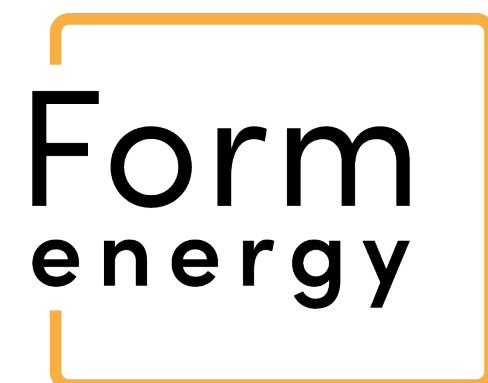


# BREAKTHROUGH LOW-COST, MULTI-DAY ENERGY STORAGE

David Hill - Director, Business Development & Operations



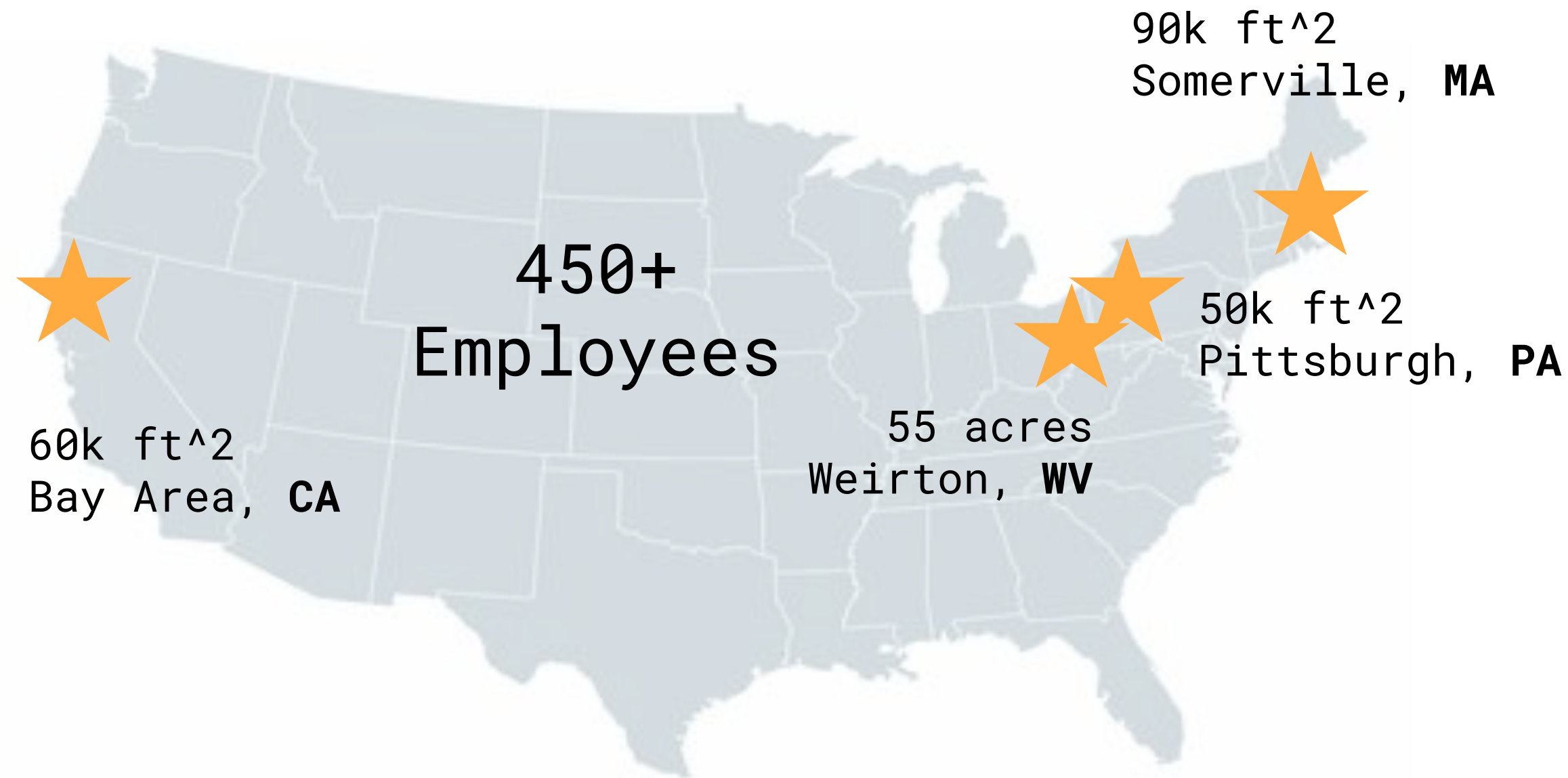
Energy Storage  
For A Better World

CONFIDENTIAL





# Rising to the challenge of climate change with a team that will deliver



## OUR INVESTORS: LONG-TERM AND IMPACT-FOCUSED

**\$820M+** in venture capital from top investors including: Breakthrough Energy Ventures (BEV), TPG's Climate Rise Fund, Coatue Management, GIP, NGP Energy Technology Partners III, ArcelorMittal, Temasek, Energy Impact Partners, Prelude Ventures, MIT's The Engine, Capricorn Investment Group, Eni Next, Macquarie Capital, Canada Pension Plan Investment Board, and other long-term, impact oriented investors

## LED BY ENERGY STORAGE VETERANS

Decades of cumulative experience in energy storage

- 100's of MW of storage deployed



# The Challenge

*The electrical grid needs to fundamentally transform to meet the challenges posed by climate change*



Intermittency of renewable assets creates periods of undersupply



Carbon mandates require retirements and risk stranding fossil assets



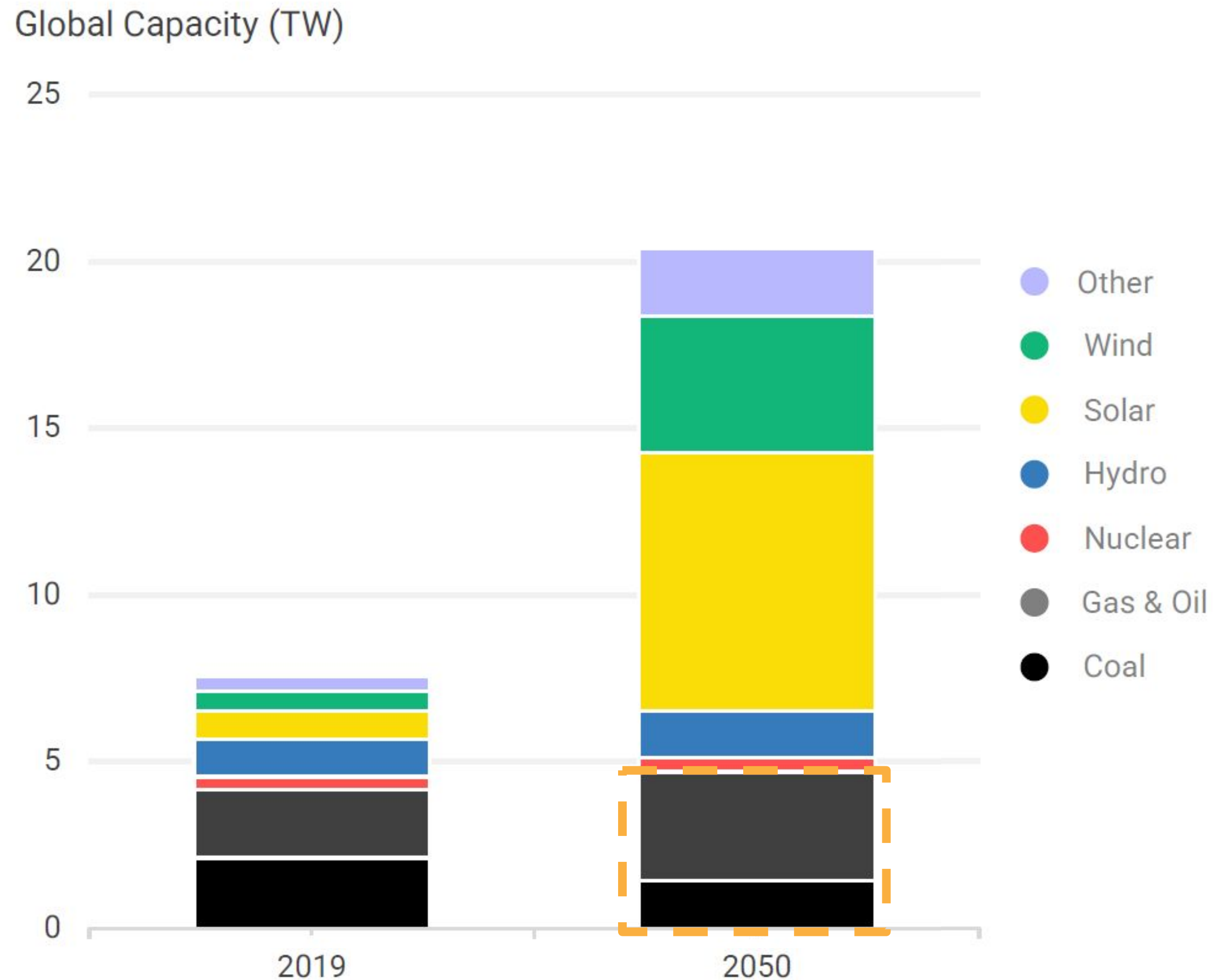
Extreme weather events become more frequent and disruptive to customers



