

Output: **Annual Bottom-Up Implied Load**

National AI Demand › Material and Supply Chain Constraints › PJM Allocation

- National AI demand is estimated using non-AI, AI training, and AI inference projections
- Demand is adjusted based on supply chain limitations
- The historically observed PJM market share is assumed to be preserved, maintaining 39.9% of U.S. load[1]

Output: **Annual Top-Down Implied Load**



The LAS submission are the best view of demand in PJM. However, they are a snapshot in time ***today***. Long-term dynamics are driven by economic factors (e.g., AI adoption and supply chains) that we assume the future pipeline will conform to. Weights are therefore biased to the pipeline at forecast start and decay over time to favor economics.

[1] *PJM share was determined based on the national fraction of operating data center power that is in PJM, with demand data retrieved from datacenterHawk.*

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CRA's pipeline adjustments reflect growing concerns over state and local moratoriums

A data center moratorium refers to a temporary hold or pause imposed by a state or local government on data center construction, which often include officials ceasing on issuing permits, zoning approvals and other authorization documents.

State-Level Moratoriums

- As of June 2026, 13 states had introduced proposals for statewide data center moratoriums.[1]
  - New York is the only state with a statewide moratorium in place on new, large-scale hyperscale data centers (EO No. 62)
- Alaska and West Virginia are the only states with no restrictions on record.

Local Moratoriums[2]

- Rather than waiting for statewide regulation, local authorities are intervening while they assess the potential impact of proposed developments. In fact, 294 local moratoriums and bans were passed between January – July 2026.[2]
- Four states account for 35% of all local moratoriums, the most within Ohio, following by Michigan, Georgia and North Carolina.
- New Jersey has the highest number of permanent data center bans.
- Virginia, Pennsylvania and Illinois have all seen an increase in the number of local moratoriums as well as broader governor actions:
  - Governor Spanberger (VA) signed EO 22 in Sept 2026 which introduces a comprehensive data center framework tightening local approval, cost-allocation, environmental and energy requirements, including removal of by-right approval for >25 MW facilities and restrictions on fast-track permitting.
  - Governor Shapiro (PA) signed EO 2026-05 in Aug 2026 which requires data centers to secure local approvals and make binding commitments to GRID standards before DEP will review permit applications, while also removing projects from fast-track permitting.
  - Governor Pritzker (IL) directed the IL Department of Commerce and Economic Opportunity to pause all new data center tax agreements and urged lawmakers to pass new data center reforms during the fall veto session.

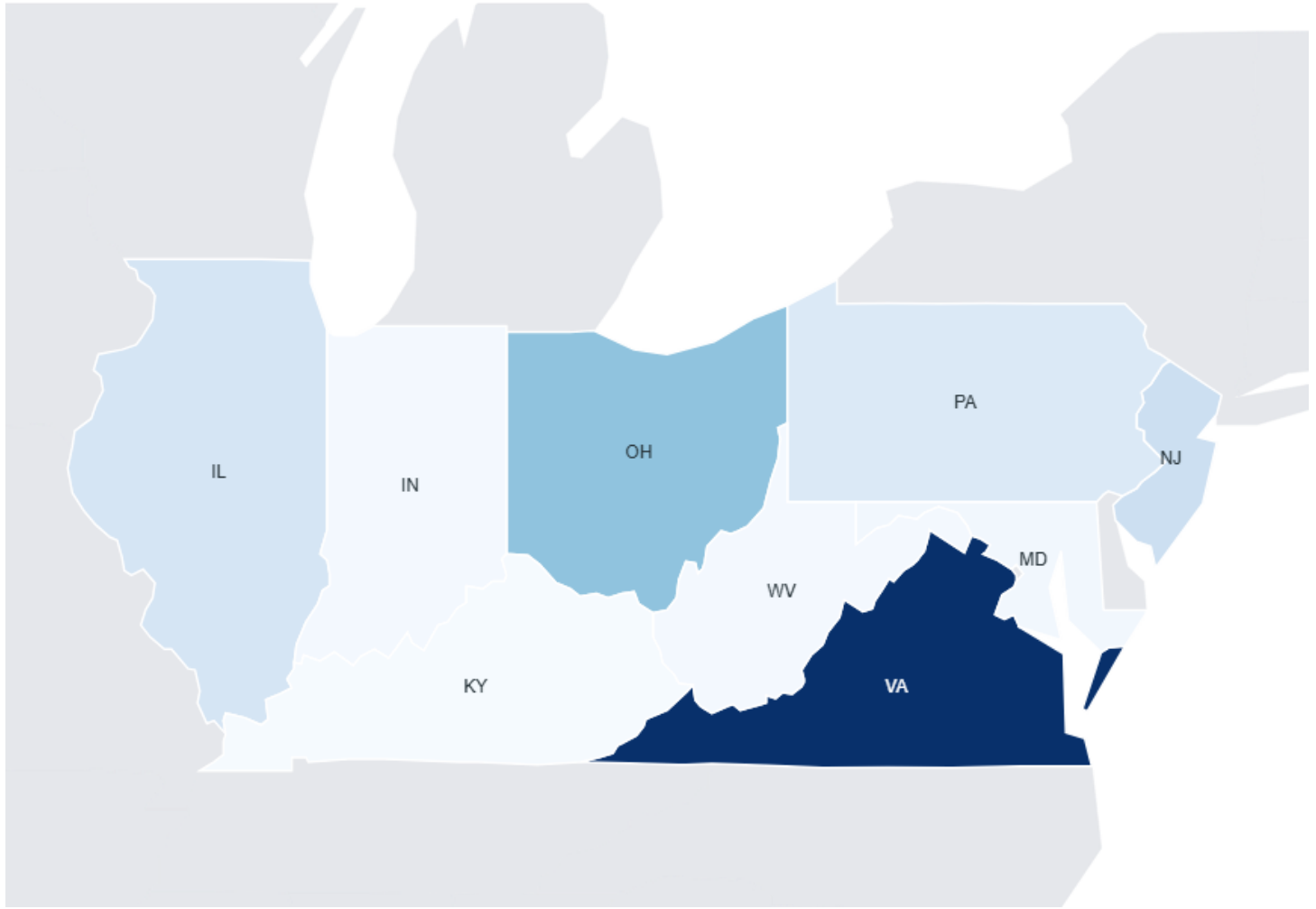
1 - https://programs.com/resources/data-center-moratoriums-tracker, Last updated October 25, 2026
2 - https://www.spglobal.com/market-intelligence/en/news-insights/articles/2026/10/data-center-backlash-shapes-midterm-ballots-campaigns-across-us-106324121

Permitting barriers can delay data center projects or shift demand to other locations, affecting when and where demand is realized

Permitting uncertainty and restrictive local development requirements can reduce a location's attractiveness by extending delivery timelines, increasing costs and raising the risk that a project cannot proceed. Developers may therefore favor alternative sites with adequate power and more predictable approval pathways, shifting where data center demand is realized.

