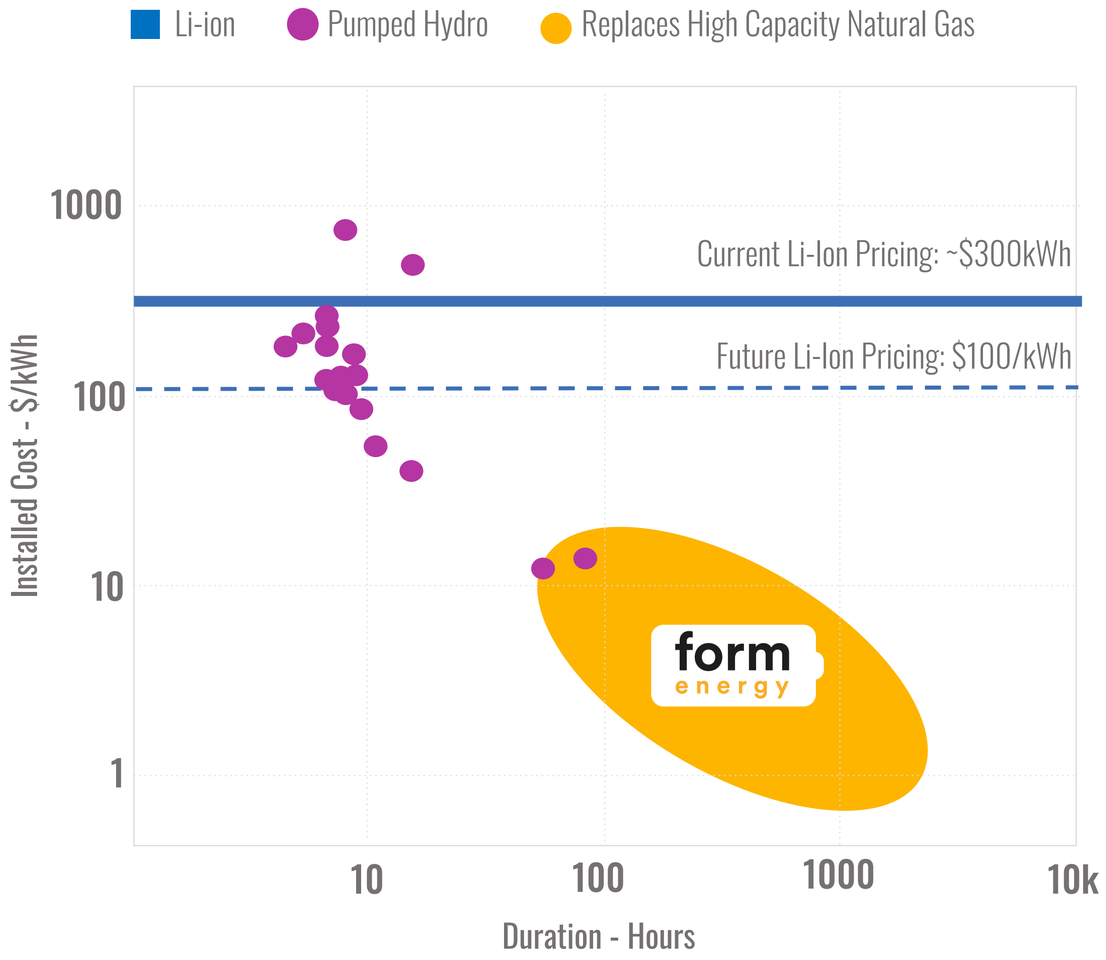
BREAKTHROUGH LOW-COST, LONG-DURATION ENERGY STORAGE

What kind of storage would it take to make renewables as reliable and affordable as gas?

New storage solutions must be

- **10-100x cheaper per kWh than lithium ion**
- **>24-hrs duration**

Pumped hydro is the longest duration/lowest cost storage resource today.



Battery-as-a-plant vision

1

DESIGN

Uses the cheapest materials possible, and in the right form; makes it a sourcing not manufacturing problem. High-value capture in design and function IP, and specialty chemical additives

2

BUILD

Plants can be built on site to spec and on cost by EPC; satisfies wide range of ultimate plant sizes; optimal plant size determined by Form.