Increased transmission congestion and long interconnection queues

# The tech gap: 4.7 TW opportunity to replace fossil plants globally

## Forecast Global Generation Capacity with Existing Commercial Technologies



Source: BNEF New Energy Outlook (2020)

**Change:** As the grid electrifies and renewable costs plummet:

- >4x growth in renewables
- 12.8 additional TW of capacity

**Obstacle:** Legacy fossil remains to maintain reliability as electric demand rises.

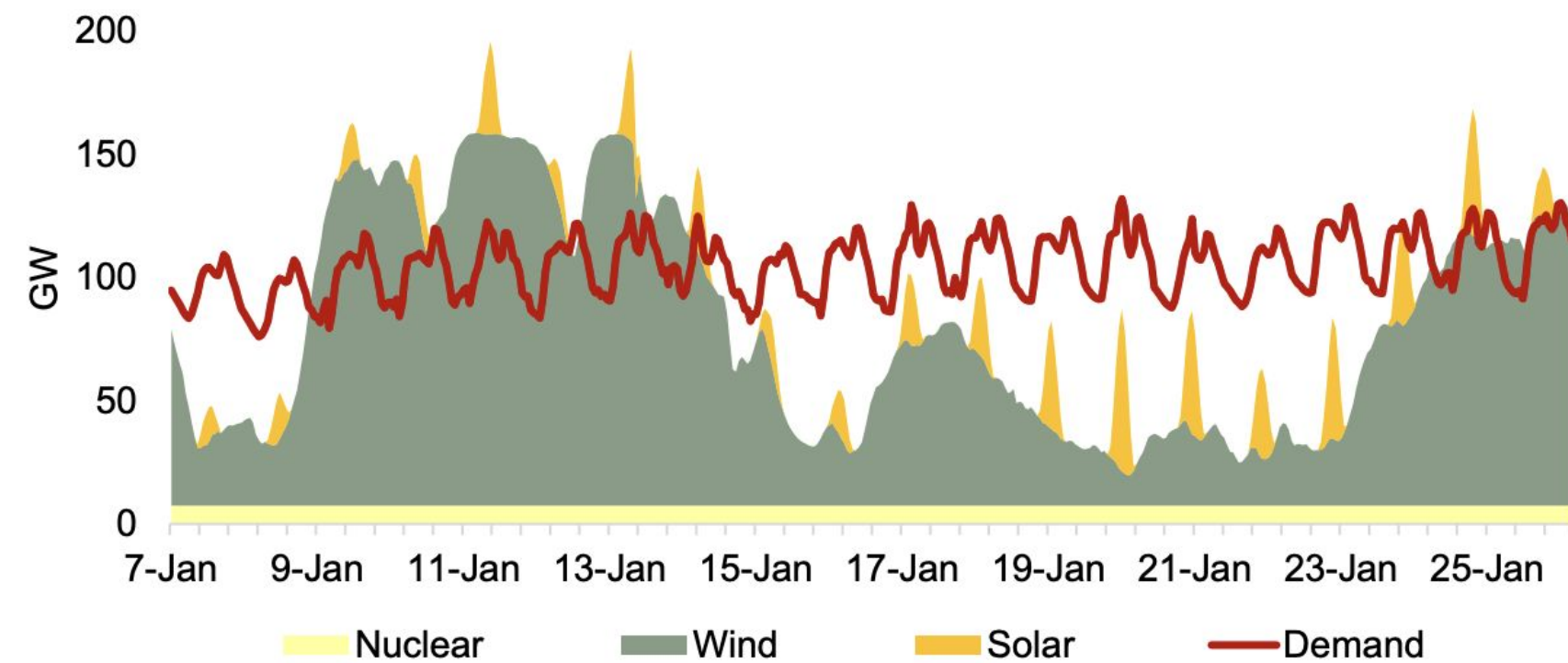
**Opportunity:** Eliminate ~4.7 TW of fossil power plants by firming renewable energy



# Reliability challenges are universal - increasingly weather driven

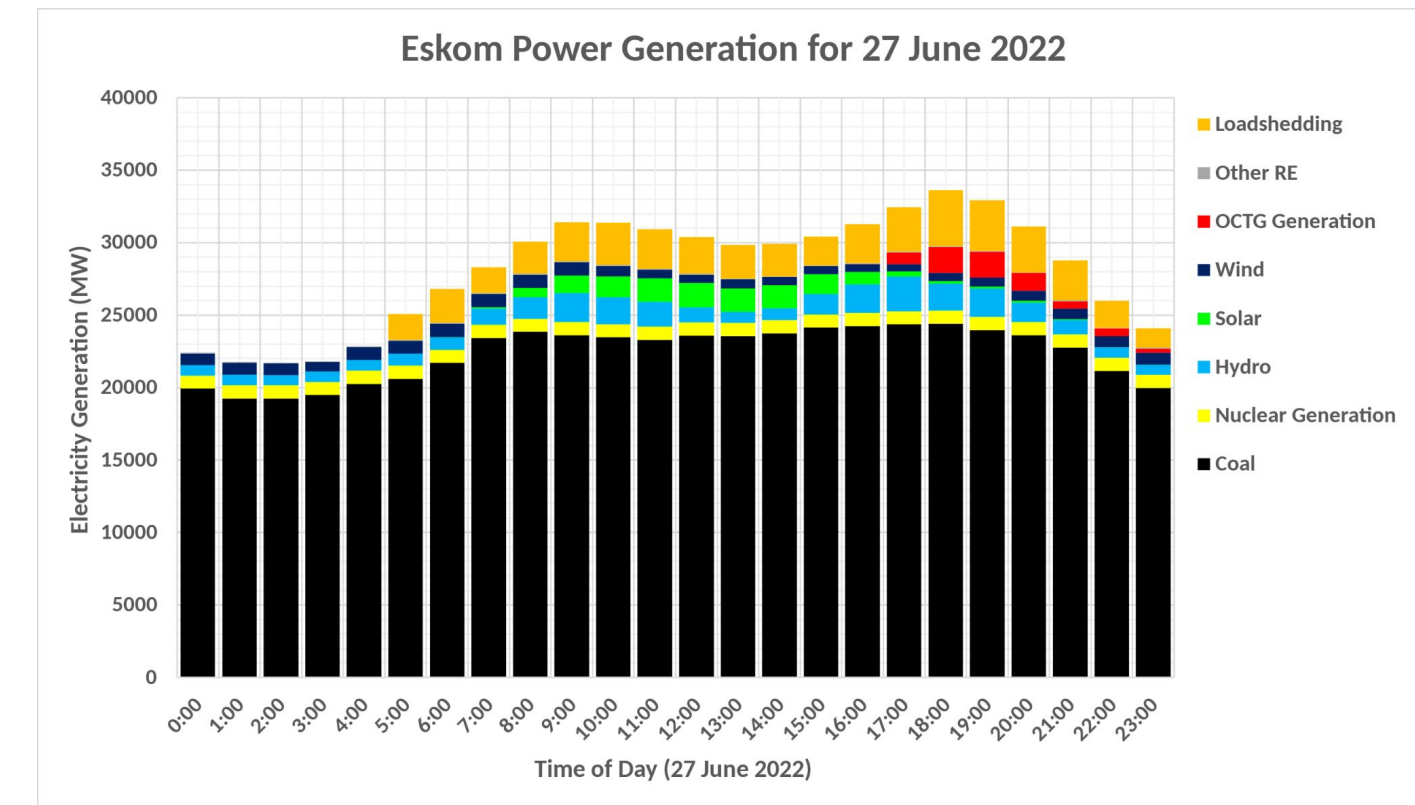
## Great Britain Multi-Day Weather Event, 2050

