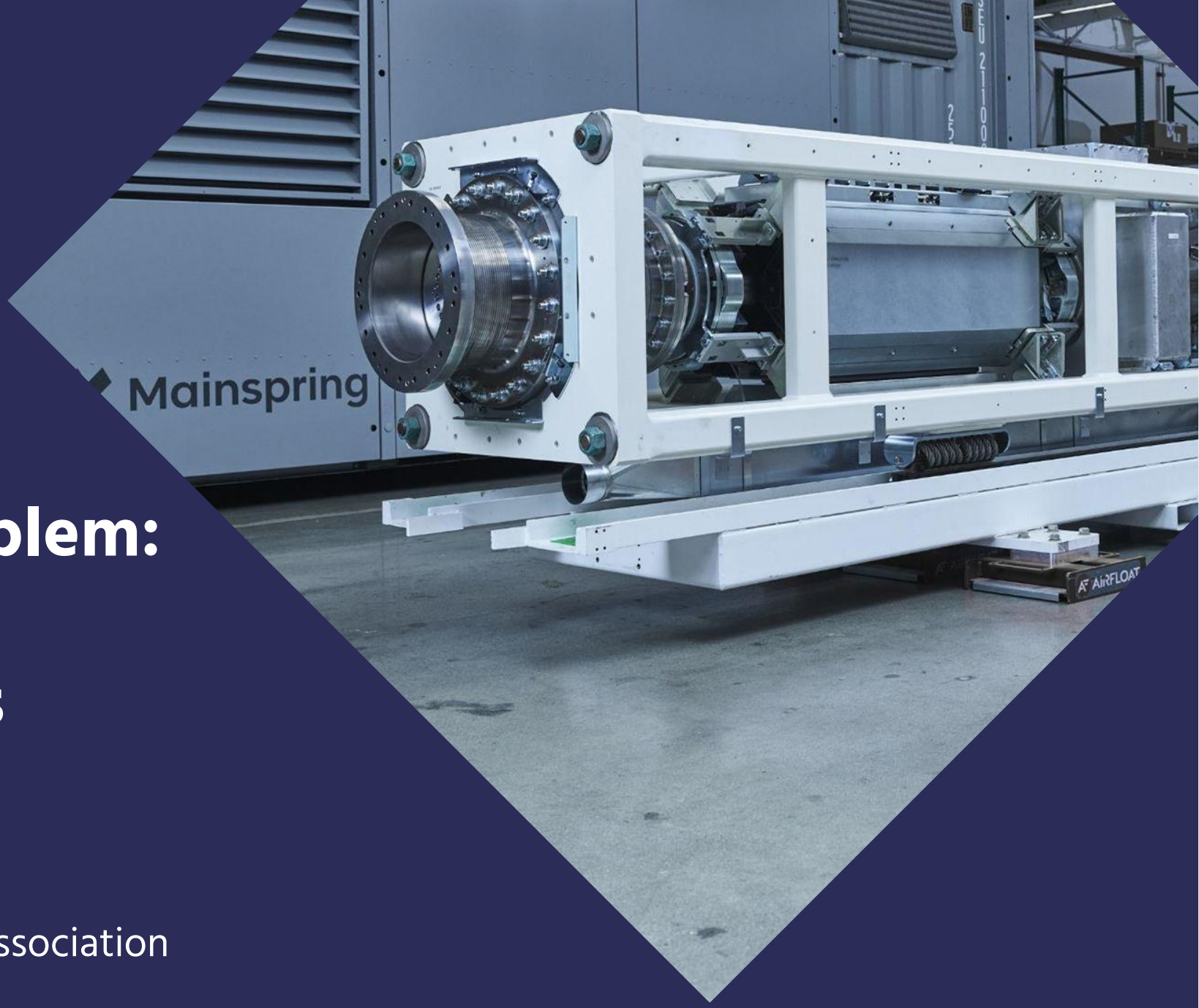
Mainspring



No Power, No Problem: Fuel Flexibility for Microgrid Projects

Kaelen McCrane
Senior Originator
California Creamery Operators Association

Solving problems for dairy operators

Monetization

Drive economic value

Maximize electricity income and capitalize on available incentives

Reliability

Maintain site operations

Modular architecture provides inherent redundancy and concurrent maintenance

Emissions

Remove emissions compliance risk

Low temperature reaction produces electricity with near-zero NOx

Speed

Powering sites faster than the grid

Power faster than the utility while maintaining flexibility post-interconnection

About Mainspring

Superior category of power generation	Local, dispatchable, clean, and fuel flexible power with lowest total cost of ownership, at any scale
Field-proven performance	Proven commercial operations with industry-leading reliability
Blue-chip customers	Fortune 500 companies and leading utilities
Experienced management team	Leaders from SunPower, Honeywell, Invenergy, and Alliant Energy
Strong financial backing	Investors include Khosla Ventures, Bill Gates, Lightrock, AEP, NextEra, and Hanwha

