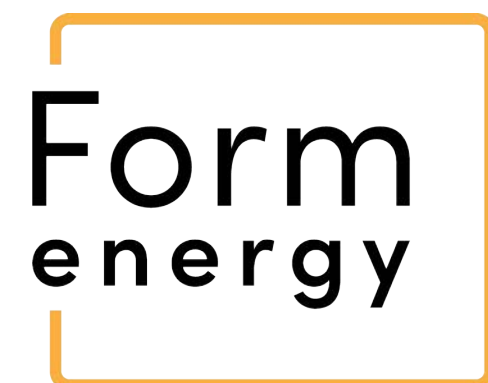


BREAKTHROUGH LOW-COST, MULTI-DAY ENERGY STORAGE

Rachel Wilson, Manager of Strategy & Market
Development Analytics

May 19, 2022

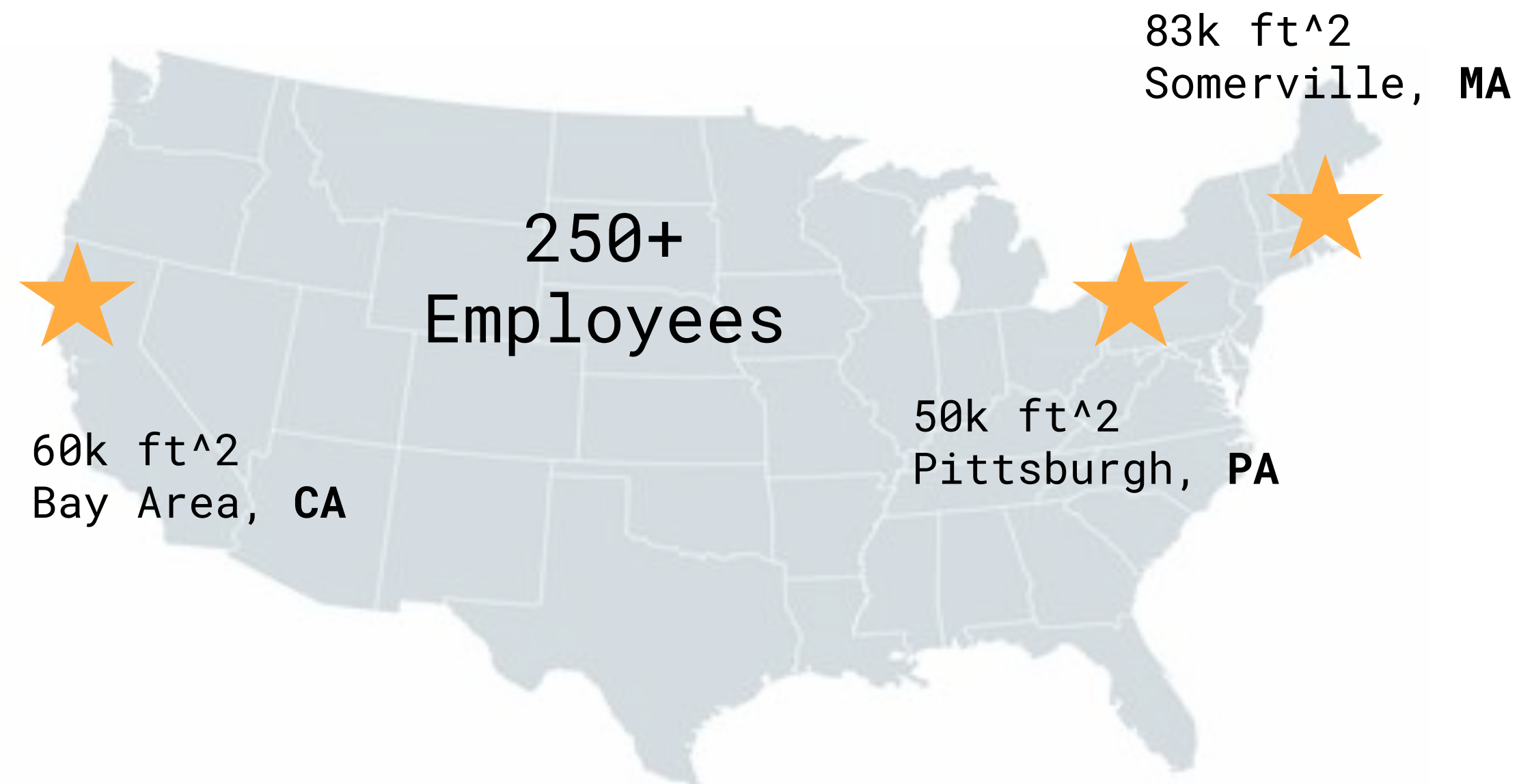


Energy Storage
For A Better World

CONFIDENTIAL



Rising to the challenge with a team that will deliver



OUR INVESTORS: LONG-TERM AND IMPACT-FOCUSED

\$367M in venture capital from top investors including: Breakthrough Energy Ventures (BEV), Coatue Management, NGP Energy Technology Partners III, ArcelorMittal, Temasek, Energy Impact Partners, Prelude Ventures, MIT's The Engine, Capricorn Investment Group, Eni Next, Macquarie Capital

LED BY ENERGY STORAGE VETERANS

Decades of cumulative experience in energy storage

■ 100's of MW of storage deployed



The Challenge

The electrical grid is facing increasing reliability risks that make it hard to keep the lights on at reasonable rates