- **Difficult permitting can redirect investment.** Developers may favor locations with adequate power and more predictable approvals, shifting where data center demand is realized.
- **Moratoriums and lengthy reviews extend development timelines.** Pauses on covered approvals, public hearings and additional review cycles can push back construction and delivery of usable capacity.
- **Zoning changes can increase costs and reduce site feasibility.** Setbacks, design requirements and restrictions on permitted locations can require redesign, reduce developable acreage or make a site unsuitable.
- **Community opposition adds uncertainty and can cause withdrawal.** Microsoft abandoned its proposed Caledonia site in WI following community feedback while remaining committed to investing elsewhere in the region.
- **Together, these factors raise costs, lengthen timelines and reduce the likelihood that announced projects proceed as planned.** Foley's survey found that 48% of respondents identified regulatory/permitting as the stage where deals most commonly stall or break down due to insufficient stakeholder collaboration.

Most data center projects in the pipeline[1] are concentrated in VA, OH, NJ, IL and PA, with OH and NJ having the highest number of local moratoriums and bans since 2022[2]



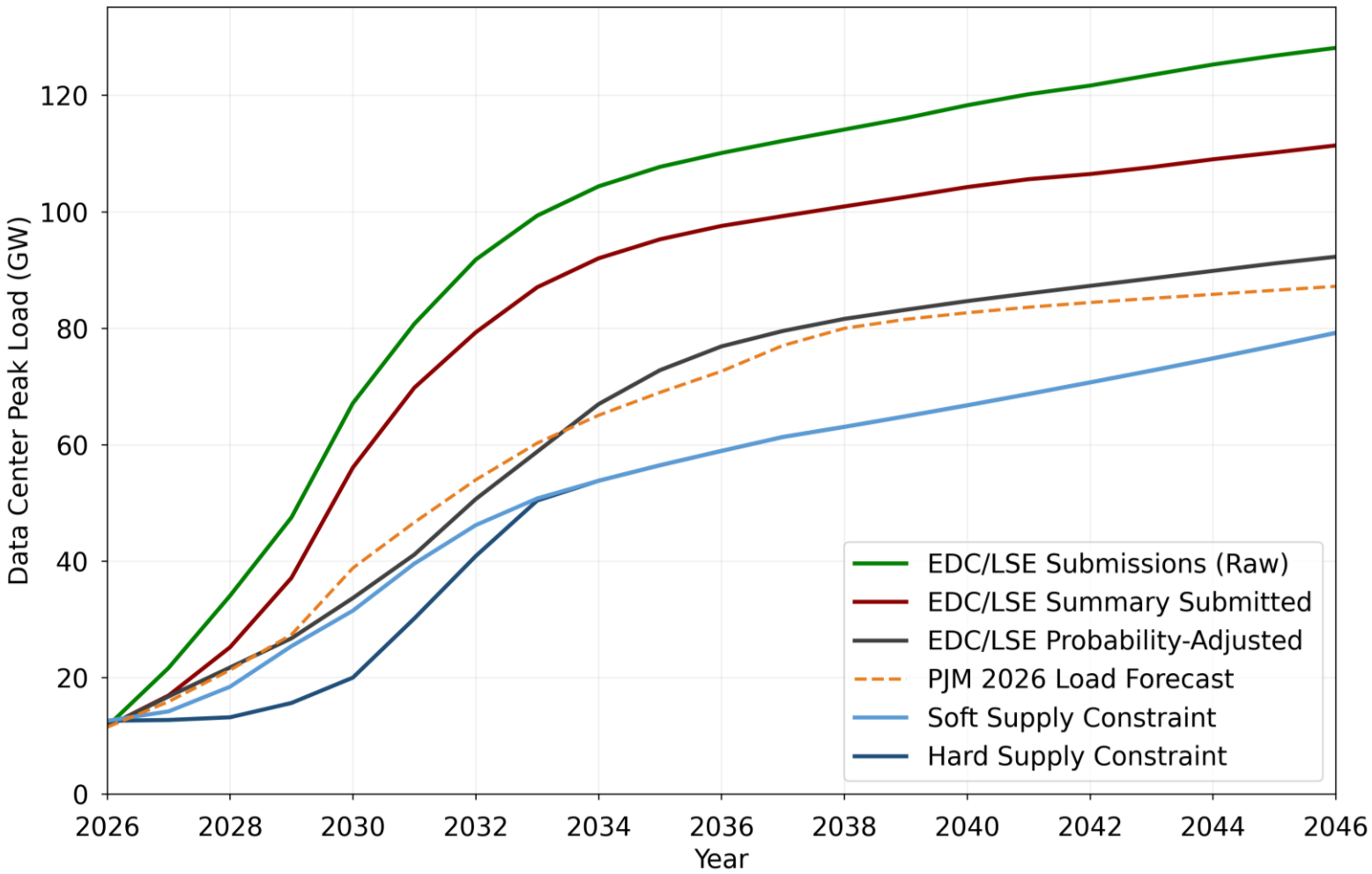
State	Number of Projects	Number of Local Moratoriums and Bans since '22
Virginia	196	5
Ohio	80	94
New Jersey	43	66
Illinois	34	21
Pennsylvania	28	6
Maryland	6	18
Indiana	4	34
West Virginia	4	0
Kentucky	2	28