Exhibit 1.6 – Generation and consumption gap (illustrative, across a period with January 2017 weather, with 2050 demand and renewable capacity mix)



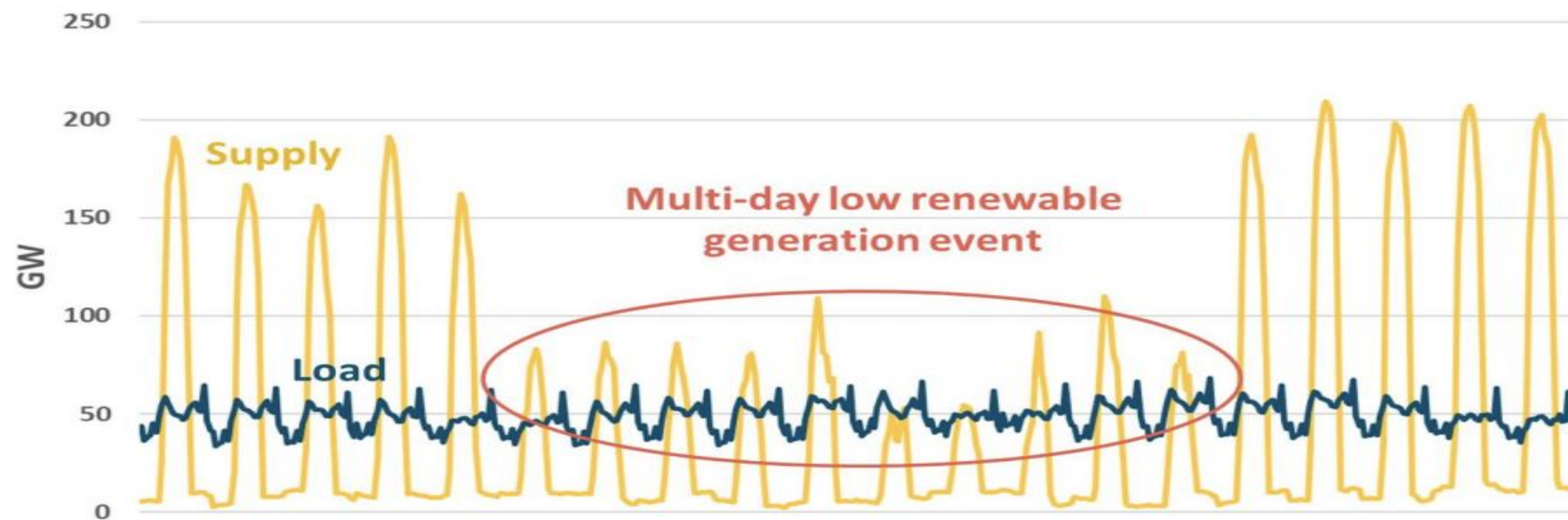
Source: AFRY, BEIS - Benefits of Long Duration Energy Storage (2022)

## South Africa Daily 20 hour load shedding across the country



Source: Eskom Energy Portal (2022)

## California Multi-Day Weather Event in Winter, 2050

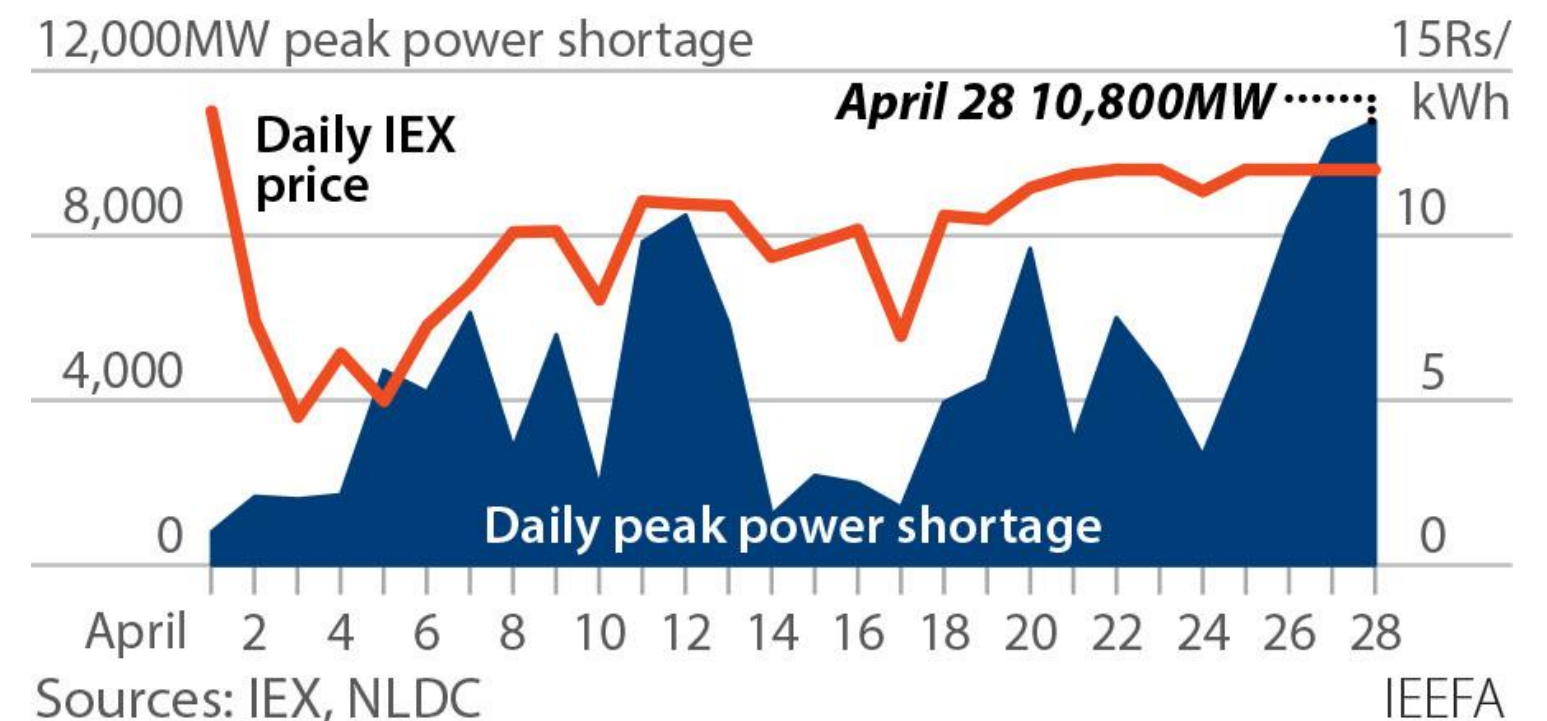


Source: E3, Long-Run Resource Adequacy Under Deep Decarbonization (2019)