Retirement of existing generation results in firm capacity shortfalls



Intermittency of renewable assets create periods of undersupply



Extreme weather events are more frequent and disruptive to customers

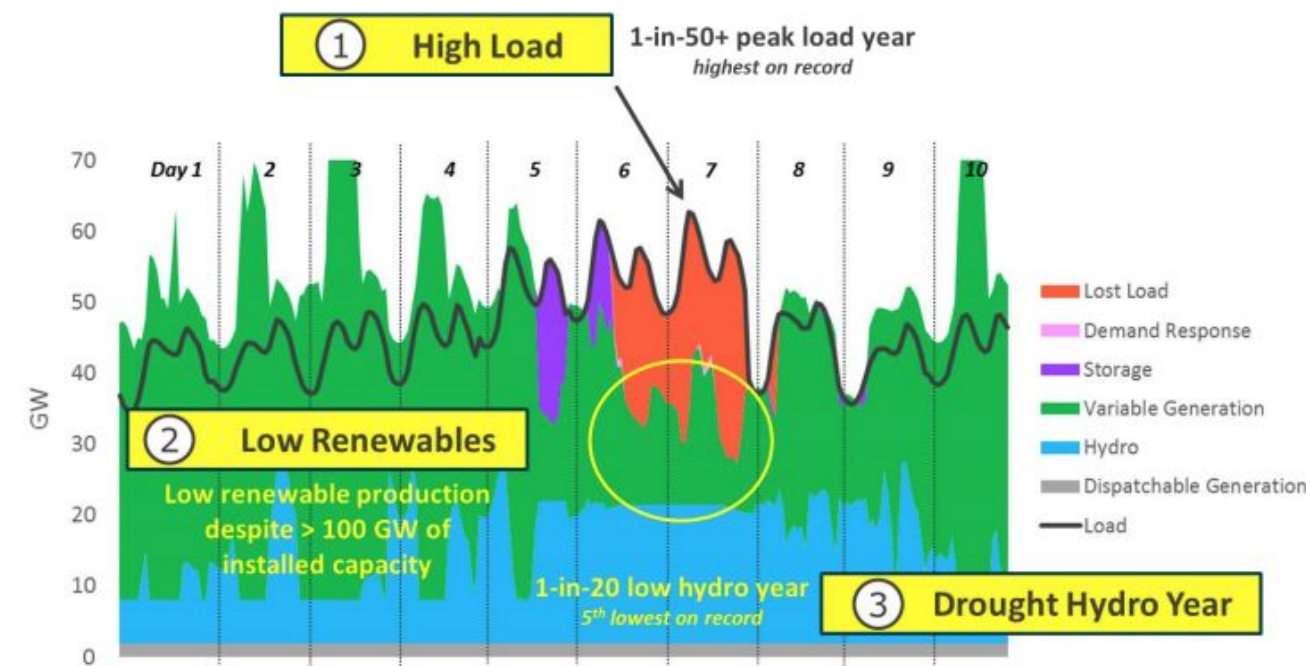


Increased transmission congestion and long interconnection queues

Weather-driven multi-day reliability challenges are universal

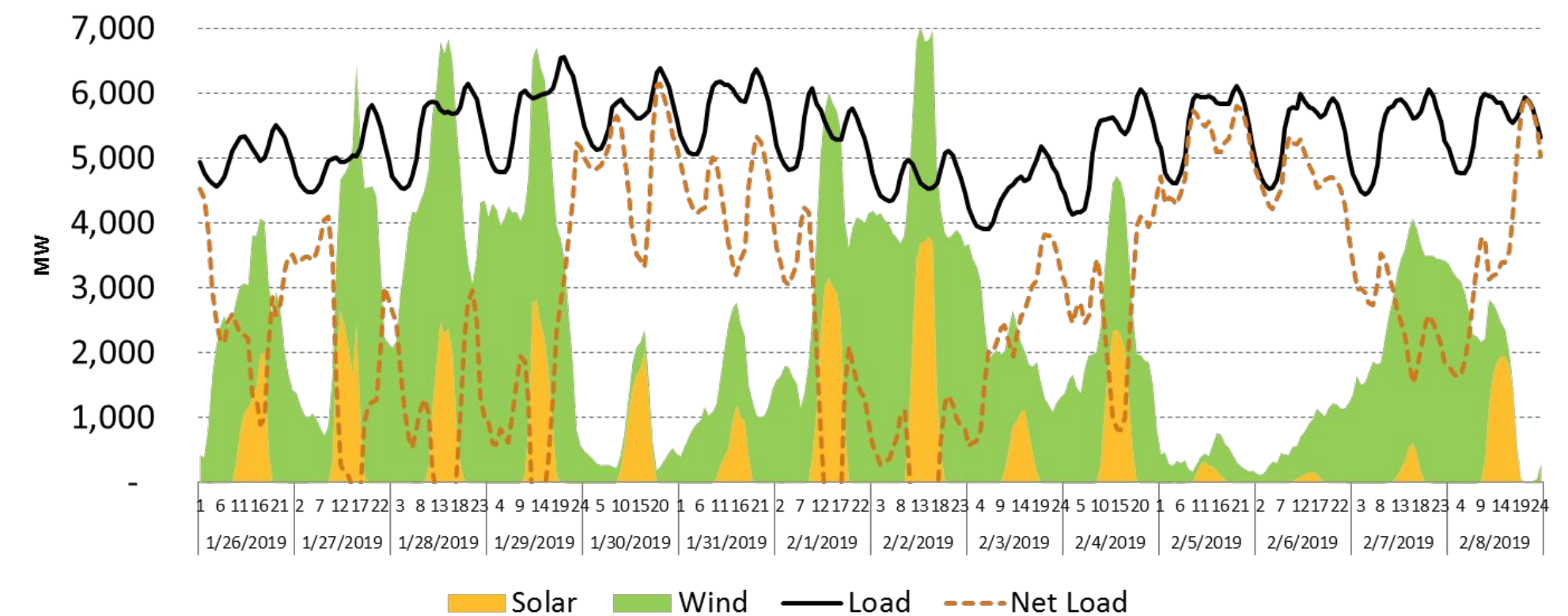
Pacific Northwest Multi-Day Weather Event, 2050

