

Will Energy Storage Replace Peaker Plants?

Prepared For:



The Premier New York State Advanced Energy Conference

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1. Federal and State Policies Barriers Coming Down

Biggest Shot in the Arm

FERC Rules Energy Storage Must be Eligible to Participate in Wholesale Markets

FERC Order 841

On February 15th FERC released draft final rules adopting participation and eligibility requirements for energy storage in ISOs and RTOs. The participation model for electric storage resources must:

Ensure that a resource using the participation model for electric storage resources in an RTO and ISO market is eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing

Ensure that a resource using the participation model for electric storage resources can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer consistent with rules that govern the conditions under which a resource can set the wholesale price.

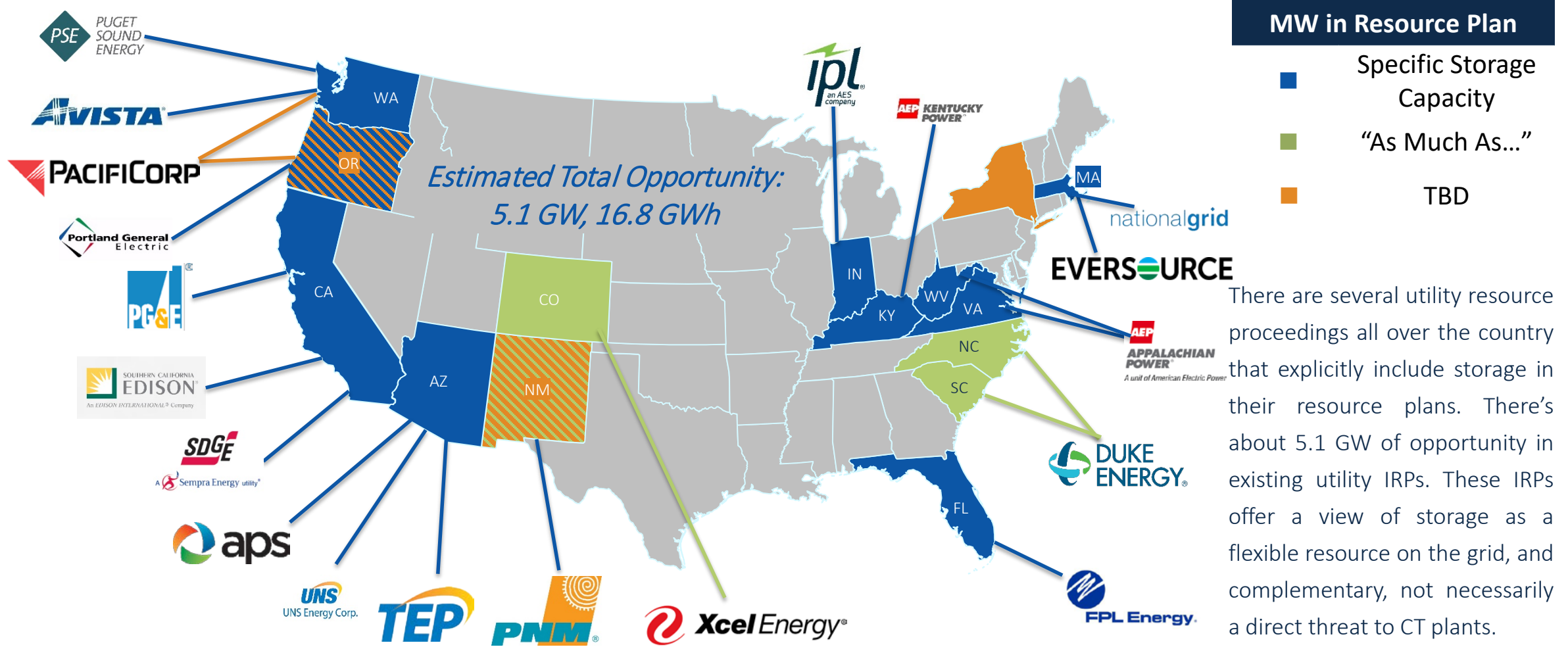
Account for the physical and operational characteristics of electric storage resources through bidding parameters or other means.

Establish a minimum size requirement for participation in the RTO and ISO markets that does **not exceed 100 kW**. Also requires that the sale of electric energy from the RTO or ISO market to an electric storage resource that the resource then resells back to those markets must be at the **wholesale locational marginal price**.

Source: GTM Research

The Momentum Builds: Energy Storage in Integrated Resource Plans

Storage Modeled, Eligible or Mandated in Utility IRPs (MW)



There are several utility resource proceedings all over the country that explicitly include storage in their resource plans. There's about 5.1 GW of opportunity in existing utility IRPs. These IRPs offer a view of storage as a flexible resource on the grid, and complementary, not necessarily a direct threat to CT plants.