## India Rapid demand growth + decarbonisation

### India: Power Shortage Crisis in April

Record peak shortages; exchange prices hitting the ceiling

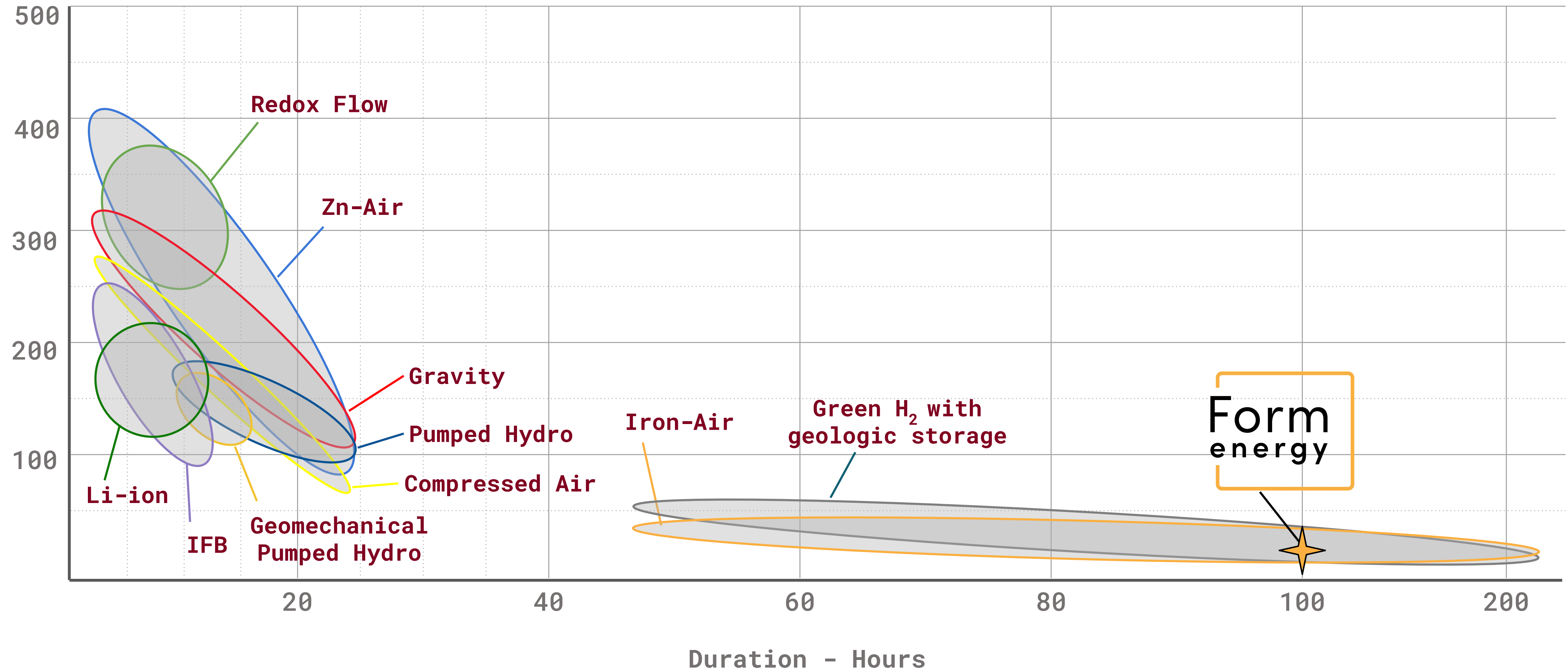


Sources: IEX, NLDC

IEEFA

# Form MDS is the only technology targeting multi-day duration without geographic constraints

2030 Installed Cost - \$/kWh





# Commercial progress underway



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 2024

“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**.



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 Xcel Energy to deploy **two 10 MW / 1,000 MWh** multi-day storage systems; one in Becker, MN and one in Pueblo, CO. Both projects are expected to come online as early as 2025

“As we build more renewable energy into our systems, our partnership with Form Energy opens the door to significantly improve how we deliver carbon-free energy so that we can continue to provide reliable and affordable electric service to our customers well into the future.” said **Bob Frenzel, Xcel Energy President and CEO**.



# Form Factory 1: commercial-scale manufacturing

Transforming Weirton steel land for battery manufacturing in West Virginia



*Building rendering*

- **Total Local Investment:** \$760 million
- **Construction Start:** Early 2023
- **Production Start:** Late 2024
- **Jobs:** Minimum of 750 full-time jobs

## Location Benefits

- Close to our existing pilot manufacturing facility in PA
- Strong natural infrastructure
- Local manufacturing know-how

## Factory Function

- Semi-to-fully automated cell, module, & enclosure assembly
- Ability to scale production in modular blocks