Figure 20: Loss-of-load Example in a Sample Week



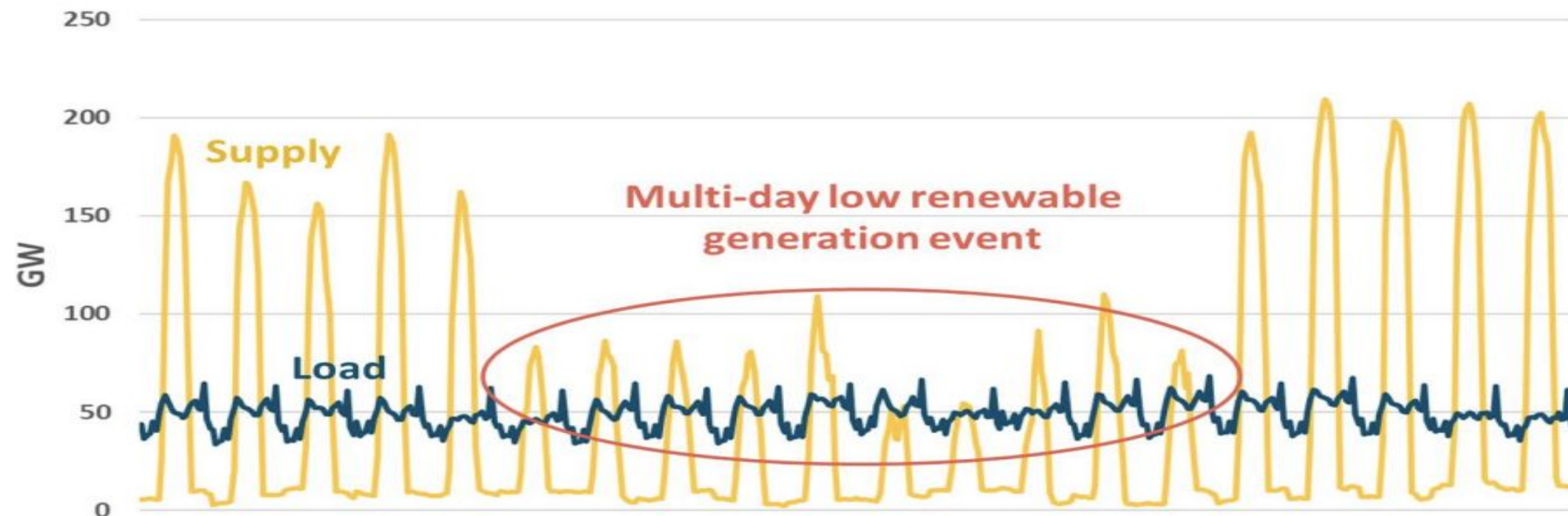
Source: E3, [Resource Adequacy in the Pacific Northwest](#)

Upper Midwest Multi-Day Weather Event in Winter, 2019



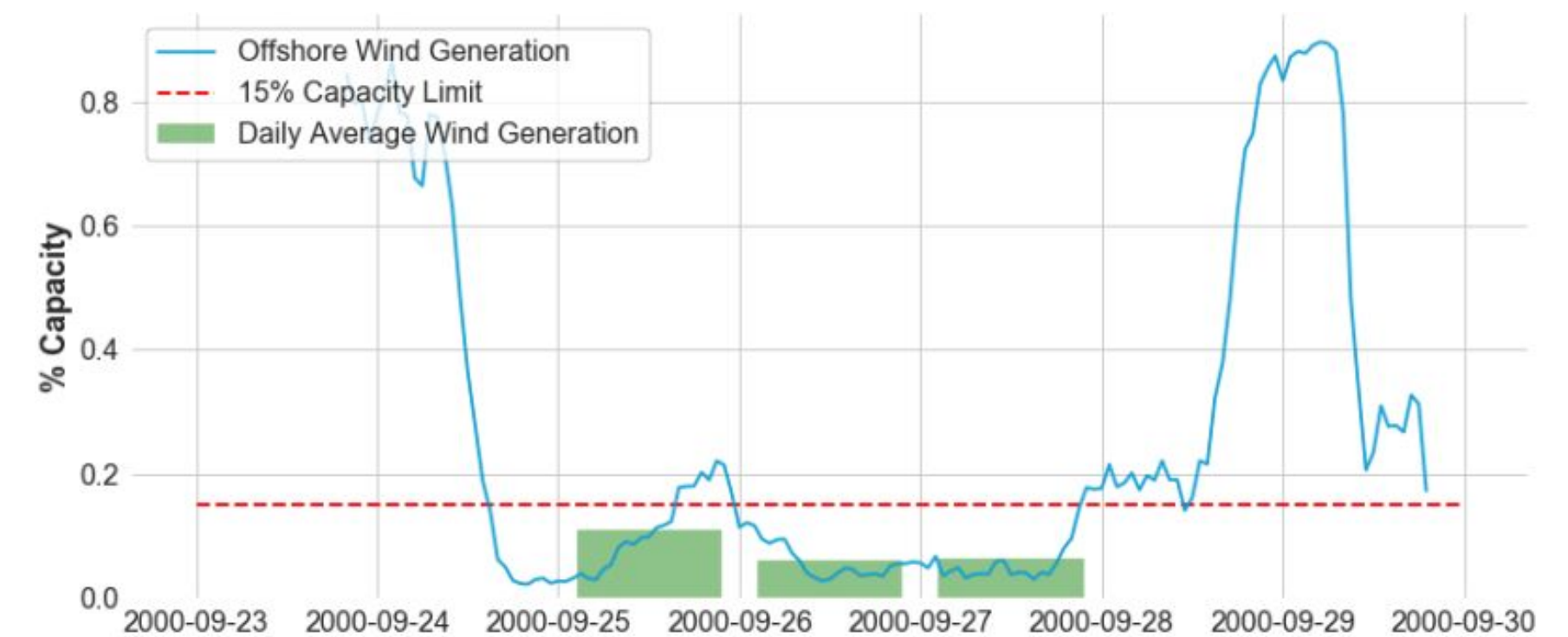
Source: [Xcel Energy](#) 2020-2034 Upper Midwest Resource Plan, May 20, 2019 Workshop