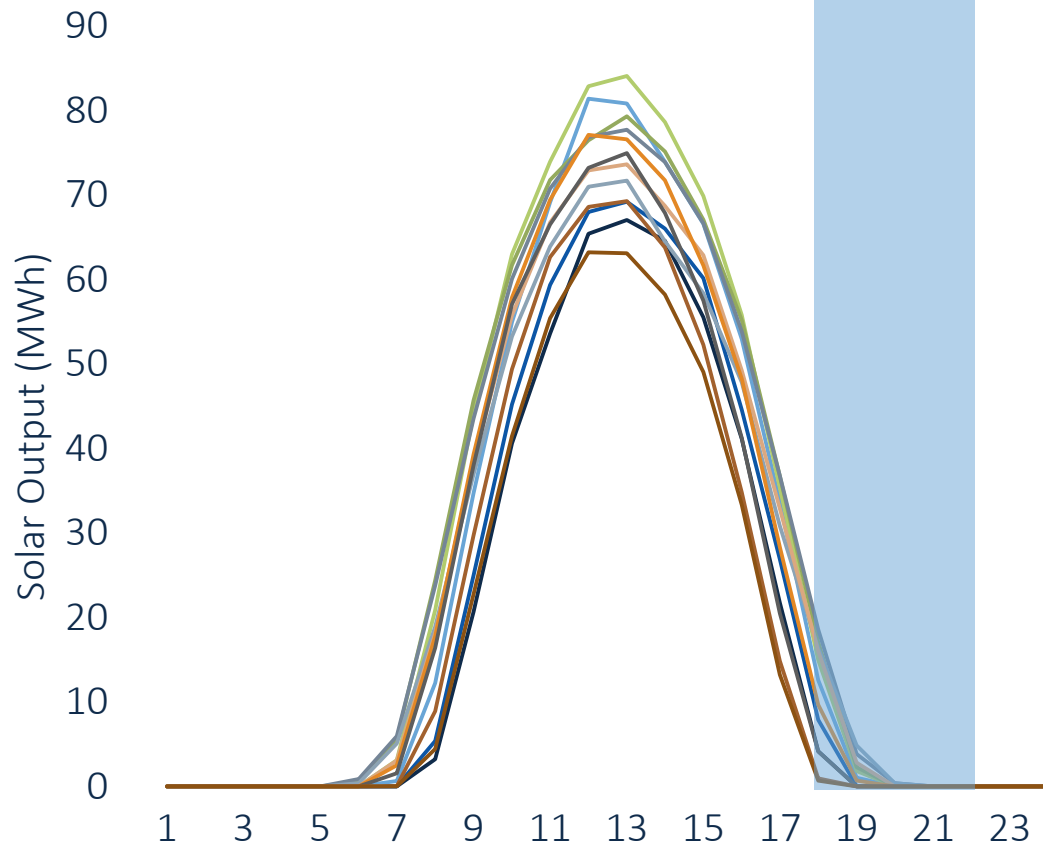
Source: GTM Research

2. Solar-Plus-Storage as Peakers

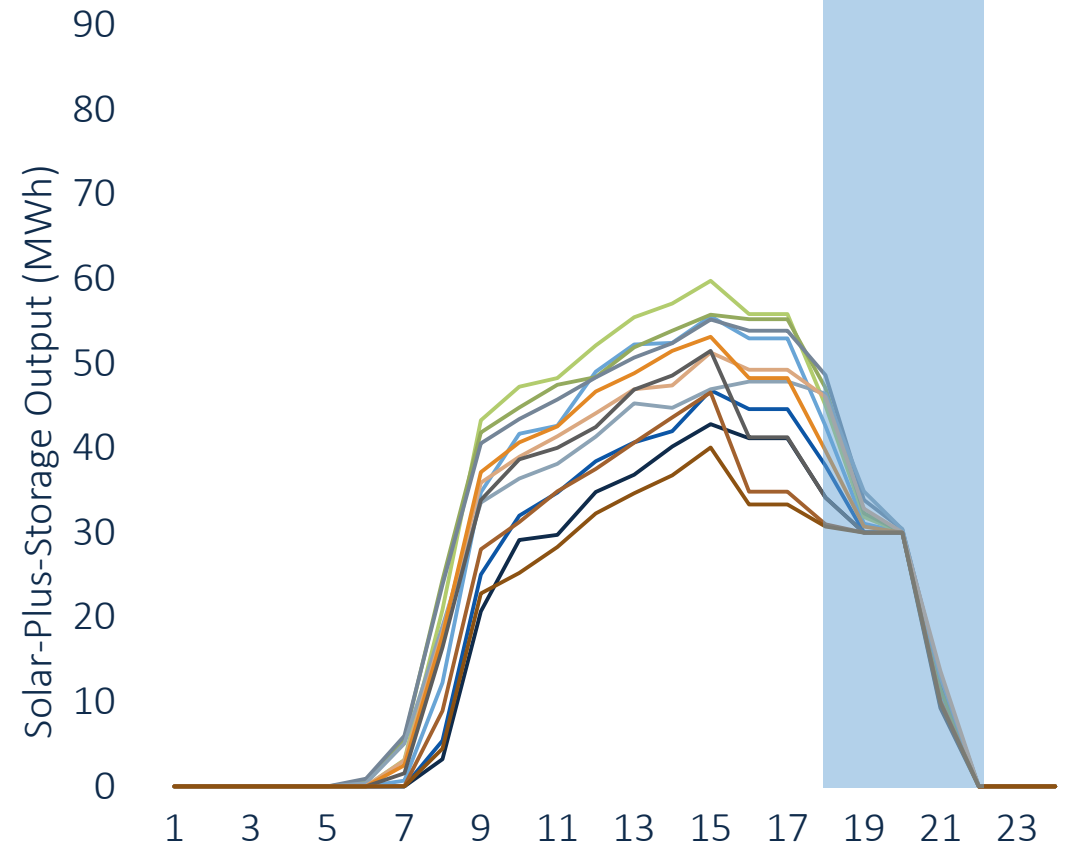
Case Study 1

Tucson Electric Power's Recent "Historically Low Price" Solar-Plus-Storage PPA

