

Powering Data Centers: Perspectives on Power Demand, Flexibility, and Operational Issues



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29th Energy and Climate Seminar

May 7, 2026

2025 Chauncey Award – EPRI’s Highest Honor



2025
THE
CHAUNCEY
AWARDS



Climate READi



Delavane Diaz



Brandon Delis



Doug Dorr



Laura Fischer



Anish Gaiwad



Andrea Staid



Jeff Thomas



Eknath Vittal



Aguarin Iriarte



Anna Lafoyiannis



Alex Summe



2025
THE
CHAUNCEY
AWARDS

Nuclear Plant Operational Performance
Under Future Climate



Rob Choromokos



Erik Smith



Jonathan Lala



Jacob Mardian



Chris Rochon

EPRI Public Analyses of Data Center Electricity Use



Powering Intelligence:
**Analyzing Artificial Intelligence
and Data Center Energy
Consumption**

May 2024



Powering Data Centers:
**U.S. Energy System and
Emissions Impacts of
Growing Loads**

Oct 2024



Scaling Intelligence:
**The Exponential Growth
of AI's Power Needs**

Aug 2025



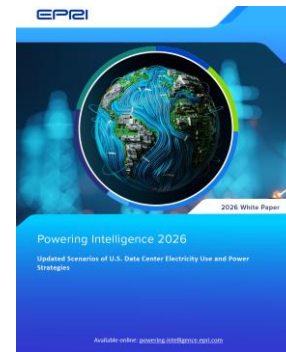
**Reconciling the Value of Grid
Interconnection and Speed to Power:**
**Strategies for Powering Data Centers in the
AI Era**

Nov 2025



Win-Win Watts:
**When Can Data Centers, Efficient
Electrification, and New Loads
Lower Electricity Prices?**