California Multi-Day Weather Event in Winter, 2050



Source: E3: [Long-Run Resource Adequacy Under Deep Decarbonization](#)

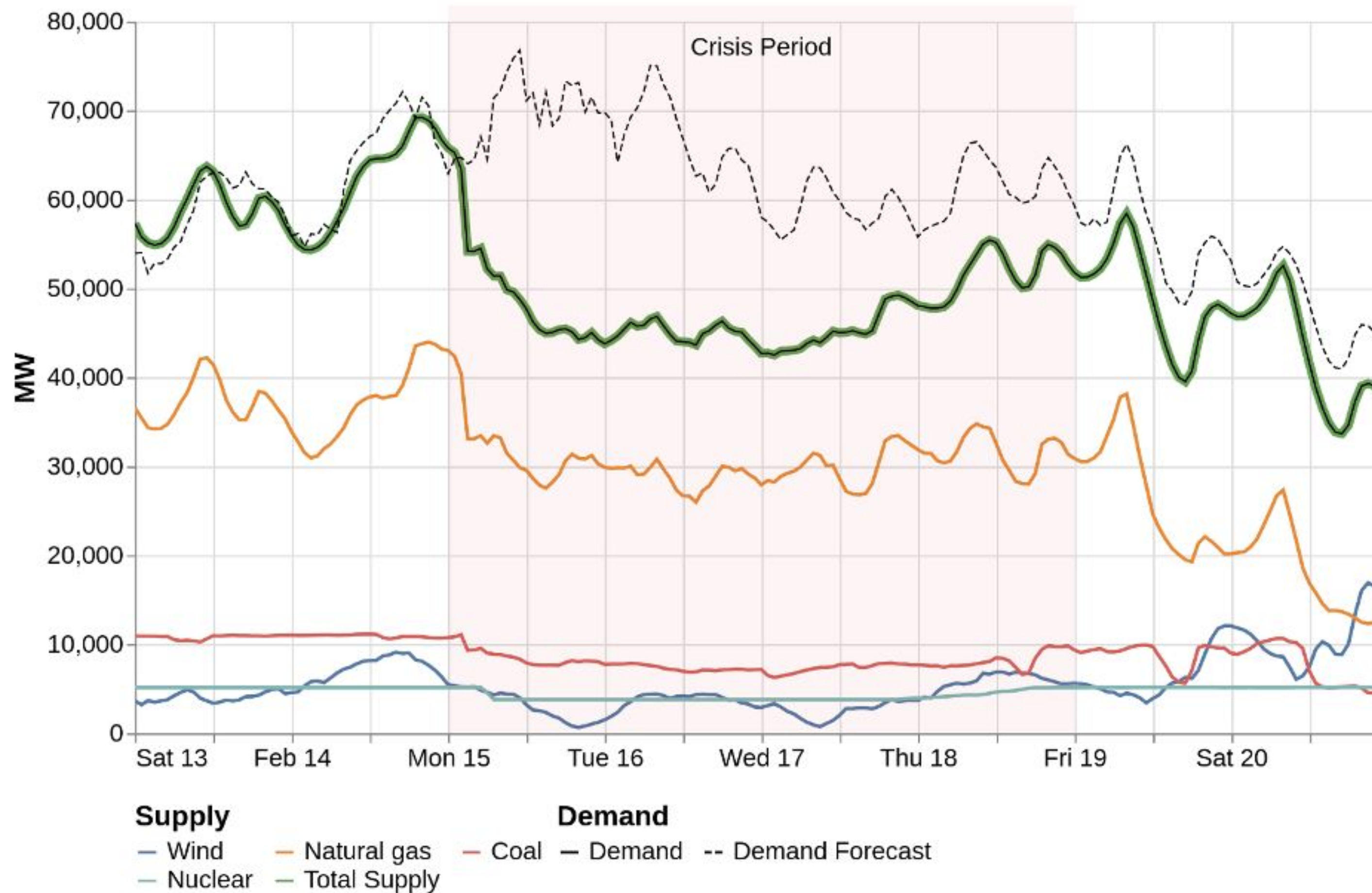
New England Multi-day offshore wind lull, 2000