Average Solar Only Profile by Month



Average Solar-Plus-Storage Profile by Month



Source: GTM Research

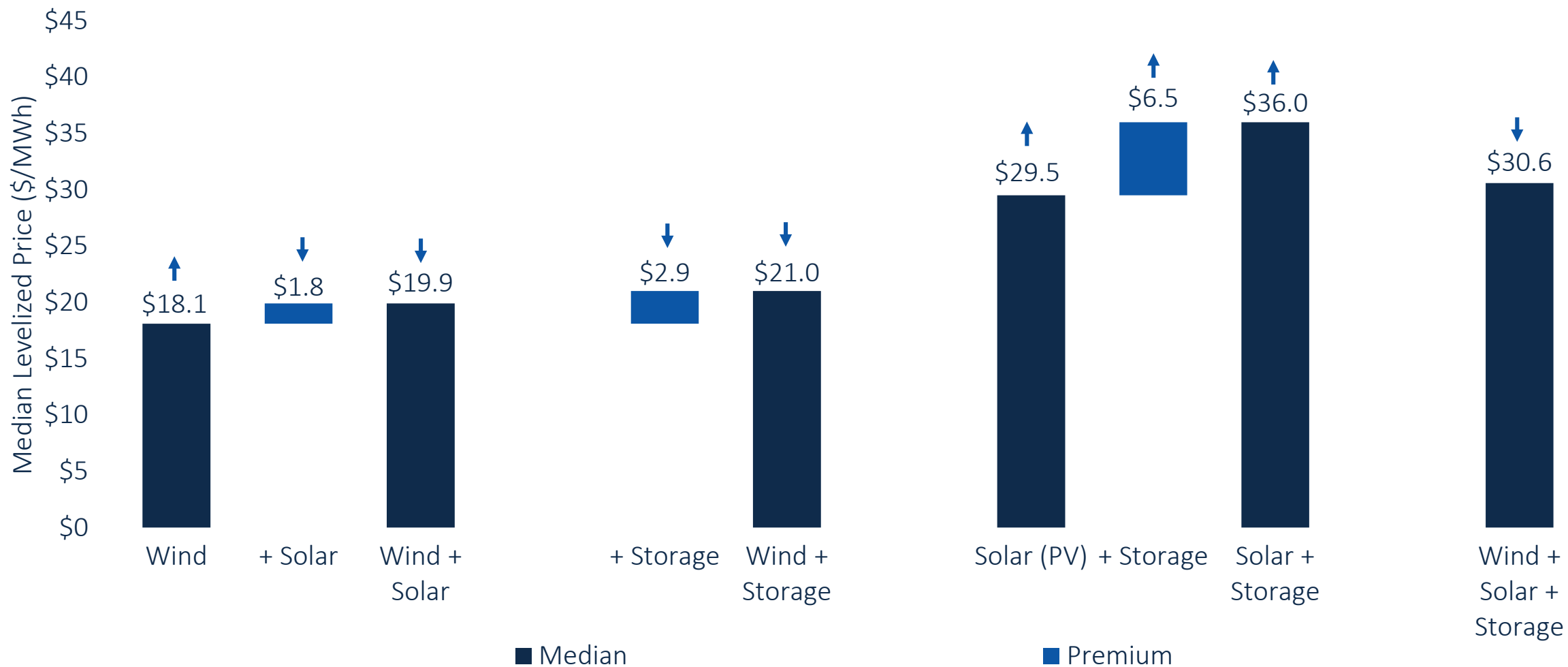
Tucson Electric Power's Recent "Historically Low Price" Solar-Plus-Storage PPA