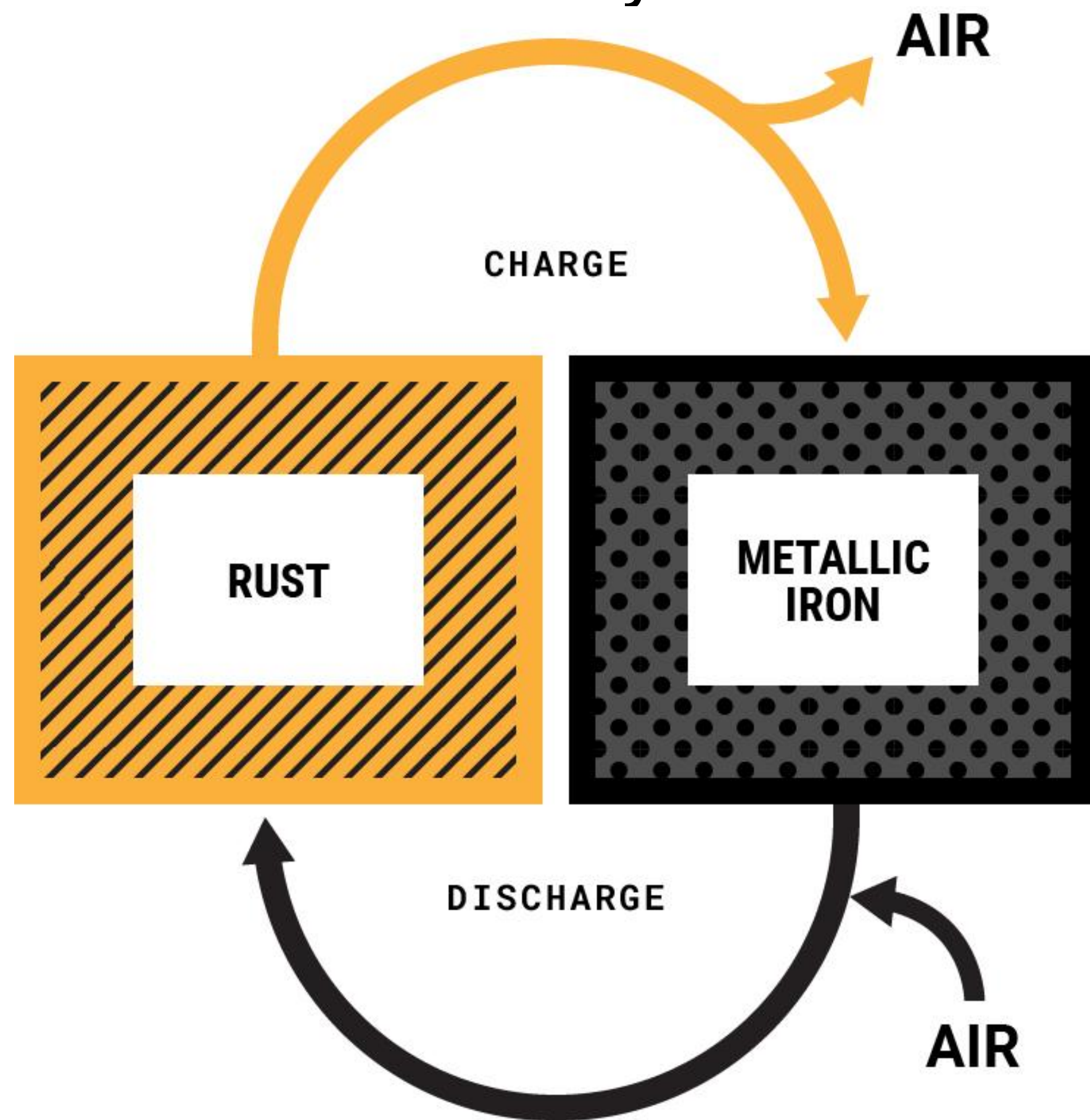


# The Solution



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

## 100-hour Reversible Rust Battery



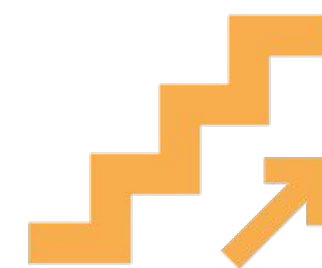
### COST

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



# Form Energy's modular 100hr multi-day storage system

## Cell



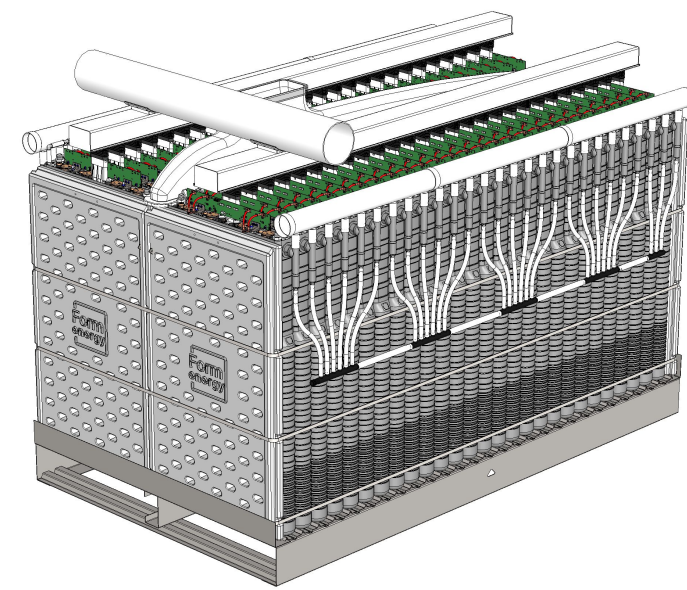
~0.10 kW / 10 kWh

~1m x 60 cm

Electrodes + Electrolyte

Smallest **Electrochemical** Functional Unit

## Battery Module



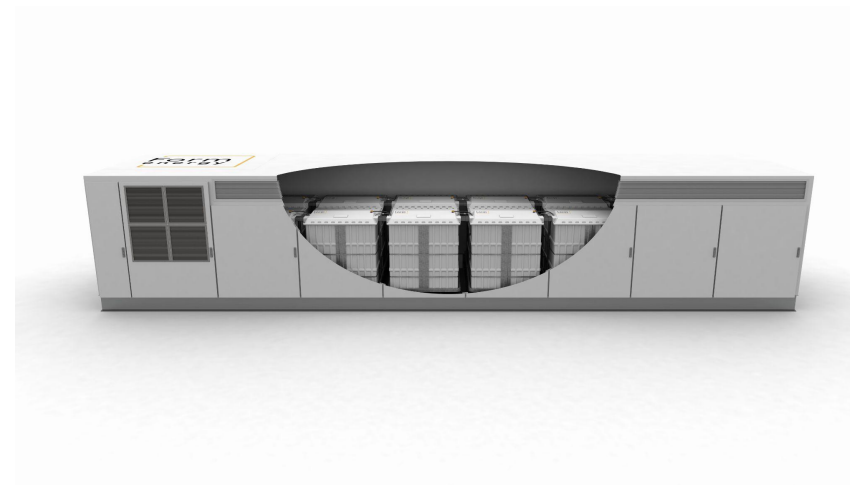
~5 kW / 500 kWh

~2.3 x 1.3 x 1.3m

~50 **Cells**

Smallest Building Block of **DC** Power

## Enclosure



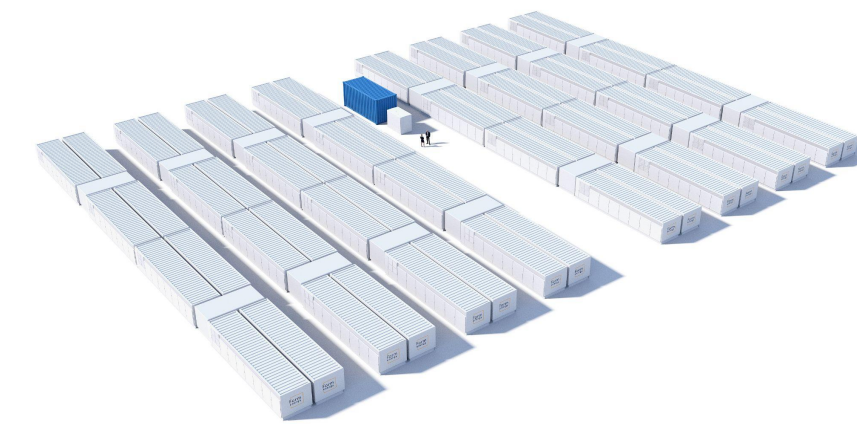
~50 kW

8.6' x 40'