Source: [DNV-GL](#) Analysis of Stochastic Dataset for ISO-NE

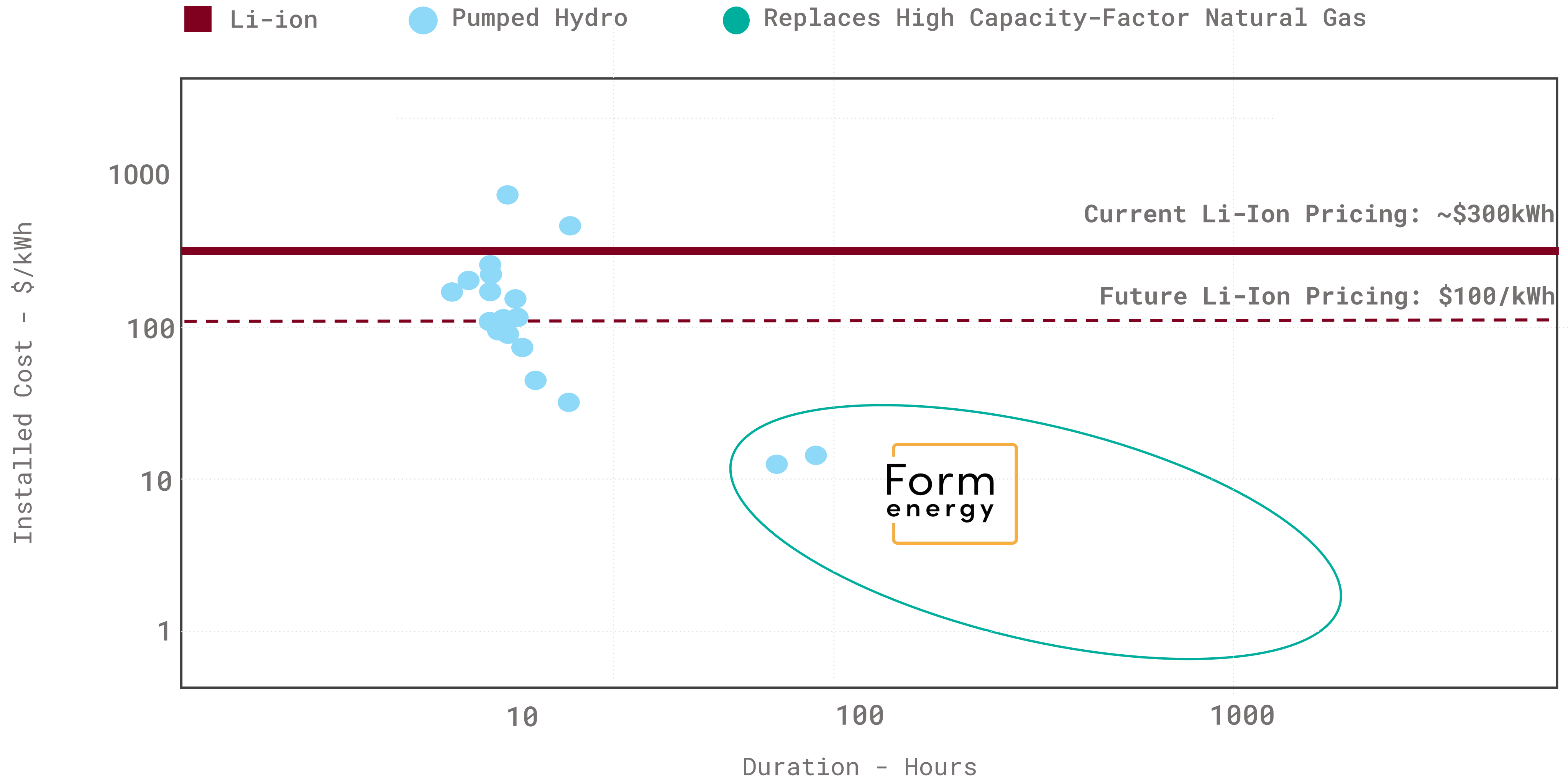
A Texas snapshot

ERCOT Market Supply and Demand, February 12-17, 2021



- **Supply shortage:** 30GW of expected generation disappeared.
- **Cost to system:** >\$30B in extreme energy prices and >\$50B in damages.
- **Solution:** At \$10/kWh capex, multi-day storage could have provided all firming required to make Texas 100% renewable and reliable

New storage solutions must be 10x longer duration and 10X cheaper than lithium ion to replace fossil generation



Our rechargeable, static iron-air battery leverages globally abundant materials and off-the-shelf components