Paths to \$45/MWh LCOE

	'Laugh Test' Storage Price and WACC	Reasonable Storage Price & WACC with Post-PPA Solar Value – I	Reasonable Storage Price & WACC with Post-PPA Solar Value – II	Reasonable Storage Price & WACC with Storage Capacity Value
Solar System Price (\$/W)	\$1.05	\$1.00	\$0.95	\$1.00
Storage System Price (\$/kWh)	\$215	\$330	\$330	\$330
WACC (%)	3%	5%	5%	5%
Post-PPA Term Residual Solar Value (\$/kWh)	\$0.00	\$0.015	\$0.025	\$0.00
Capacity Value (\$/kW/yr)	\$0	\$0	\$0	\$46
Real LCOE (\$/MWh)			\$45	

Source: GTM Research

Ultra-Competitive Renewables Paired Storage Bids Dominate Xcel Colorado's All-Source Solicitation

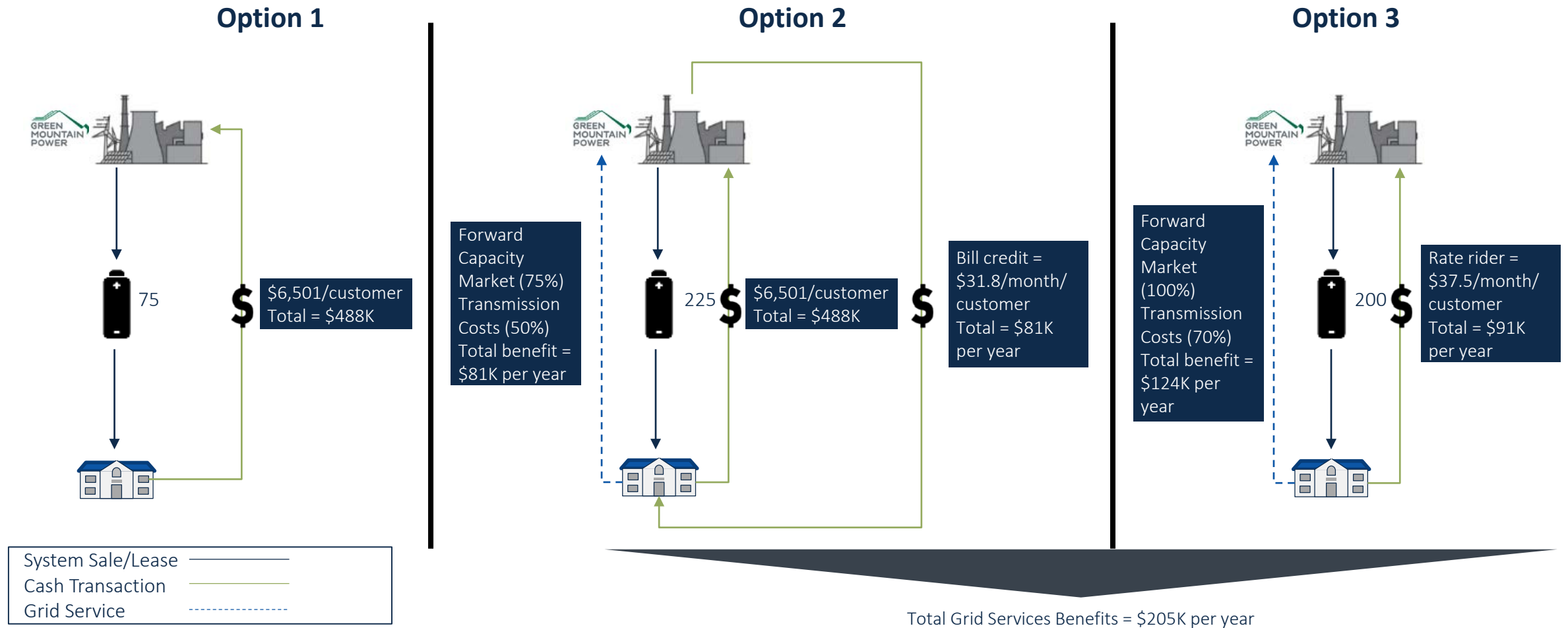


Source: GTM Research

3. Aggregated Behind-the-Meter Storage as Peakers

Case Study 2

Green Mountain Power to Use Behind-the-Meter Storage to Reduce Peak Capacity and Transmission Costs