Jan 2026

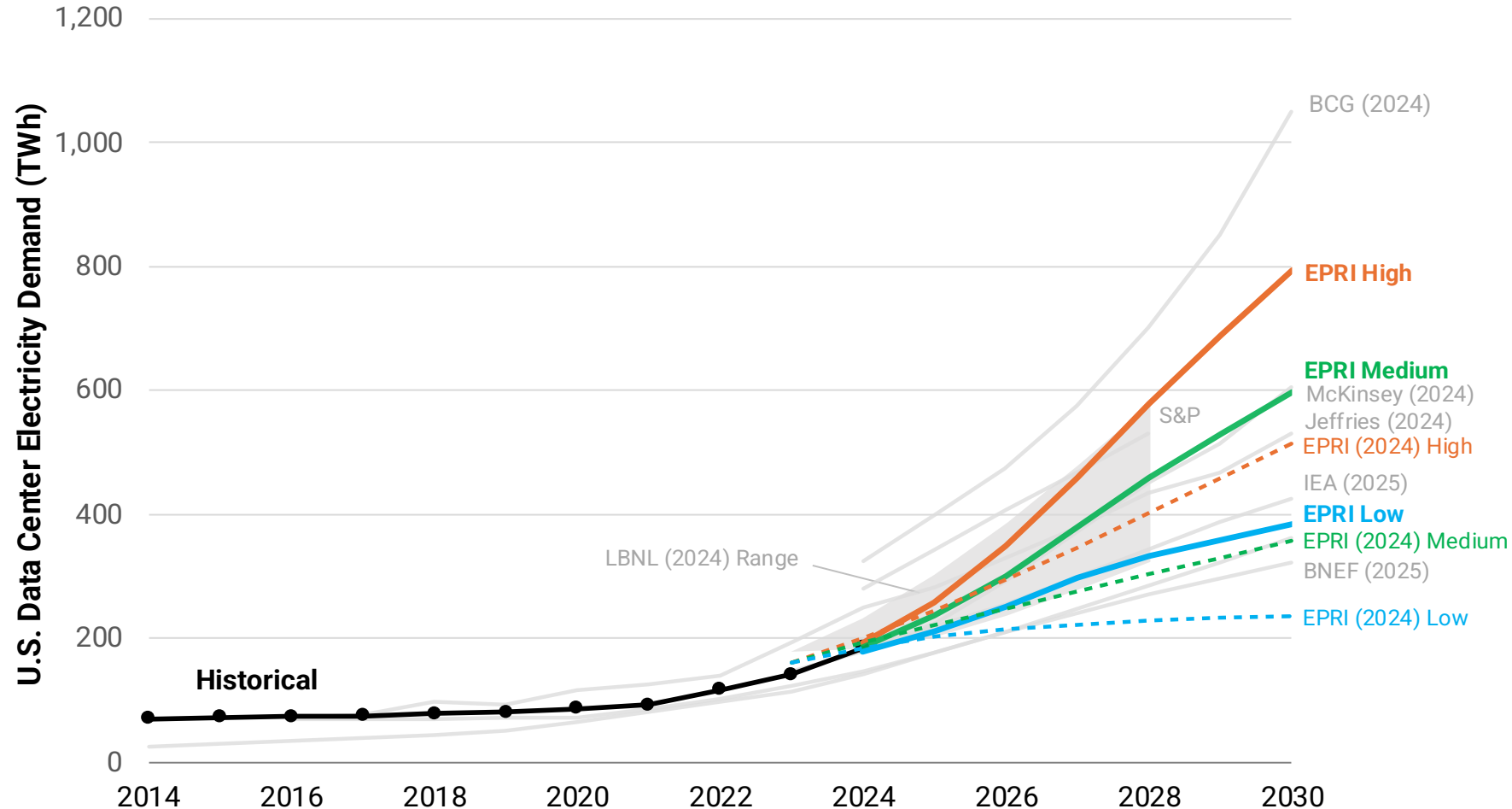


Powering Intelligence 2026:
**Updated Scenarios of U.S. Data Center
Electricity Use and Power Strategies**

Feb 2026

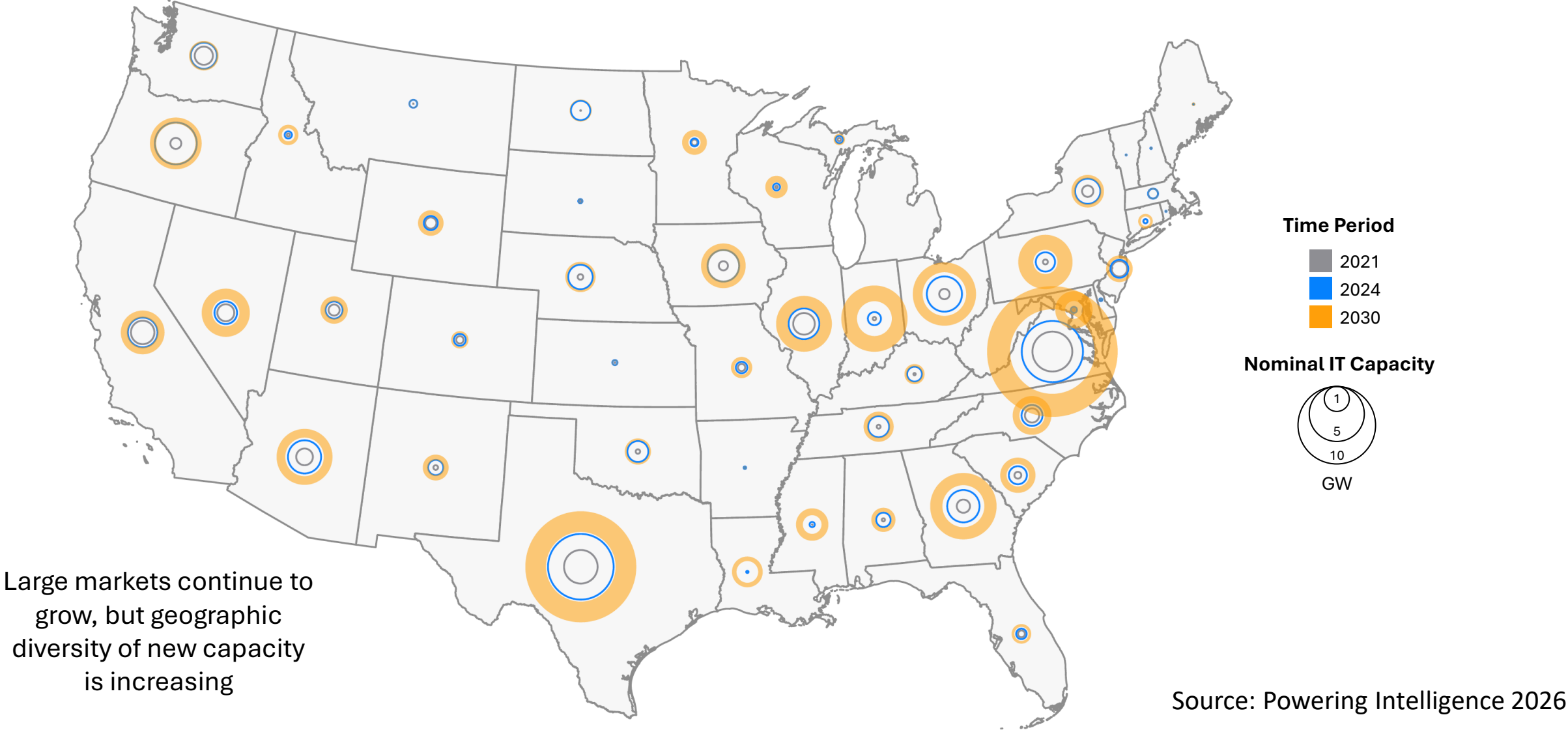
Additional research available through the [DC Flex Initiative](#)