SYSTEM BUILDING BLOCKS

Iron Anode

- Highly abundant
- Very low cost metal
- Non-toxic
- Highly recyclable

Air Electrodes

- Commercially proven air electrodes
- Readily scalable production

Water based electrolyte

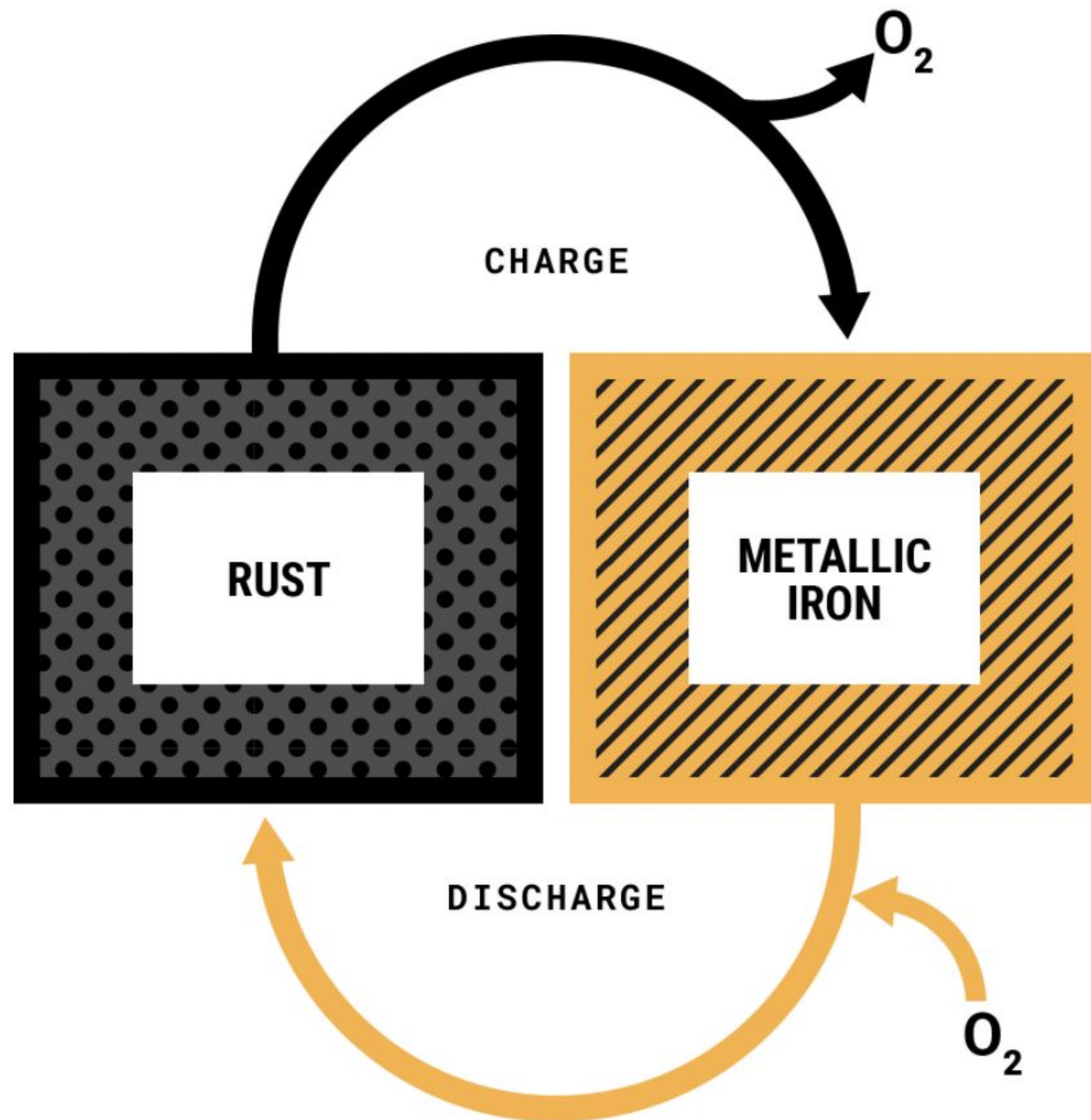
- High pH (similar to AA batteries)
- Non-flammable
- No heavy metals

Balance of System

- Off-the-shelf water distribution, HVAC, & air handling system components
- Standard utility-grade inverter

Rechargeable iron-air is the best technology for multi-day storage

Reversible Rust Battery



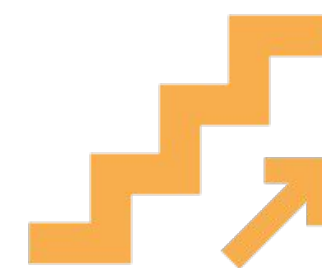
COST

Lowest cost rechargeable battery chemistry.
Less than 1/10th the cost of lithium-ion batteries



SAFETY

Non-flammable aqueous electrolyte. No risk of thermal runaway.



SCALE

Uses materials available at the global scale needed for a zero carbon economy. High recyclability.



DURABILITY

Iron electrode durability proven through decades of life and 1000's of cycles

Key advantages of our technology



LOW-COST

Less than 1/10th the cost of lithium-ion battery technology.



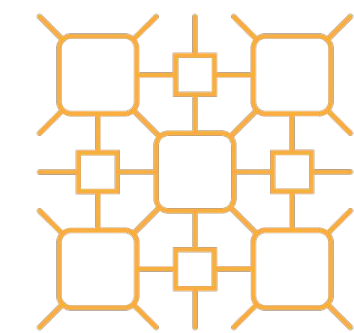
FLEXIBLE

No geographic limitations: can be sited anywhere to meet utility-scale needs.



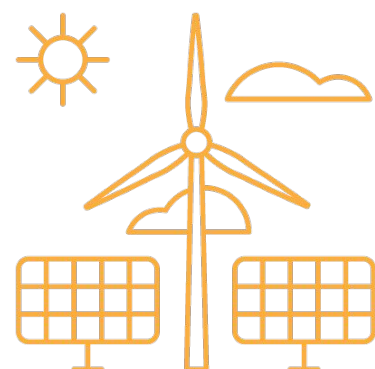
OPTIMIZABLE

Pairs well with lithium-ion batteries and renewable energy resources to enable optimal system configurations.



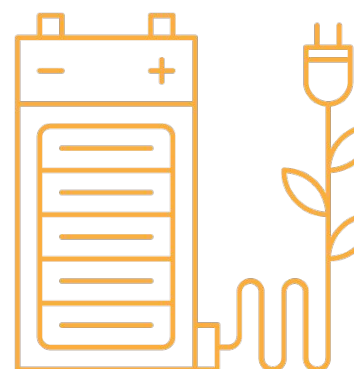
SCALABLE

Materials and designs with global scale needed for zero carbon economy.