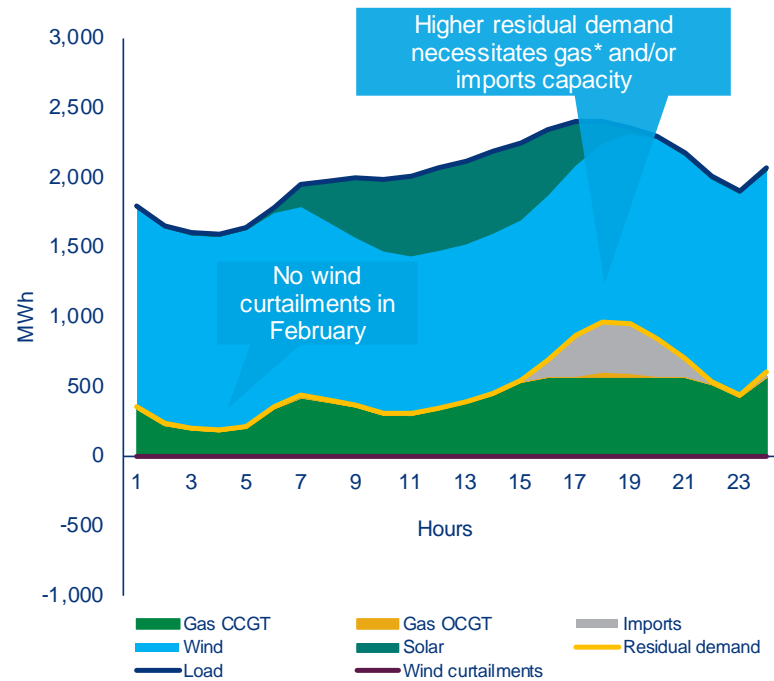
Source: Green Mountain Power, GTM Research

4. Wind-Plus-Storage as Peakers

Case Study 3

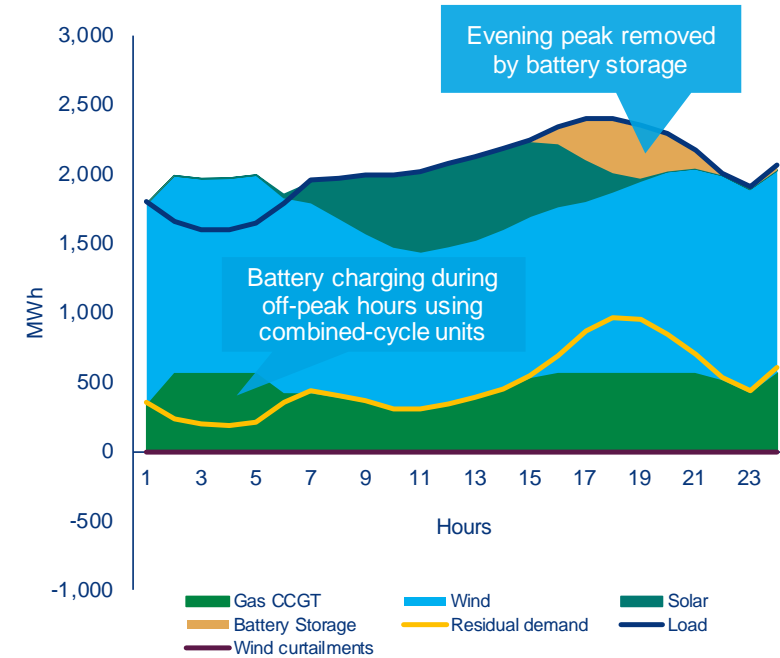
Battery Storage is a Potential Solution to Manage the Evening Peak Load in South Australia