1 - The Pipeline refers to utility planned data centers submissions and third-party hybrid and BTM data centers
2 - https://programs.com/resources/data-center-moratoriums-tracker, last updated October 25, 2026

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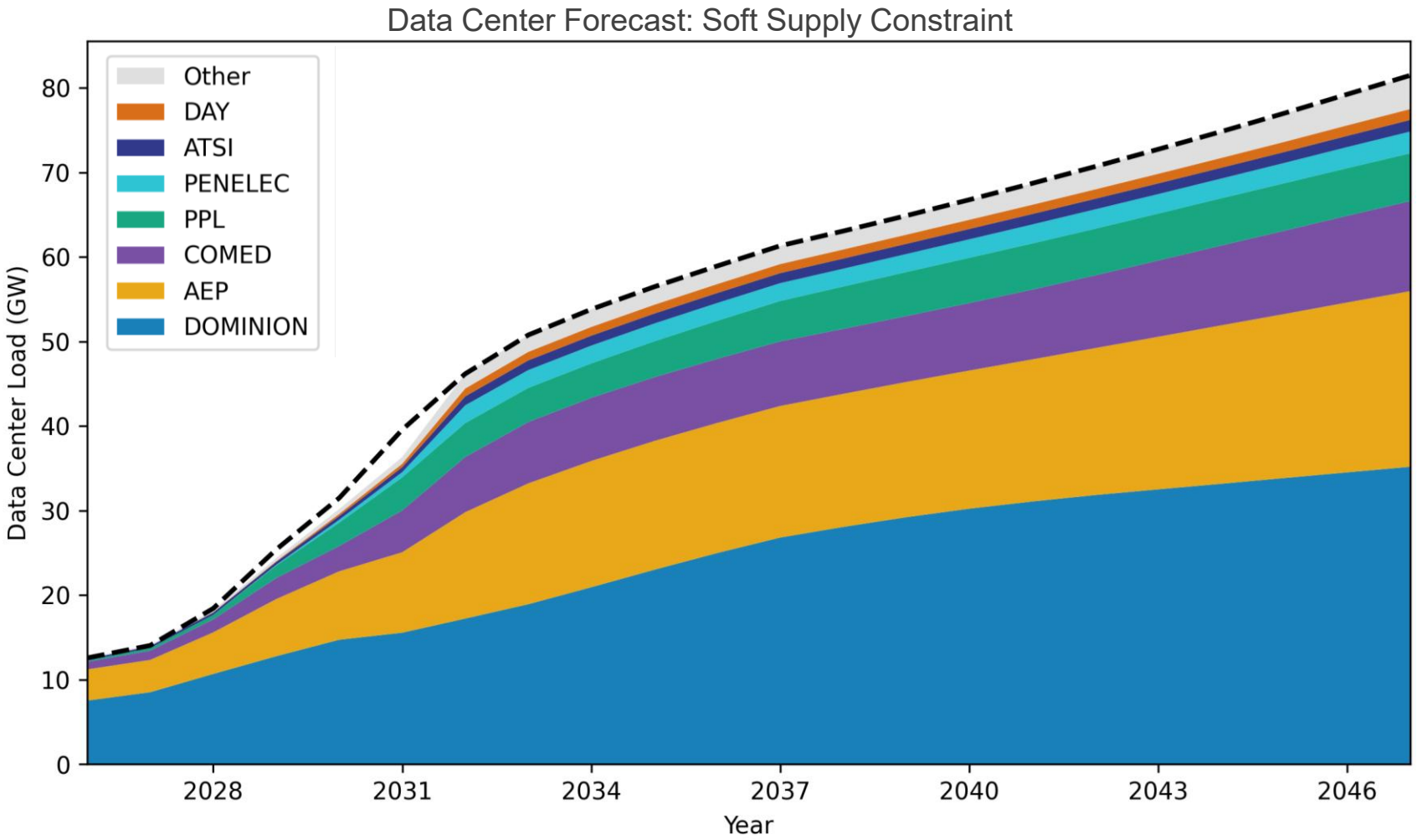
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Data center demand forecast: comparison of alternative trajectories



- **EDC/LSE Submissions (Green):** Unadjusted aggregate data center demand from EDC/LSE submissions.
- **EDC/LSE Requests (Red):** Requested power from PJM by each EDC/LSE.
- **EDC/LSE Probability-Adjusted Submissions (Dark Grey):** Aggregated demand adjusted for probability of materialization and delay.
- **PJM 2026 Load Forecast (Dashed Orange):** PJM's published forecast for comparison.
- **Soft Supply Constraint (Light Blue):** CRA's reconciled top-down and bottom-up demand forecast.
- **Hard Supply Constraint (Dark Blue):** CRA's power-constrained base forecast, reflecting planned generation additions, current regulations, behind-the-meter generation offsets, and 1-in-10 reliability.