Clean, dispatchable, onsite power generation

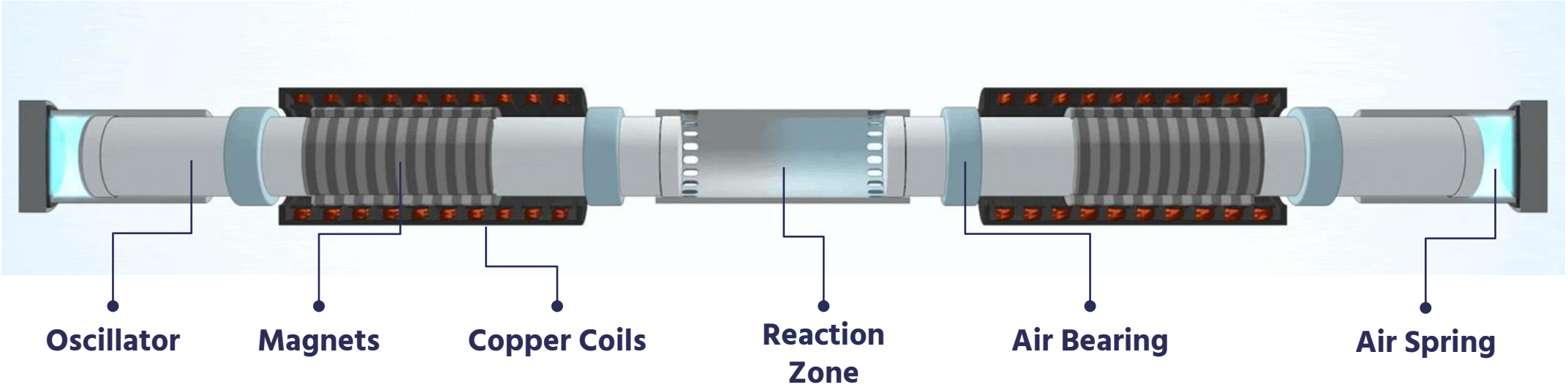
Product

- **Scalable** - 250 kW per box, scalable to meet any power need with up to 25 MW/acre
- **Seamless fuel switching** - runs on variable methane biogas, natural gas, propane, hydrogen and ammonia
- **Minimal cleanup** - biogas composition requirements much lighter than RNG in all steps of the cleanup process
- **Resilient** - grid parallel and islanded operation
- **Easy to permit** - Near-zero NOx emissions
- **Easy installation** - UL listed, add capacity where and when you need it
- **CHP potential** - exhaust heat supplied to process biogas

Services

- **O&M services** - 24/7 monitoring, all inclusive service
- **Financing** - zero-money down, offered through NextEra
- **EPC services** - design, construction, and commissioning
- **Biogas cleanup -** leveraging our network of partners

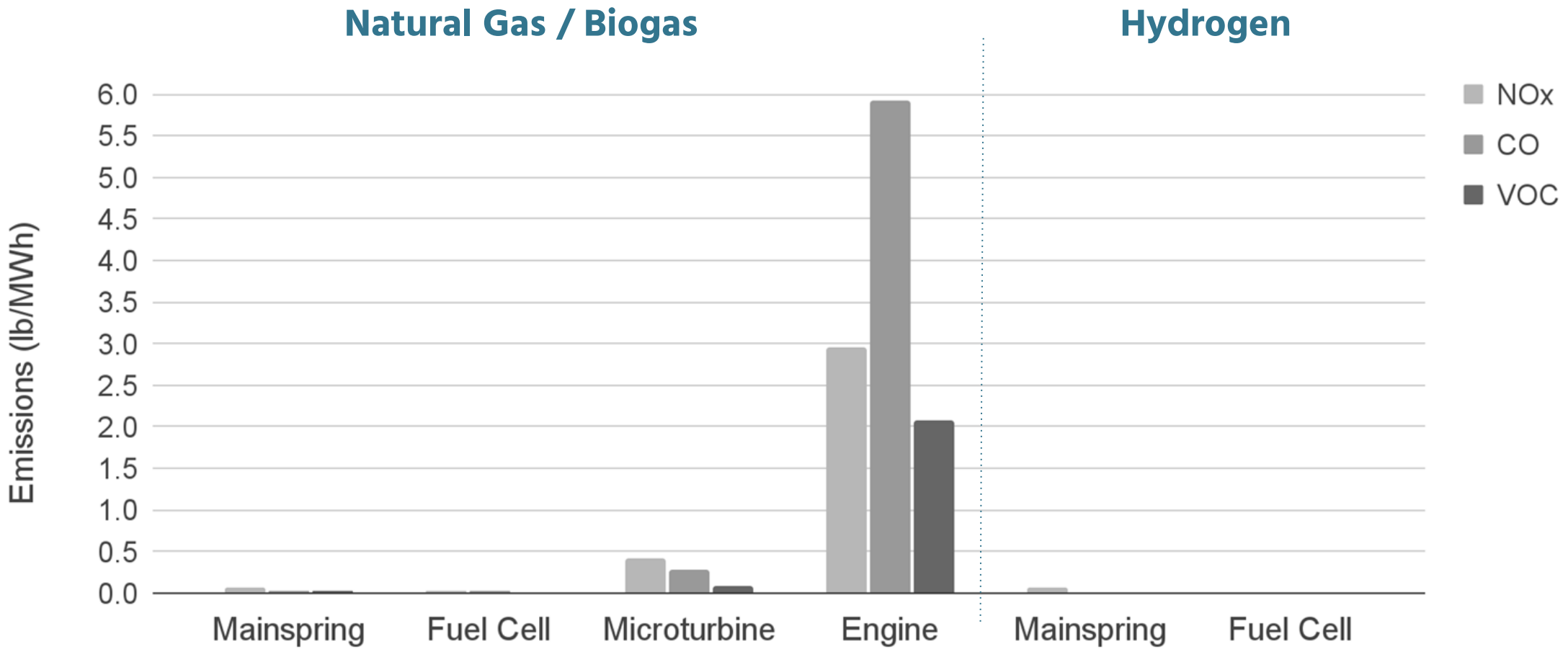
Core technology enabling flexibility and performance