2025 February – Peaking Residual Demand in the Evening



Source: Wood Mackenzie, GTM

2025 May – Battery Solution to Flatten Evening Peak



Source: Wood Mackenzie, GTM

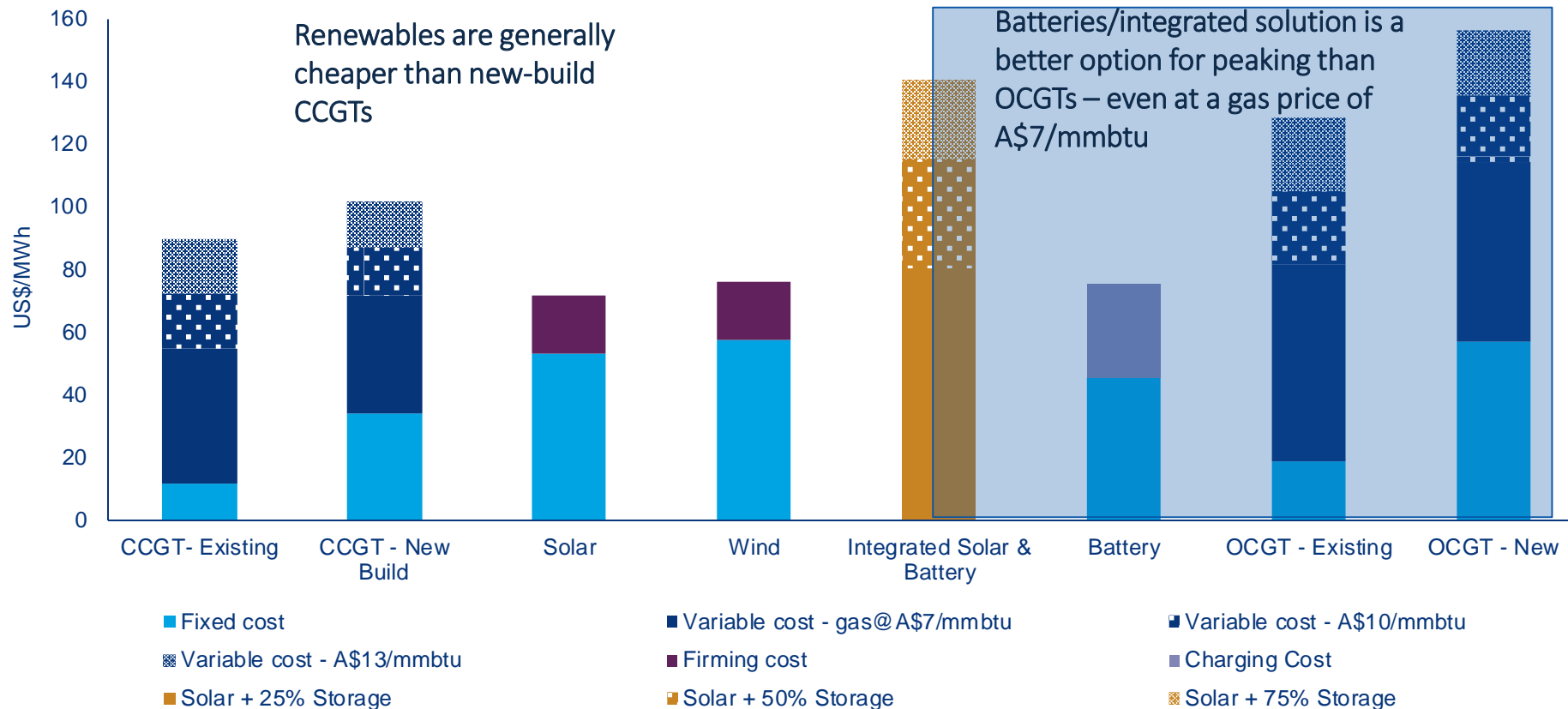
400-MW/1,600-MWh battery storage will take care of the highest peaking residual demand in May in 2025. This storage asset will be unlike the 100 MW/129 MWh Tesla's Hornsdale facility, which is designed for reliability needs.

By 2025, Renewables and Batteries Will Offer a Low Cost Alternative to CCGT Plants Depending on the Future Gas Price in South Australia

Renewables become increasingly competitive. However, OCGTs will still be required for back-up generation to ensure system security 24/7