~10 **Modules**

Product Building Block with **integrated module auxiliary systems**

## Power Block



~3.5 MW / 350 MWh

<2 acres

~50 - 100 **Enclosures**

Smallest independent system and **AC Power** building block

## System



100+ MW / 10 GWh

50+ acres

10s - 100s of **Power Blocks**

Commercial Intent System



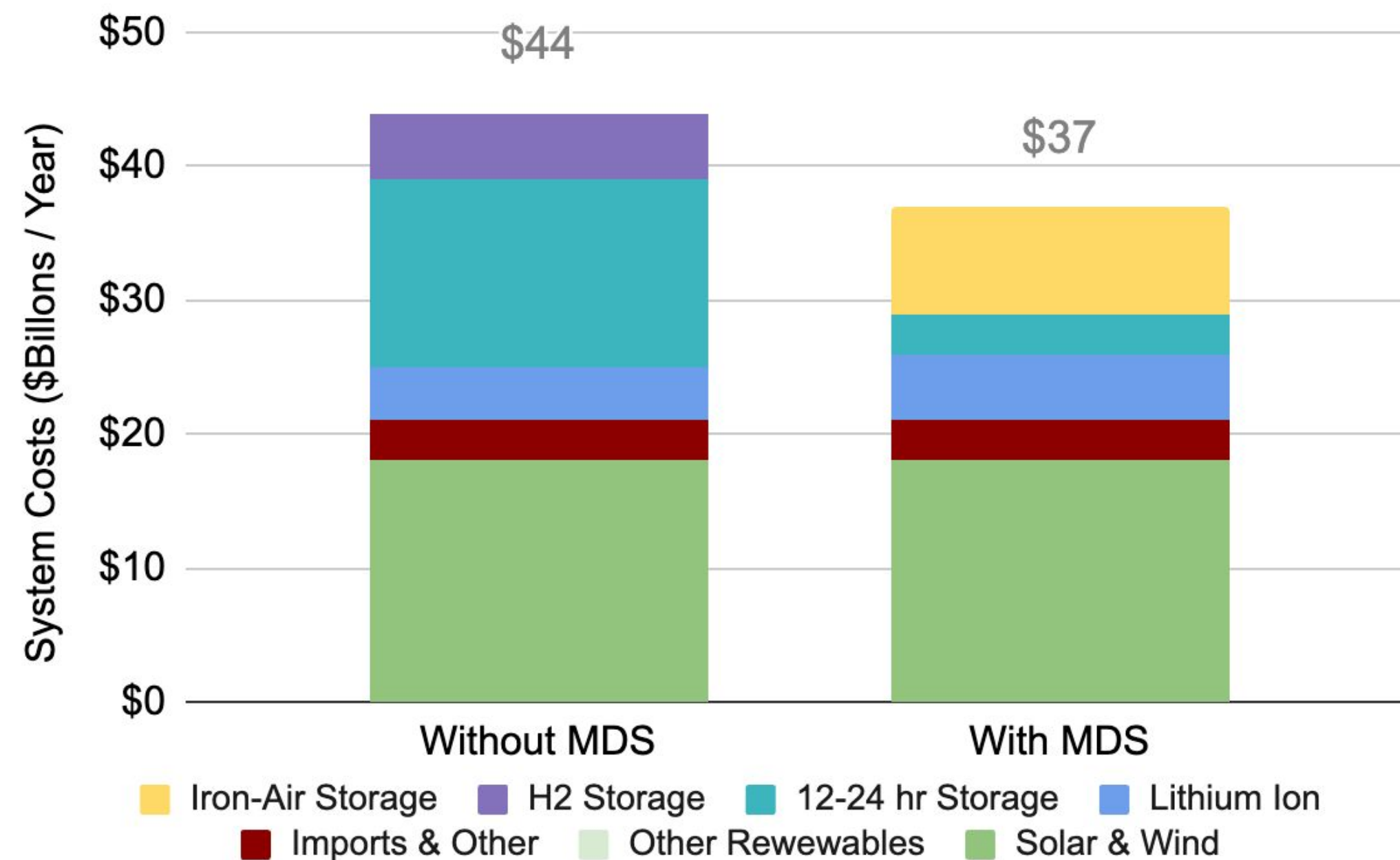
# The Benefits



# Least cost portfolio

## New York System Analysis

### Cost of 2040 Zero Carbon Goals

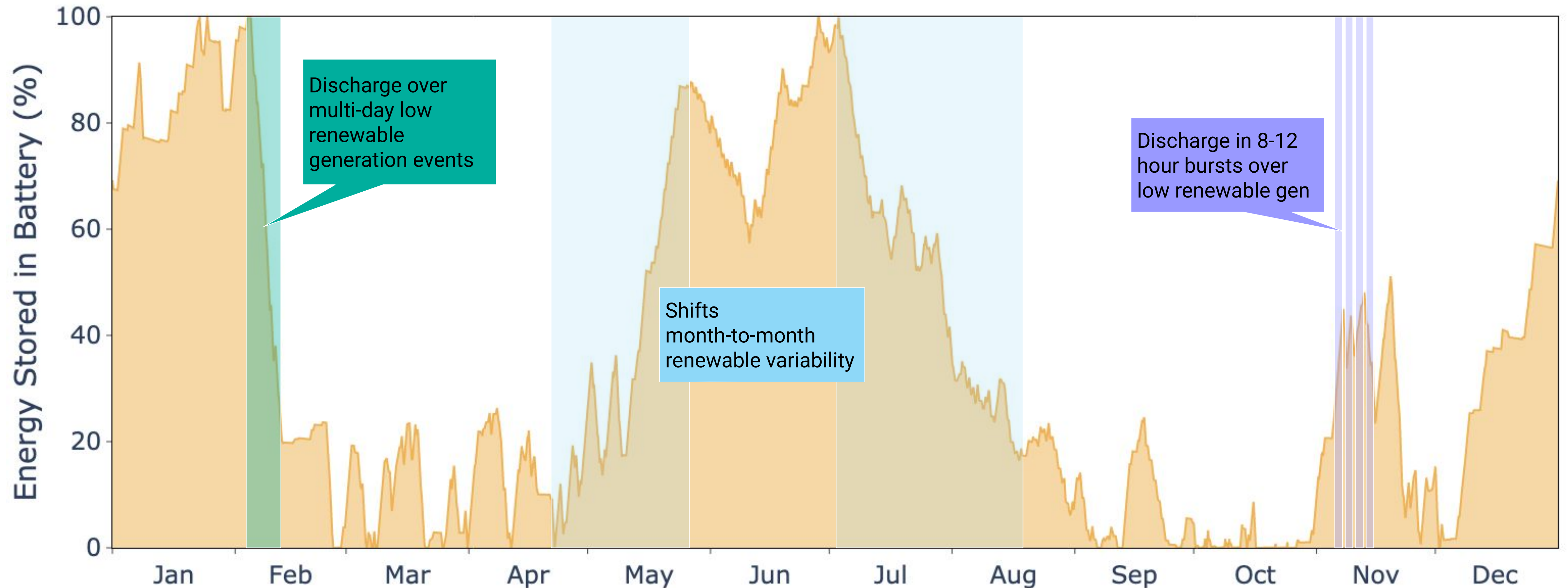


Analysis conducted using Formware, Form Energy's grid modeling software

- Iron-Air MDS has the potential to save New York **\$8b/yr or 20% of total system costs** in a fully decarbonised grid in 2040.
- To meet deep decarbonization goals in such systems, a portfolio with Form's MDS technology results in **substantially lower costs** and total needs for new capacity.
- MDS acts as a **firm capacity replacement for thermal assets**, better integrating intermittent renewables and seasonally shifting energy.