EPRI Estimates Data Centers Consumed 4-5% of U.S. Power in 2024 and Projects that it Will Consume 9-17% in 2030



Source: Powering Intelligence 2026

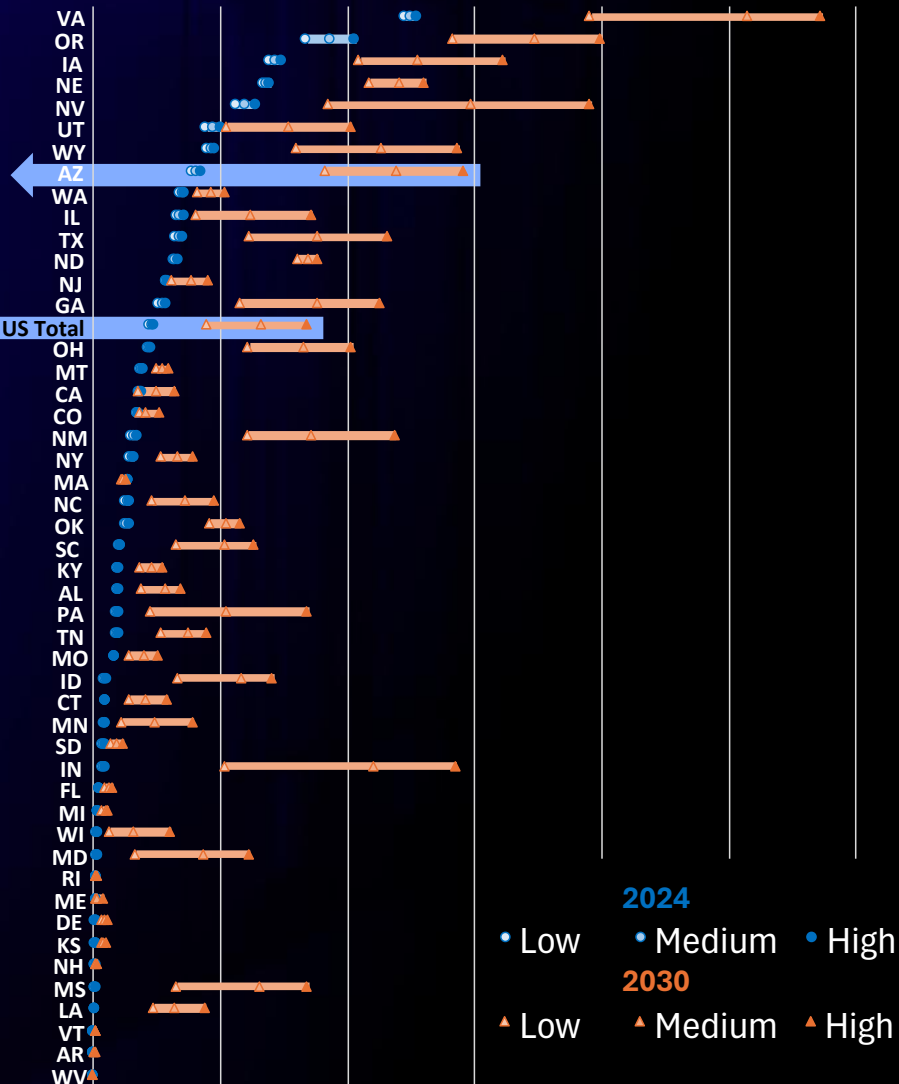
Data Center Capacity by State: 2030 Range Depends on Project Execution