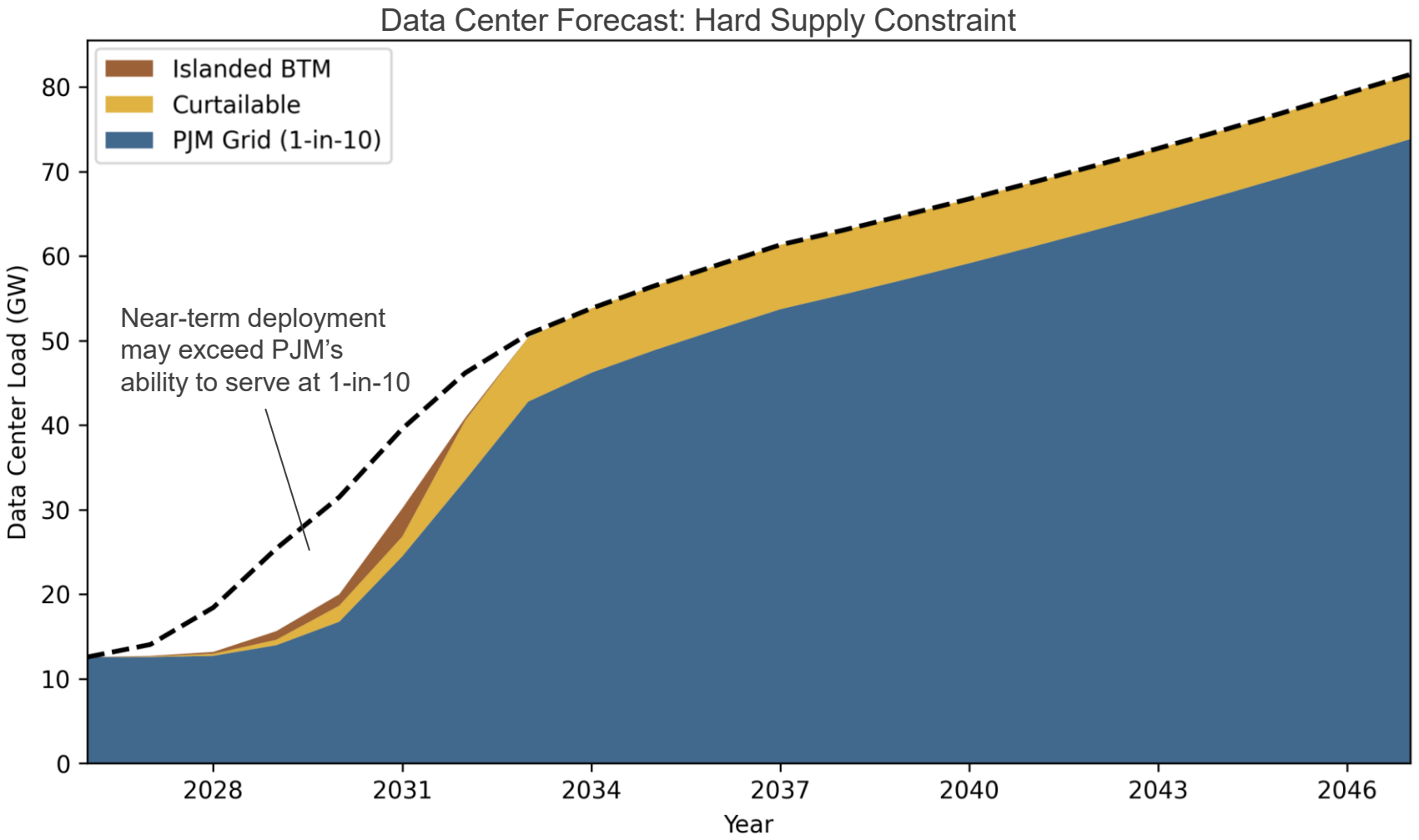
PJM data center demand reaches 30 GW by 2030 and 82 GW by 2047, concentrated in Dominion and AEP



- *Soft Supply Constraint* assumes that projects deploy beyond PJM's ability to support at 1-in-10.
- Dominion and AEP comprise the largest share of demand given pipeline size and existing deployed data centers.
- PPL and ComEd represent important secondary markets that grow substantially in the 2030s.

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Absent faster supply additions, PJM could face a ~11.5 GW shortfall by 2030



- *Hard Supply Constraint* represents how deployment would occur if 1-in-10 reliability were binding, identifying the generation gap existing across zones.
- Supply may not keep pace with projected demand under status quo assumptions.
- Additional policy or market action could increase the demand served at 1-in-10, reducing the gap.
- Curtailable load with on-site generation (gold segment) is assumed not to contribute to peak. Rules for how that curtailment would work are still being defined.

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Impact of Scenarios

Using scenarios can illustrate how demand growth and constraints interact under different states of the world, how quickly constraints relax, and therefore how much national demand can realistically translate into regional load.

State of the World	Constraint Environment	Impact on Forecast
Base *Baseline power and adoption assumptions*	AI adoption continues, but power, supply chain, and siting constraints slow realization. Going forward, new infrastructure accelerates beyond current rates.	*Demand grows steadily, but constraints cap near-term load realization and push some growth into later years.*
Abundance *More generation added than base*	Infrastructure, compute, and power constraints are relaxed faster than base case expectation	*Faster load growth enabled by fewer binding constraints on realizing demand.*
Constrained *Less generation added than base*	AI demand remains strong, but power availability and interconnection remain severely constrained (current rates remain), particularly in legacy markets. This forces efficiency gains in AI adoption	*National demand exists, but regional load realization is significantly limited by deliverability, cost, and timing of power. Data centers are likely to increasingly shift toward emerging and tertiary markets.*
Low Adoption *U.S. AI adoption is lower than expected*	AI adoption is more measured due to cost, use-case uncertainty, efficiency improvements, or customer adoption friction.	*Lower overall demand trajectory, with less pressure on infrastructure constraints and slower regional siting.*