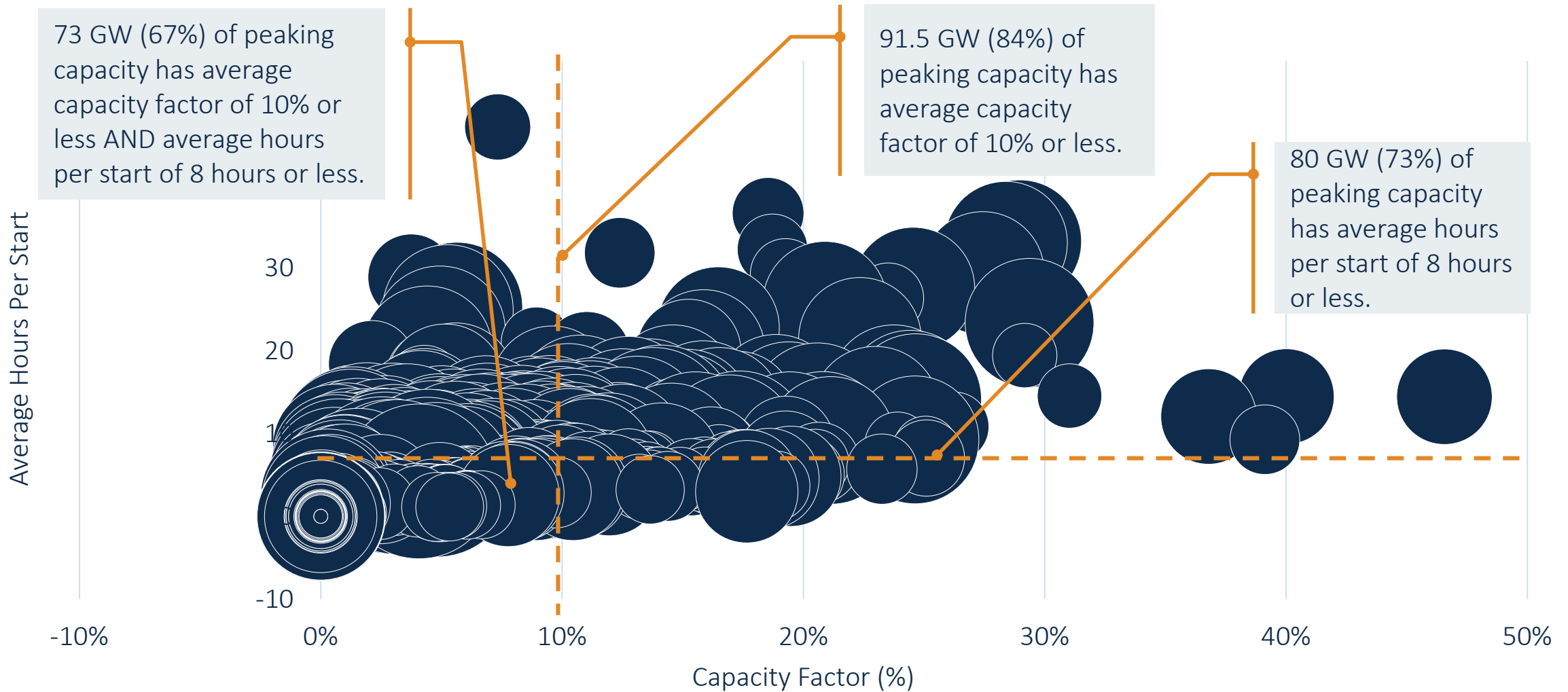
2025 LCOE by technology



Source: Wood Mackenzie, GTM

5. Peaker Replacement: The Next Frontier

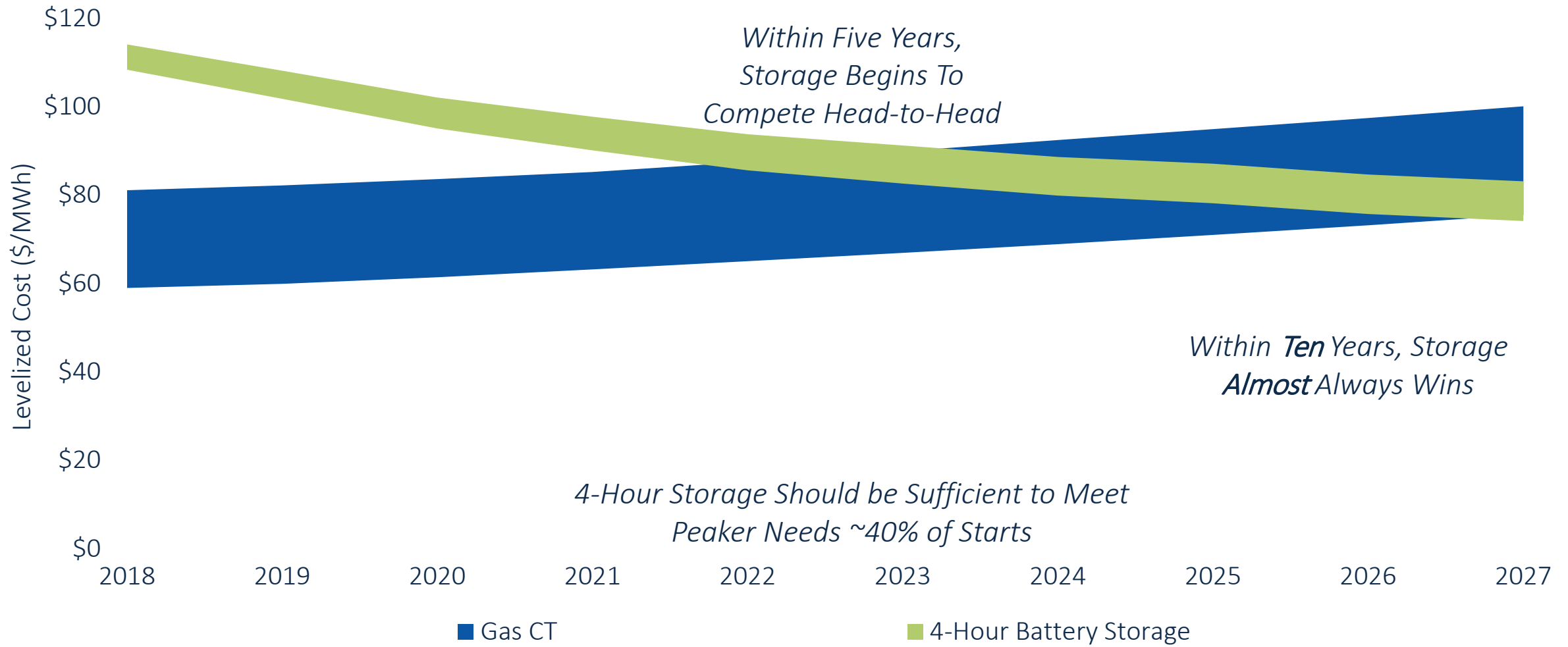
120 GW of Peaker Plant Capacity Operational in the U.S. Median Capacity Factor of 3%, Median Hours Per Start of 5.3 Hours