# Multi-day storage operates year-round to balance seasonal, multi-day, and intra-day variability in renewables



● Multi-Day

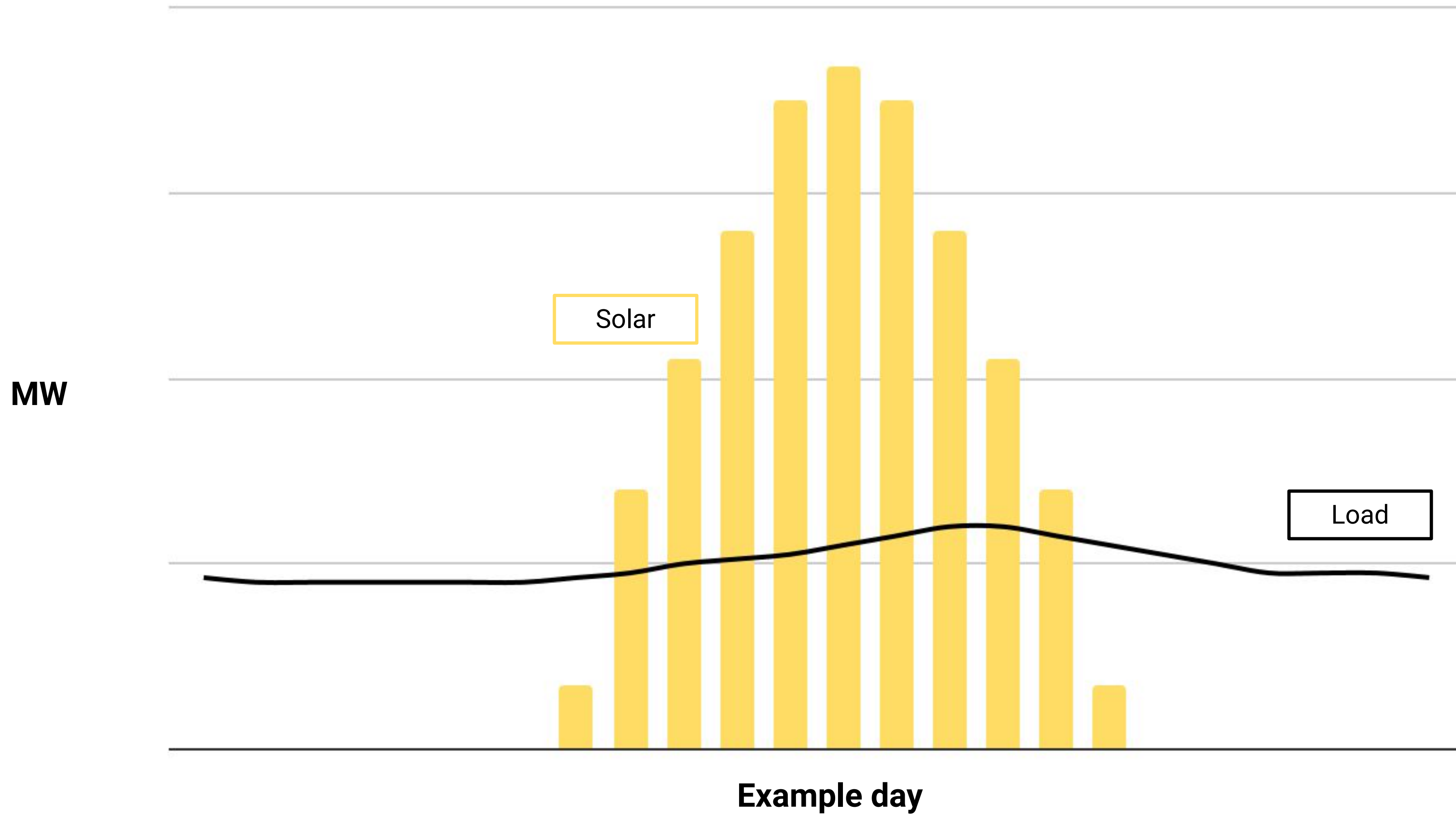
● Seasonal Up  
(net charge with excess renewables)

● Seasonal Down  
(net discharge during peak load season)