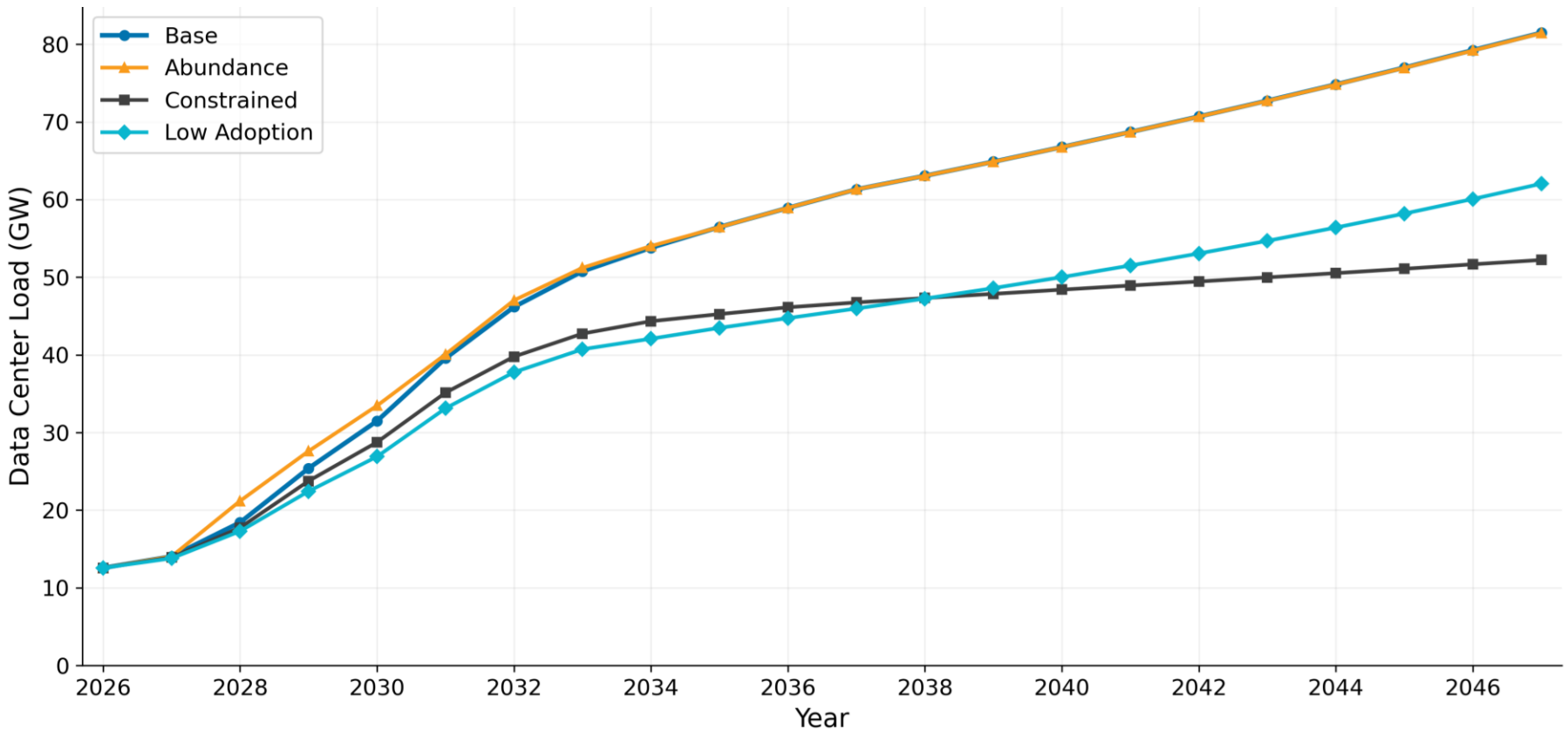
Scenarios test a range of internally consistent outcomes across power supply and AI adoption

Scenario	Supply-Demand Outlook	AI Adoption	AI Efficiency	BTM Generation
Abundance *More generation added than base*	More generation added than base	Same as base	Same as base	Same availability as base
Constrained *Less generation added than base*	Less generation added than base	Same as base	Incentivized to innovate: Increased efficiency gains	Build limits tighten
Low Adoption *US AI adoption is lower than expected*	Same as base	Lower adoption rate than base case	Same as base	Same availability as base

Most significant implication

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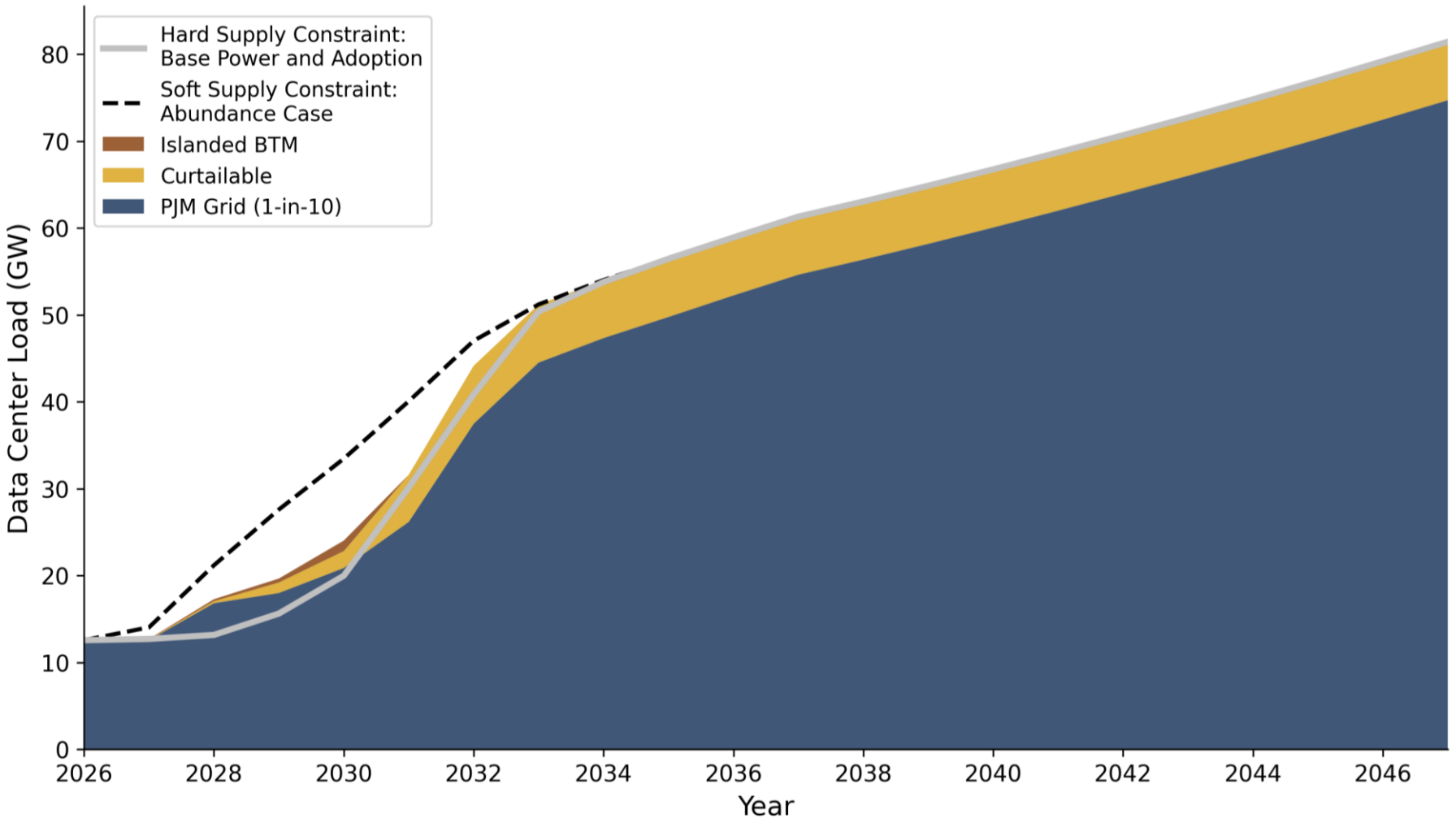
Additional near-term generation buildout can increase PJM demand. Constrained generation additions cause demand to plateau