Source: Wood Mackenzie based on EIA

Natural Gas Peakers At Risk

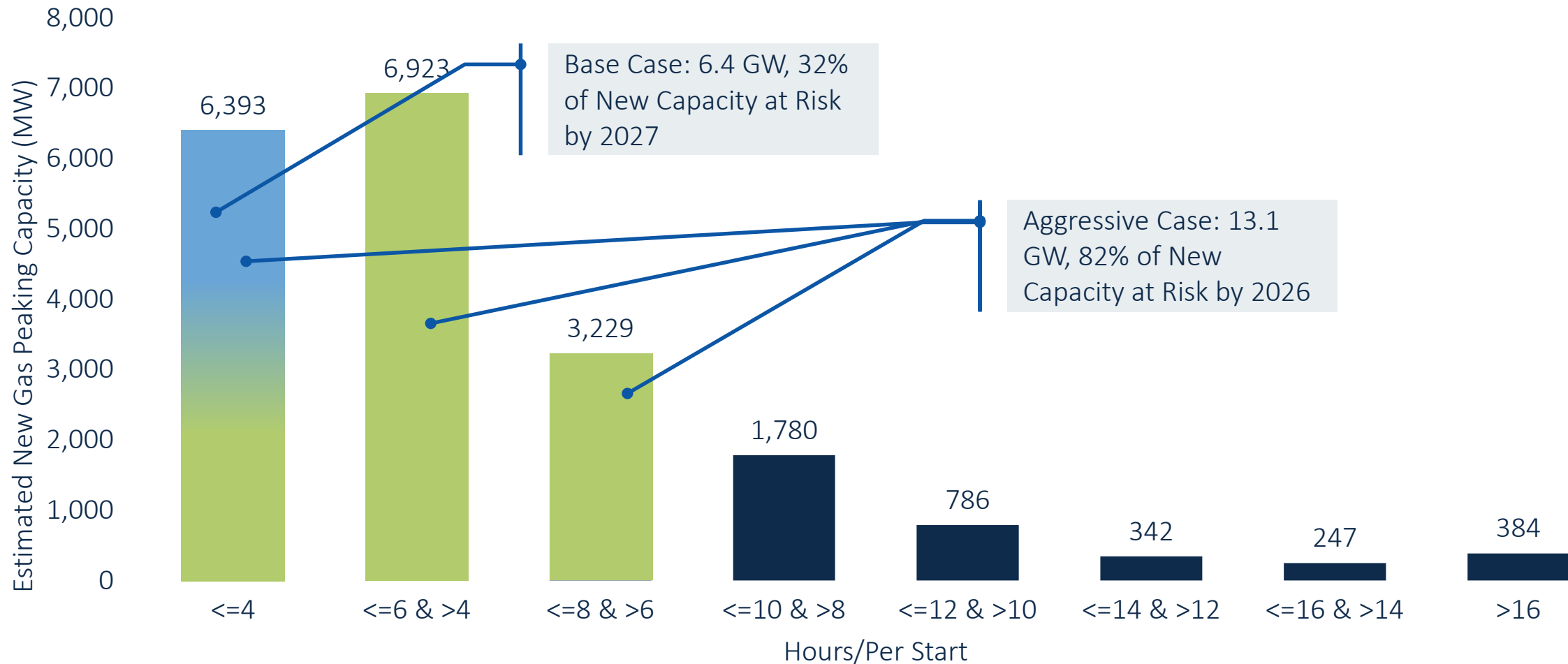
Base Case Levelized Cost of Energy – Peaking Gas Combustion Turbine vs. 4hr Li-ion Battery Storage (\$/MWh)



Source: GTM Research, Wood Mackenzie

32% of New Peaker Capacity at Risk from 4-Hour Storage by 2027

In Aggressive Case, 82% of New Peaker Capacity at Risk from 8-Hour Storage by 2026



Source: GTM Research, Wood Mackenzie

Thank You!

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