● Intra-Day

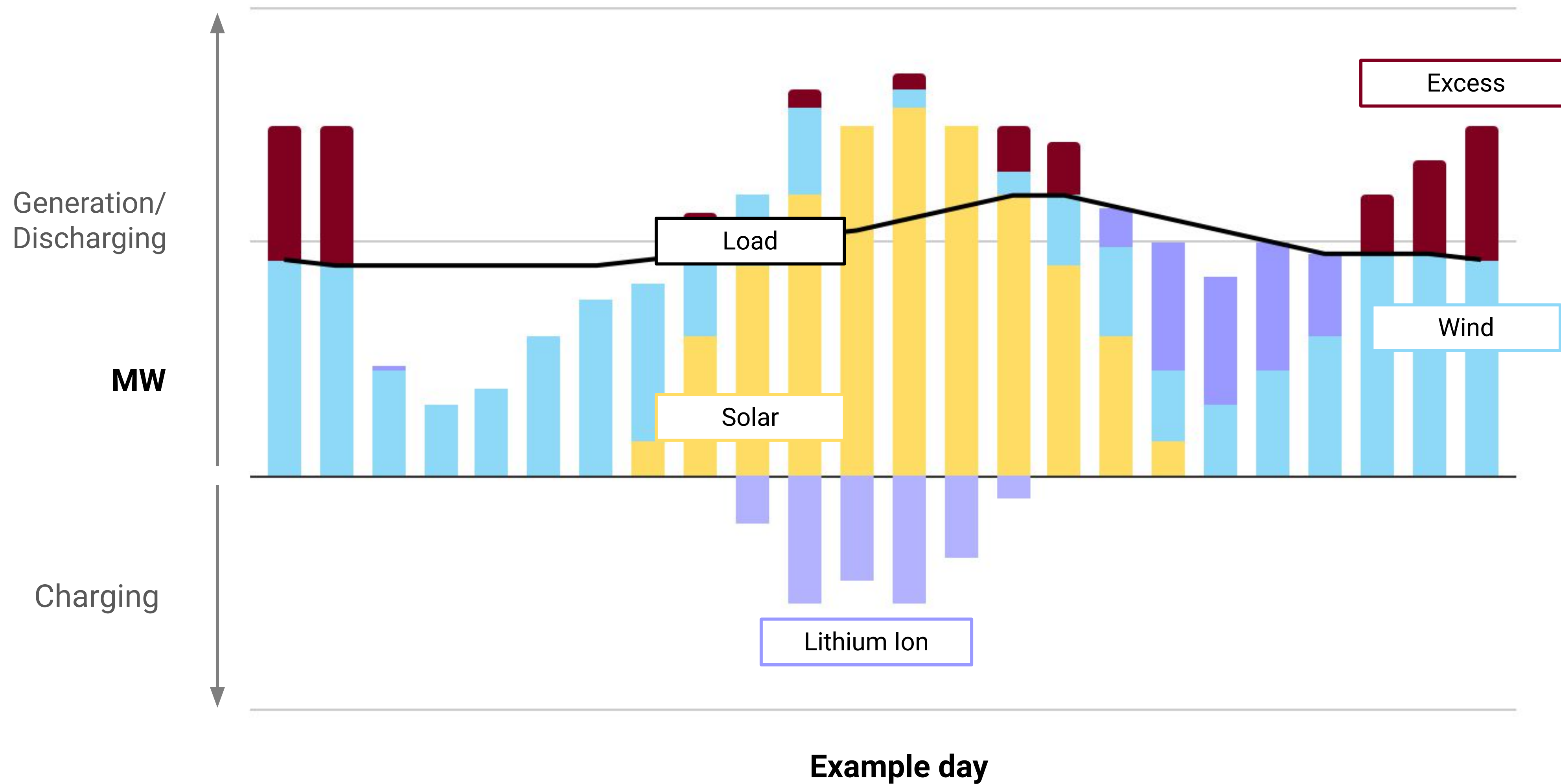


# 100% Renewable microgrids can leapfrog traditional grid system



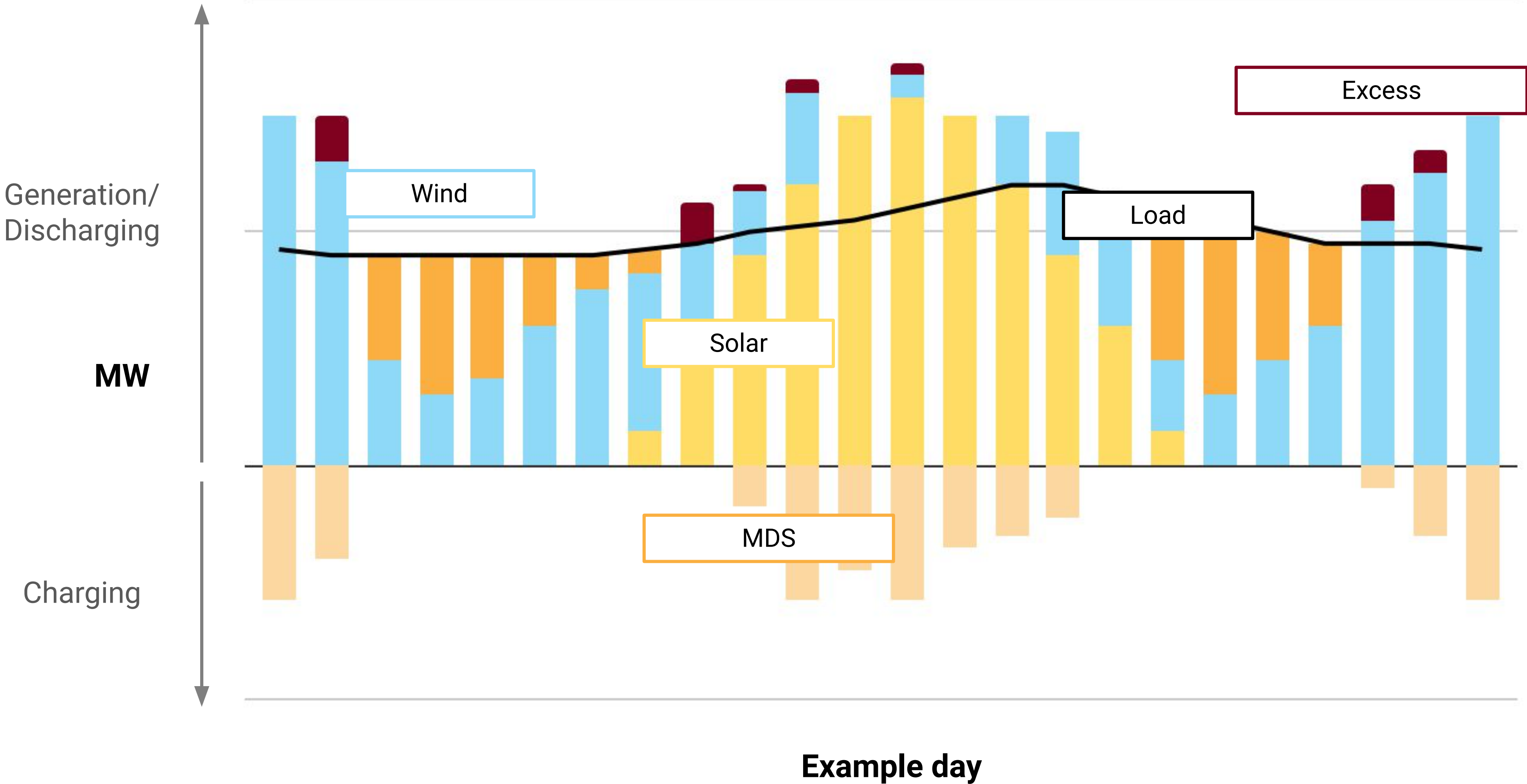


# Renewables plus lithium-ion only gets you 80 - 90% of the way there



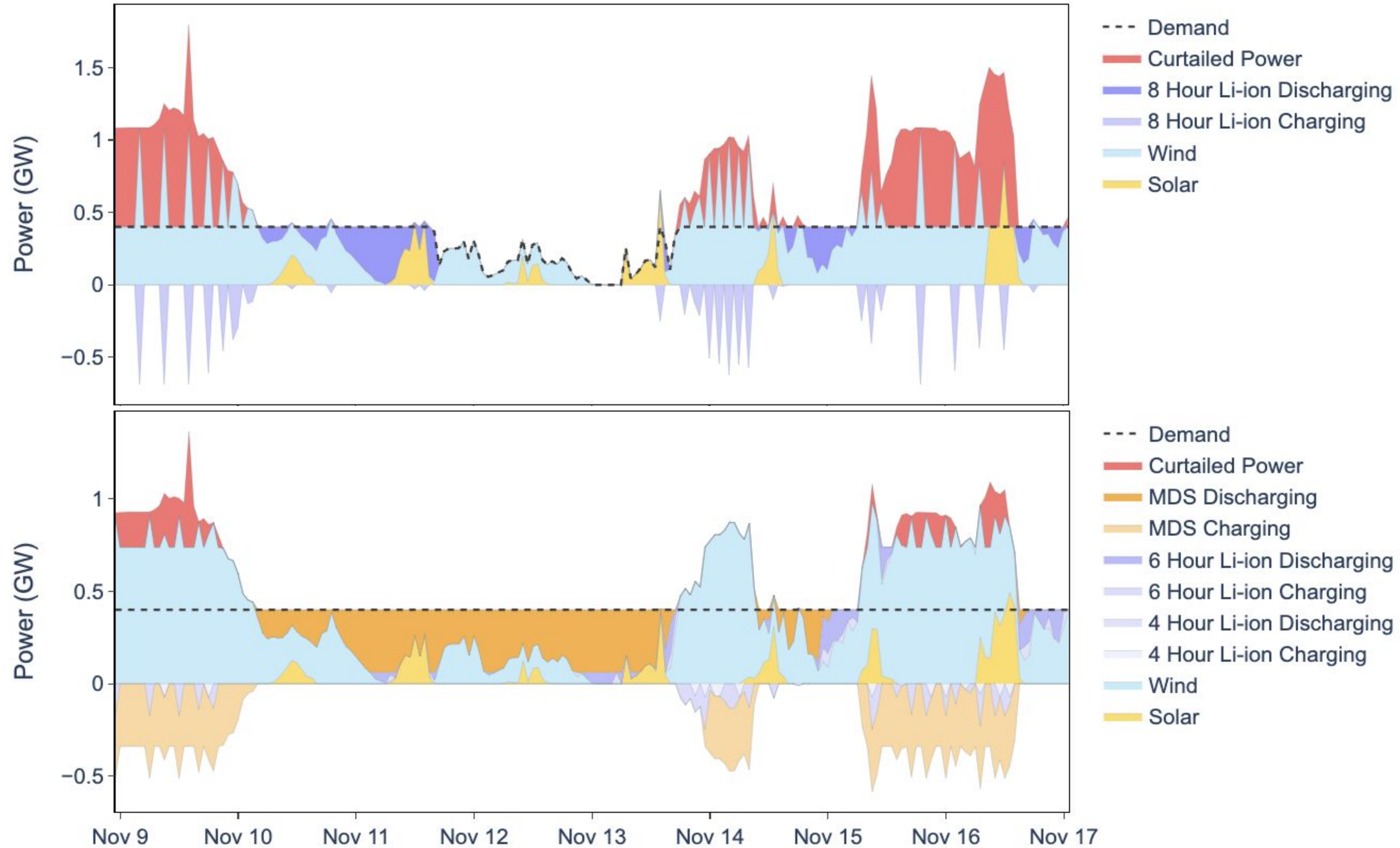


# Around the clock reliable renewable energy requires multi-day storage





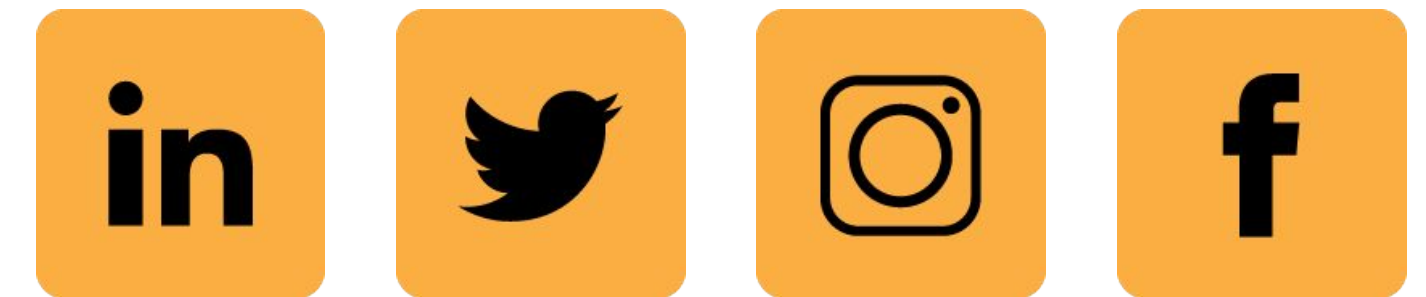
# Around the clock reliable renewable energy requires multi-day storage





# Thank you!

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