- PJM data center demand under ***Soft Supply Constraints*** varies by scenario. Uncertainty spans 6.6 GW in 2030 and 29.3 GW in 2047.
- Near-term generation additions increase the *Abundance* demand relative to the *Constrained* scenario.
- Constrained power represents the most pessimistic long-term view of data center load and implies permanently lost market share.

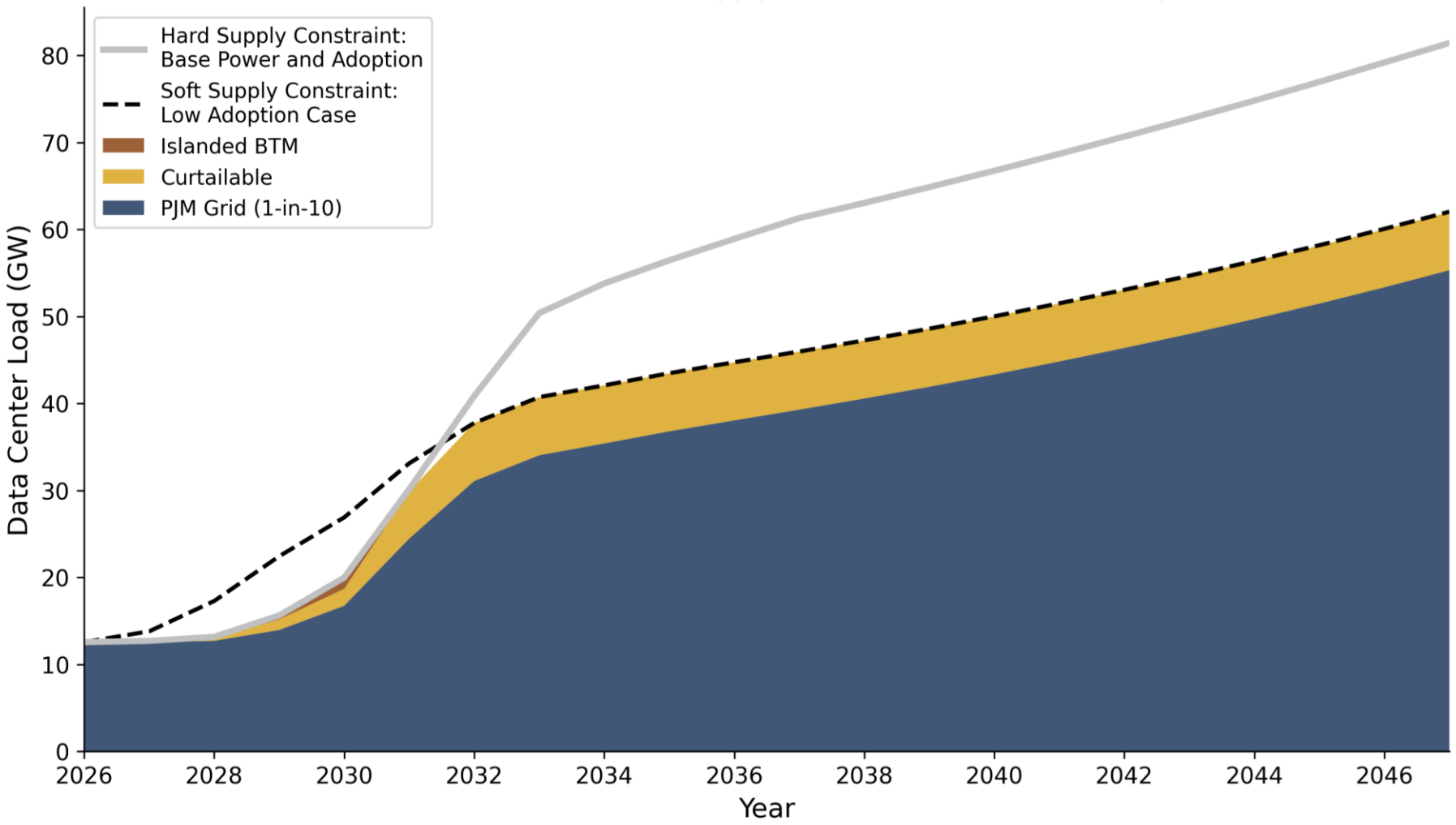
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Abundance Case: The abundant power scenario reduces the amount of demand not served at 1-in-10 reliability to 3.9 GW in 2028.