U.S. Datacenter Share of Total Electricity Use: 2024 and 2030

U.S. estimated share
4-5% in 2024
9-17% in 2030

Data Center Share of Total Electricity Use
 0% 10% 20% 30% 40% 50% 60%



Mature markets expand

New markets emerge

Source: EPRI Powering Intelligence 2026



Optimize Data Center Operational Flexibility to Help Strengthen the Grid and Improve Affordability

Field Demonstrations (Underway or Completed)

Phoenix, AZ	AI workload management (Nature Energy article)
North Carolina	Cloud workload management
Paris	Power quality, ride through
Chicago, IL	Scaled AI workload management
Dallas, TX	HVO backup fuel
Ashburn, VA / Chicago, IL	Geospatial compute shifting
Manassas, VA	Flexibility by design (under construction)
London	Flexible AI, day ahead, hour ahead, real time
Texas	AI control of jobs, batteries, and HVAC

Five Workstreams



Funding

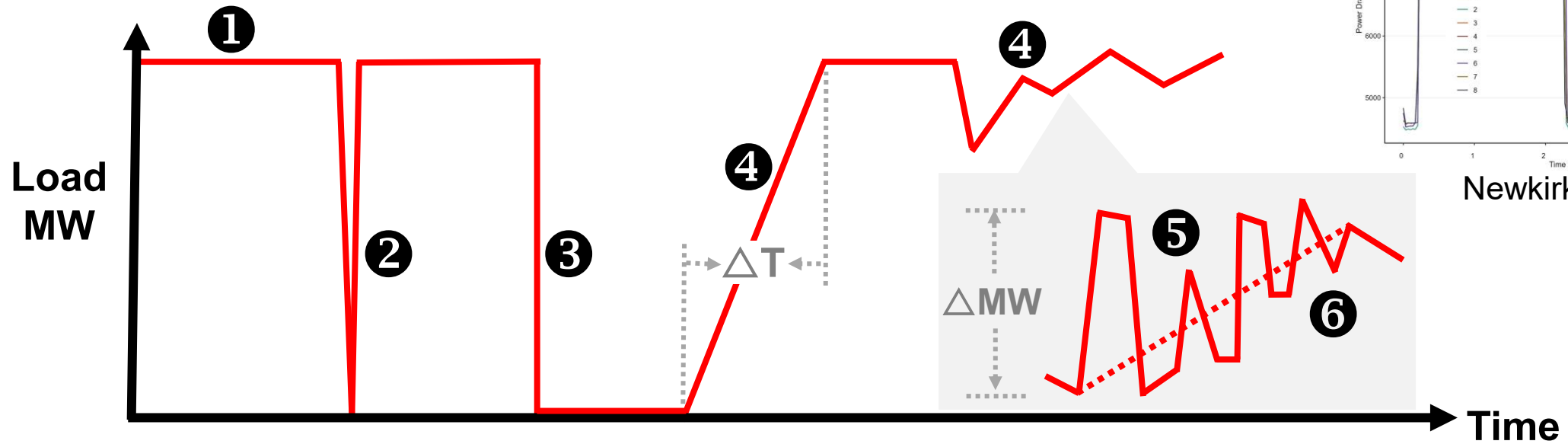
>60 companies (and growing):

- Developers, Hyperscalers, Equipment Suppliers
- ISO/RTOs, IPPs, Utilities
- Others (R&D, finance, consulting)



Learn More:
dcflex.epri.com

Serving Data Center Loads Reliably



Newkirk, et al., 2025

- | | |
|---|---|
| 1 GW+ Loads: Unprecedented size and scale | Risk: Reduces generation and transmission adequacy |
| 2 Ride-Through: Load dropping out momentarily | Risk: Creates over-generation impacting stability |
| 3 Load-Loss: Loads drop for sustained periods | Risk: Introduces a new single-contingency loss of load |
| 4 Ramps: Slower MW up & down (min) | Risk: Increases cycling and wear on thermal generation |
| 5 Variability: Faster MW up & down (sec) | Risk: Exceeds system ramping and generation capability |
| 6 Oscillations: Fast sustained fluctuations (sub-sec) | Risk: Degrades system stability and risks asset damage |



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