MULTI-DAY

No need to supplement number of modules to achieve 100+ hour duration required to make renewables reliable



SAFE

No risk of thermal runaway. Made from non-flammable active materials. High recyclability.

Multi-day storage fills three key grid needs

FIRM CAPACITY

- Reliably replace retiring fossil assets by providing a firm, dispatchable alternative
- “Firm” intermittent renewables at both the asset- and system-level, including over multi-day generation lulls, and reduce uneconomic renewable energy curtailment

FLEXIBILITY

- Shape portfolio output to meet any load profile and respond quickly enough to meet flexible and fast ramping needs

TRANSMISSION OPTIMIZATION

- Reduce transmission grid congestion, increase the total amount of low-cost renewable energy that flows across transmission boundaries, and reduce needs for new transmission lines

Modular design enables easy scaling to multi-GWh systems

Energy Storage System



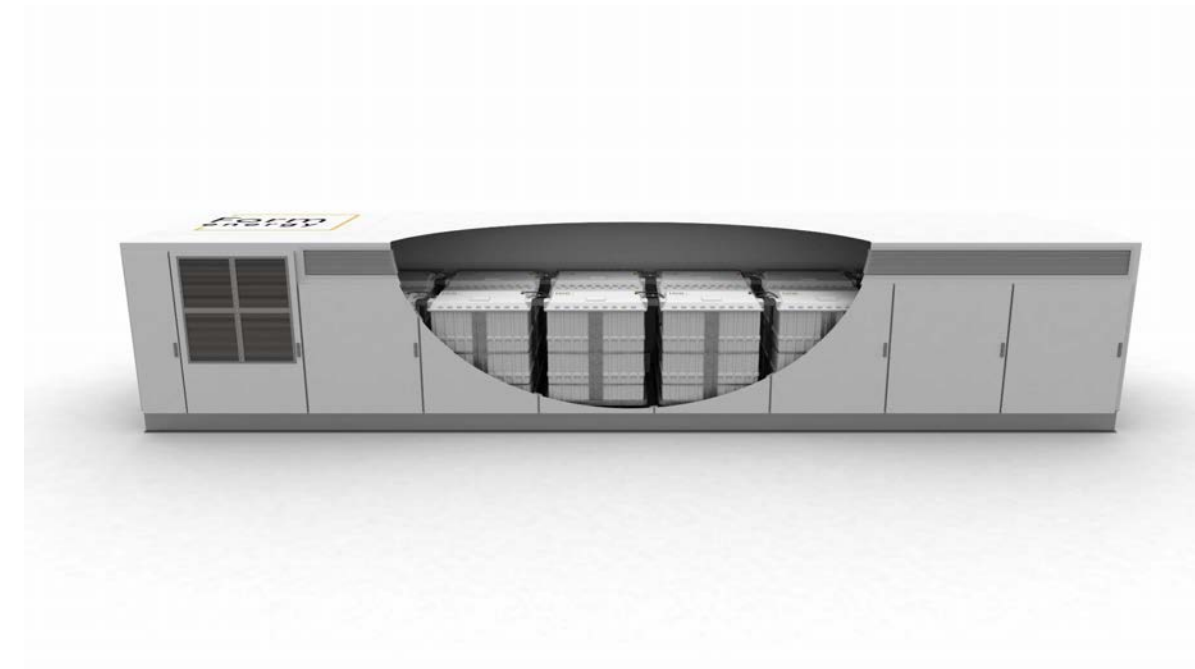
100+ MW / 10 GWh

50+ acres

1000s of Enclosures

Commercial Intent System

Enclosure



~ 10s kW

10 x 40'

~10 Modules

Product Building Block with integrated module auxiliary systems

Battery Module



~ kW

1x1x1m

~10s Cells

Smallest Building Block of DC Power

Cell



< 1 kW

1x1 m

Electrodes + Electrolyte

Smallest **Electrochemical** Functional Unit

Form Energy Multi-Day Storage delivers grid-scale reliable capacity year-round

System Overview

Rated AC System Power	10 - 500+ MW
System Capacity	1 - 50 GWh
Repeatable Power Block	3.5 MW / 350 MWh
Discharge Duration	100 hr
Average Round Trip Efficiency*	40%
Ramp (offline to full power)	< 10 minutes
Areal Energy Density	> 200 MWh/acre
Operating Temperature	-40°C - 50°C
System Lifetime	20 years

**Average AC-AC round-trip efficiency, inclusive of losses from power conversion and auxiliary loads*



Commercial progress underway



Collaborating with Georgia Power on a project application of **up to 15 megawatts/1500 megawatt hours (MW/MWh)** of energy storage systems to be located in the utility's service area

"At Georgia Power, we know that we must make smart investments and embrace new technologies now to continue to prepare for our state's future energy landscape," said **Chris Womack, Chairman, President and CEO of Georgia Power**. "We're excited to have Form Energy as a partner to help us build on Georgia's solid energy foundation."