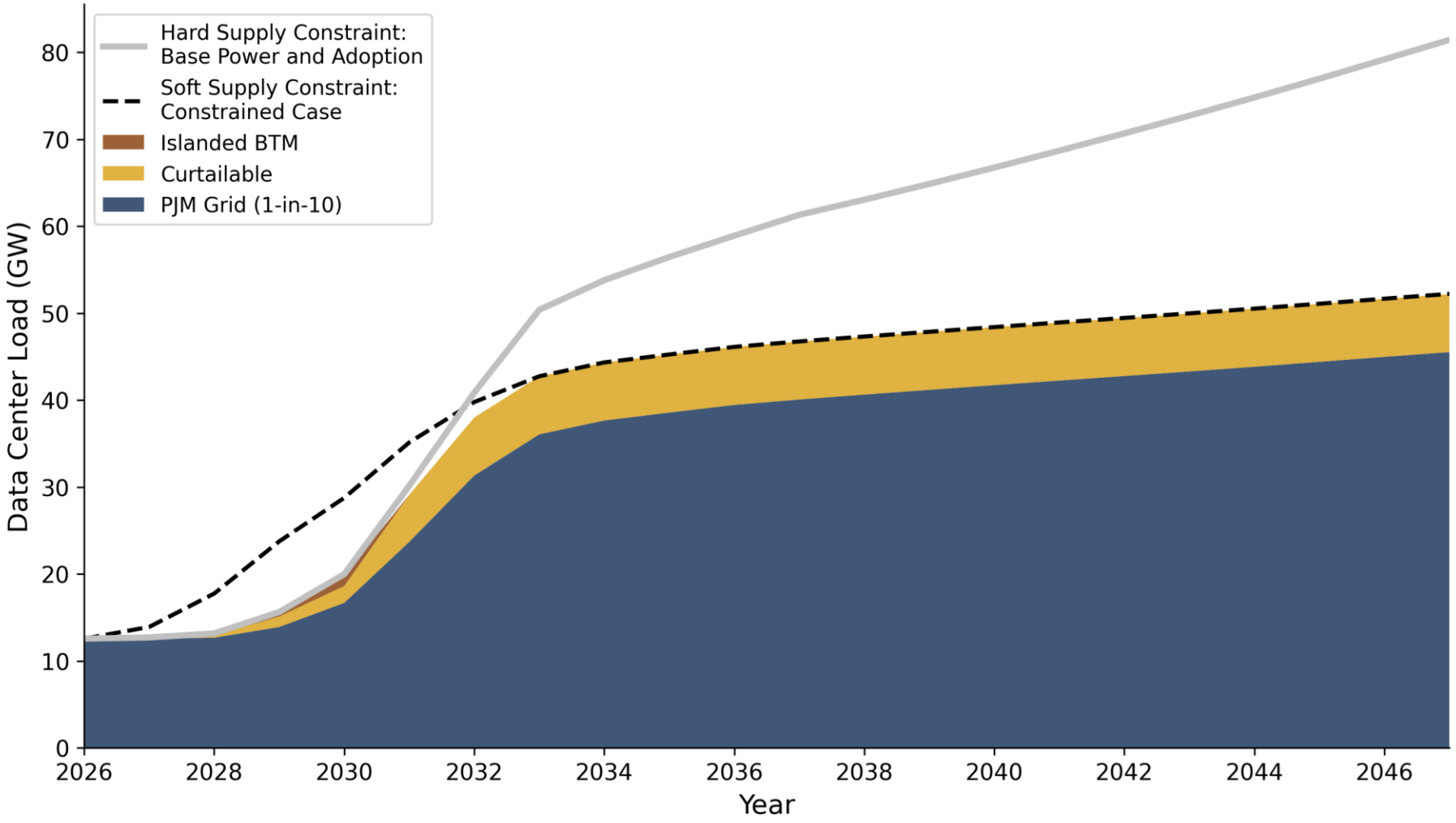
- The abundant power supply scenario implies generation additions near-term that strongly improve the near-term outlook.
- 4.7 GW of data centers are deployed in this scenario compared to 0.6 GW by 2030.
- The abundance and base scenarios converge to the same deployment level by 2035 as power ceases to be a binding constraint.

Low Adoption Case: Low adoption maintains similar modeled deployment near-term but converges to a 19.4 GW lower demand in 2047



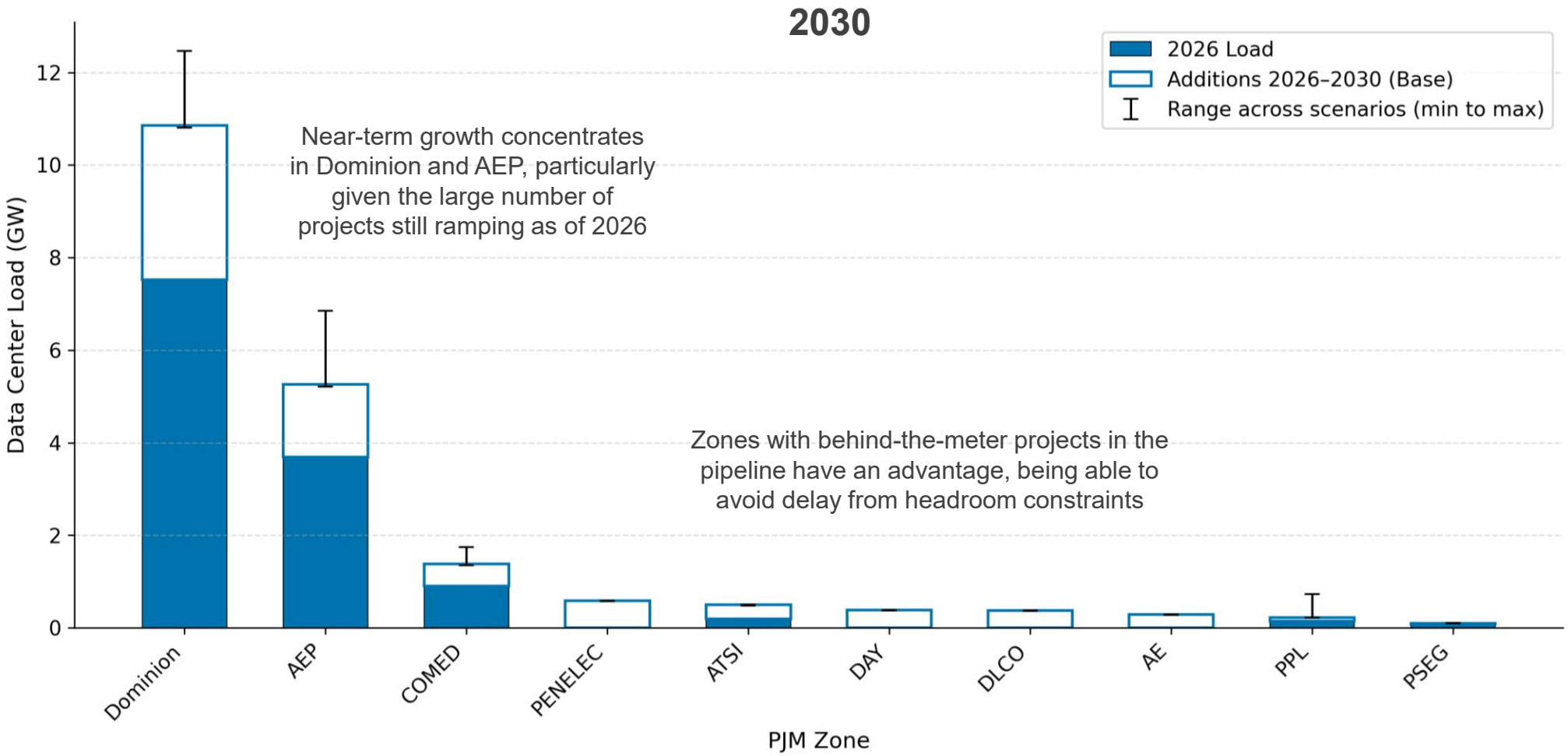
- Low adoption sees similar load growth through 2031 as the base case and abundance scenario.
- Long-term load growth reaches 62 GW by 2047, a 19.4 GW decrease from the base case.