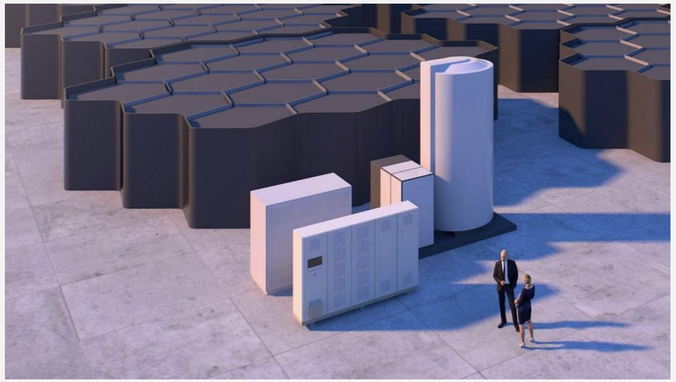
3

OPERATE

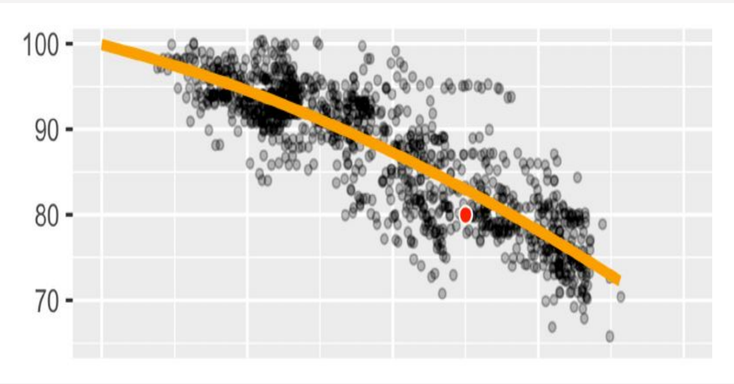
Plant owner is entity with capital appetite; Form optimizes control and operation, secures license fees from owner.

COMMODITY COMPONENTS

MODULAR SCALABLE ARCHITECTURES



DEEP KNOWLEDGE OF PERFORMANCE



Form Energy Team

Co-Founders:

- Mateo Jaramillo, CEO; Founder Tesla Energy, Tesla VP
- Yet-Ming Chiang, Chief Science Officer; MIT Professor, Founder of 6 companies (A123, 24M, Desktop Metal)
- Ted Wiley, President/COO; Co-founder Aquion, HBS, US Army
- Marco Ferrara, SVP Analytics/BD; MIT PhD, VP IHI (ESWare)
- William Woodford, CTO; MIT PhD, Director R&D 24M, TR35

Company:

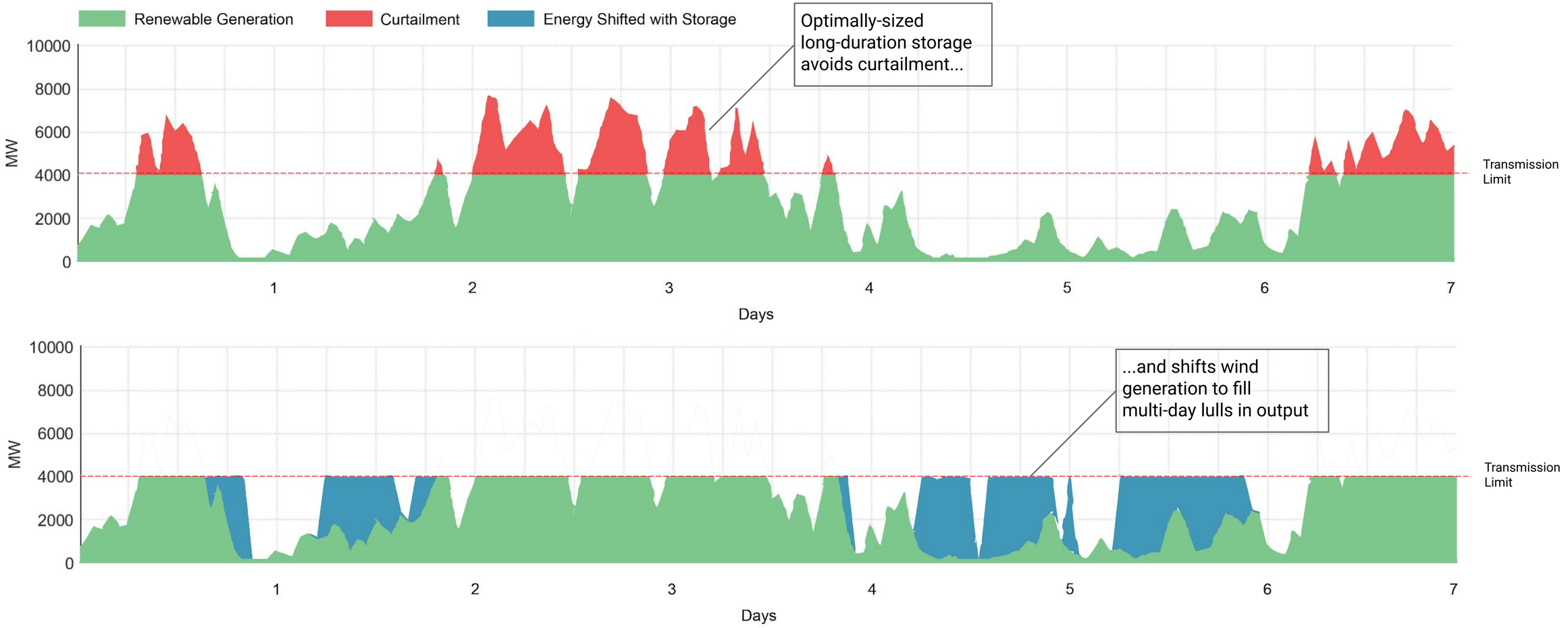
- 35 mostly scientists and engineers (12 PhDs)
- >1000 experiments to date
- 100's of cells on test
- 55,000 ft^2 facility in Somerville, MA

Investors:

- $51M in venture capital to date from Eni Next, Breakthrough Energy Ventures, MIT's The Engine, Prelude Ventures, Capricorn Investment Group, Macquarie Capital, and Saudi Aramco Energy Ventures.

Use Case: Wind + Storage + Transmission Optimization

Goal: Co-optimize long-duration storage with new wind + transmission to import Midwest wind into PJM



Differentiated Value of Long-Duration Storage in Maine

Optimize Transmission

Goal

- Minimize transmission upgrades, maximize transmission utilization

Challenges

- Renewable output exceeds transmission in some hours, causing congestion
- In other hours, low renewable output leaves transmission capacity unused

Solution

Shape renewables to maximize transmission use and respect constraints.

Multi-Day Resilience

Goal

- Maintain grid reliability during multi-day to multi-week periods of peak stress

Challenges

- Multi-day weather events can cause lulls in renewables + fuel shortages, leading to energy insufficiency risks.
- Rural communities can face extended outages from single-line failures.

Solution

Provide dual functions: daily grid services plus multi-day-to-week zero-carbon energy reserves or backup power.

Annually Firmed Renewables

Goal

- Minimize costs to decarbonize the grid and maximize project-level returns

Challenges

- Mismatch between renewable output and times of high load and value.
- Cost of meeting reliability and clean energy goals is high without firm zero-carbon resources.

Solution

Replace the balancing function that gas generation provides and make renewables available when needed and most valuable.

Recommendations

Target the most pressing challenges facing the state and overcome storage commercialization barriers

Grid Needs

- Improve reliability and resilience during winter cold spells
  - Address ISO-NE energy security risks with zero-carbon resources
  - Improve reliability in remote communities without diesel backup or new wires
- Maximize the value of existing transmission and wind projects
  - Avoid uneconomic curtailment, and minimize future transmission needs
- Balance renewables with zero-carbon resources
  - Prioritize demonstrating solutions that can enable reliable high-renewables, low-carbon grids

Recommended Policy Approach

- Pursue first-of-kind long-duration storage demonstration projects
  - Leverage utilities or state funding to demonstrate emerging technologies and high-value use cases

Contact

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