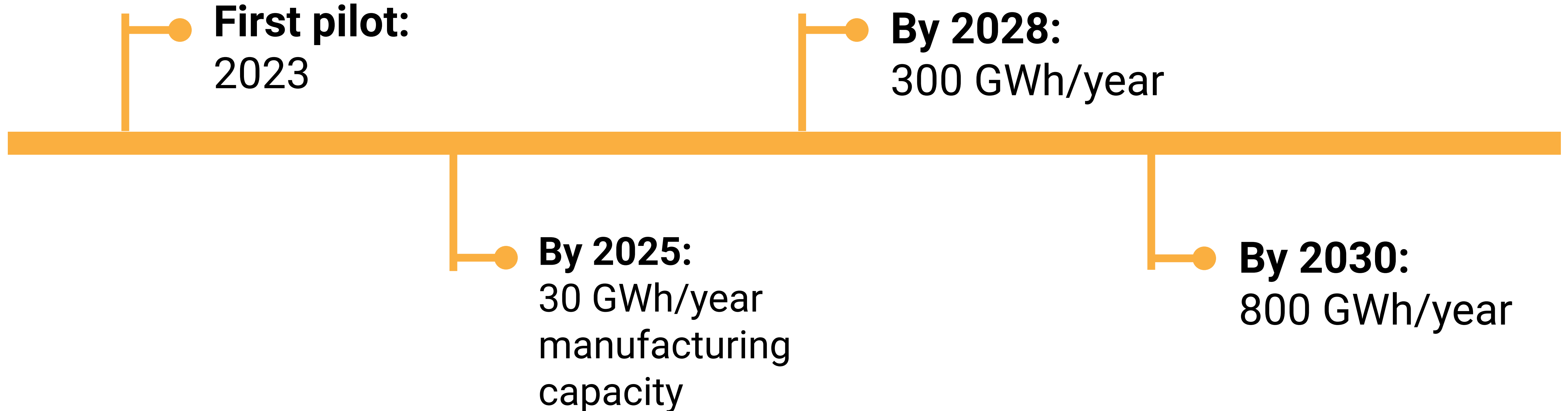


Partnering with Great River Energy to deploy a first-of-its-kind **1.5 megawatt/150 megawatt hour** multi-day energy storage project in Cambridge, Minnesota in 2023

"Great River Energy is excited to partner with Form Energy on this important project. Commercially viable long-duration storage could increase reliability by ensuring that the power generated by renewable energy is available at all hours to serve our membership," said **Great River Energy Vice President and Chief Power Supply Officer Jon Brekke**.

Form Energy offers an affordable and reliable solution, year-round

Key Milestones



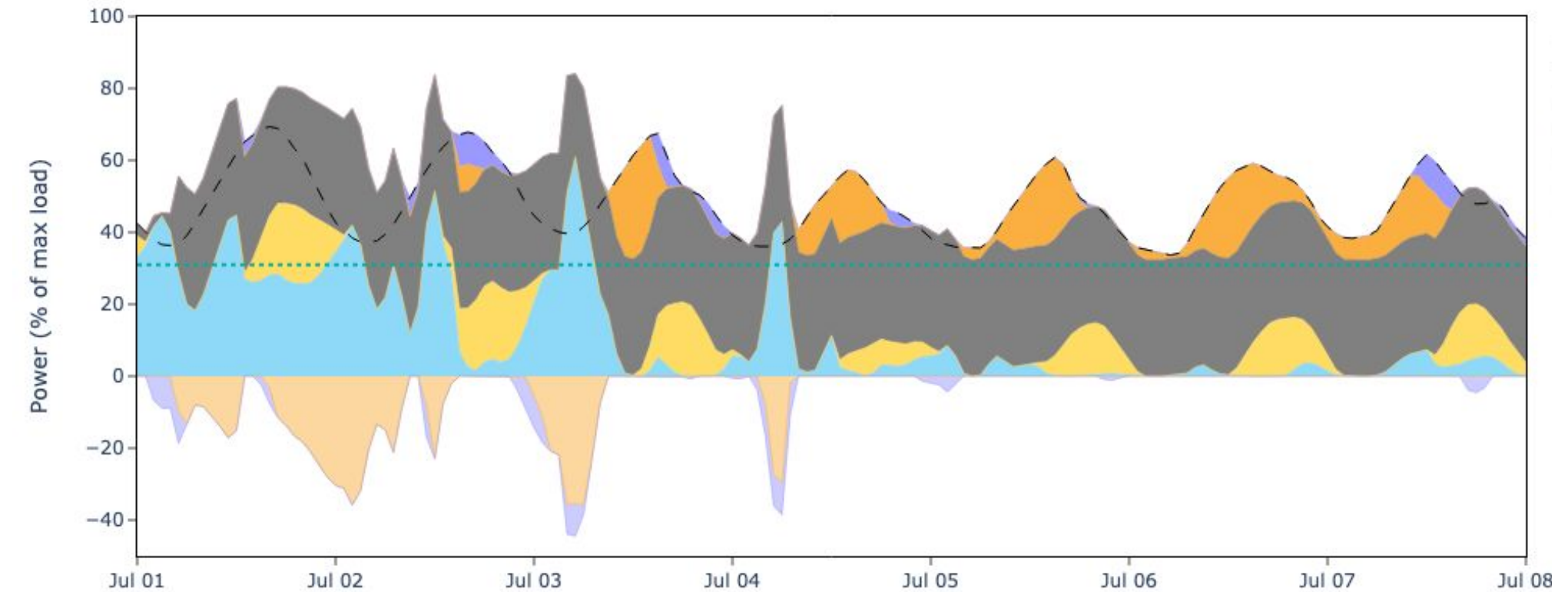
What is Formware?

Formware is a flexible, high-fidelity power system model that optimizes for least cost:



Capacity Expansion

Composition and sizing of energy asset portfolios



Unit Commitment & Economic Dispatch

Hourly operation of energy assets

Formware Differentiators

- **Granularity:** 8760+ model captures forecast volatility
- **MDS Modeling:** captures multiday storage attributes & dynamics
- **Scenario Modeling:** co-optimizes to validate solution across range of conditions
- **Model Customization:** flexible, customizable model enables delivery of bespoke analyses on-demand

Thank you!