Constrained Case: Power availability would fundamentally cap data center growth in PJM. Restricted growth rates result in a 29.2 GW demand reduction in 2047.



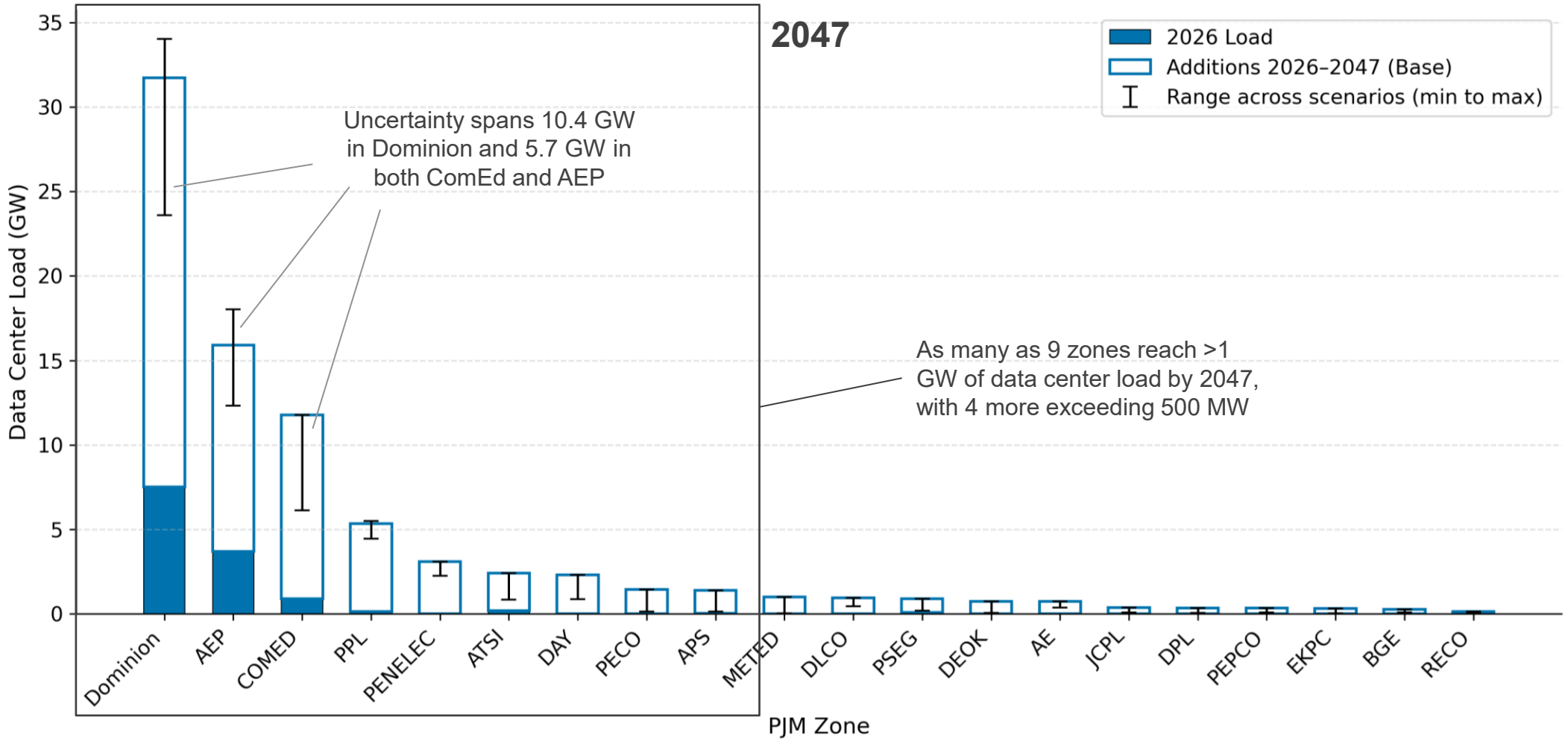
- Constrained power also sees similar load growth through 2031 but diverges as generation additions observed in the base case do not materialize.
- Power availability is the single most important factor to long-term demand growth in PJM. A constrained power scenario decreases long term demand by 36% in 2047, down to 52.2 GW.

Near-term data center growth concentrates in zones with existing projects ramping or BTM projects in the pipeline that can circumvent the PJM headroom constraint



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Realized load varies most in Dominion, AEP, and ComEd, with uncertainty of up to 10.4 GW in Dominion by 2047



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Conclusions / Key Take-away

1. Power constraints in PJM create a significant reduction in data center load that can be powered at 1-in-10 reliability through 2033.

2. The gap between the soft and hard constraint view reaches 11.5 GW in 2030.

3. Load growth concentrates in Dominion and AEP, with significant secondary markets of PPL and ComEd.

4. Low AI adoption reduces data center demand by 19 GW in 2047. Constrained power supply is more restrictive, reducing 2047 demand by 29 GW.

5. Zonal load growth from data centers varies significantly by the forecast end. Dominion, AEP, and ComEd have the largest uncertainty ranges, while nine zones may see data center load above 1 GW.


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