- ☑ **High Efficiency** enabled by direct conversion of linear motion into electricity
- ☑ **Fuel Flexibility & Dispatchability** enabled by power electronics & software control of oscillators motion
- ☑ **Ultra-Low Emissions** enabled by low-temperature, non-combustion reaction without a flame or burning
- ☑ **Low Maintenance & High Reliability** enabled by having only two moving parts riding on air

Video: mainspringenergy.com/technology/

Criteria emissions comparison



Assumptions: Mainspring emissions based on third party source tests; natural gas fuel cell emissions based on Bloom Energy and Doosan data sheets; microturbine emissions based on Capstone data sheets; and engine emissions based on EPA NSPS emissions limits for SI engines

Flexible operating modes enable optionality

Phase 1: Power faster than utility
Pre-Interconnection

<10 months vs. years from utility Islanded, black-start capability

Phase 2: Power cheaper than utility
Post-Interconnection

Fully dispatchable to shave peaks without the duration limitation of batteries

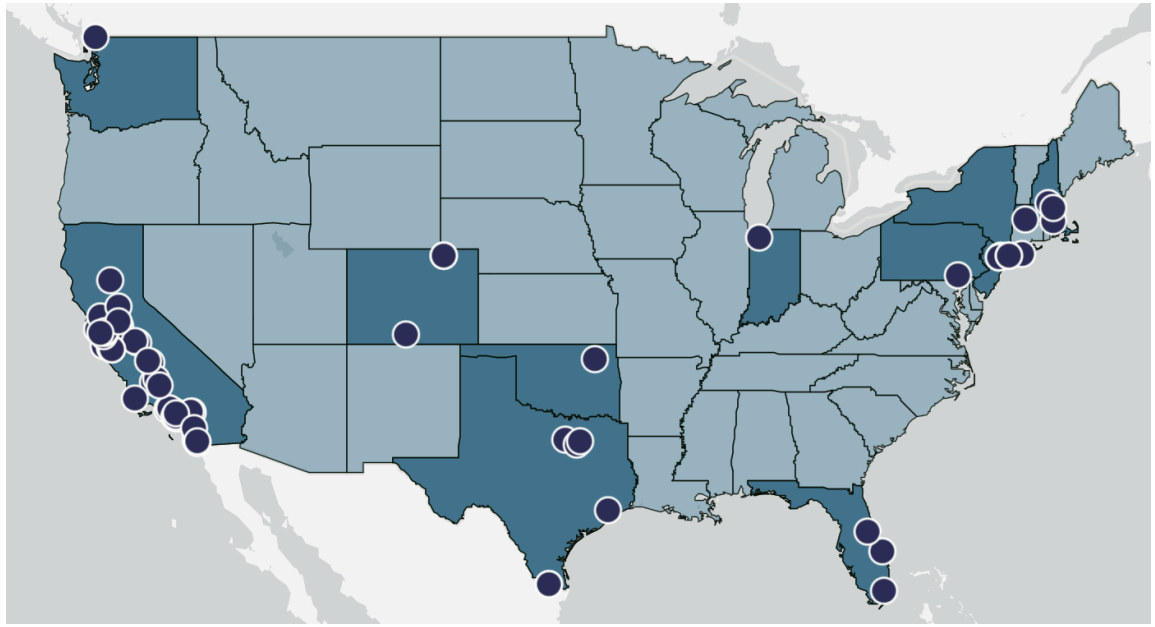
100% facility backup during grid outages

Combine grid + MSE to increase total capacity and power facility expansion

MSE Grid

Proven commercial results for top-tier customers

Rapidly expanding nationwide footprint



- Sites deployed, contracted and in contracting

Map as of Q1 2024

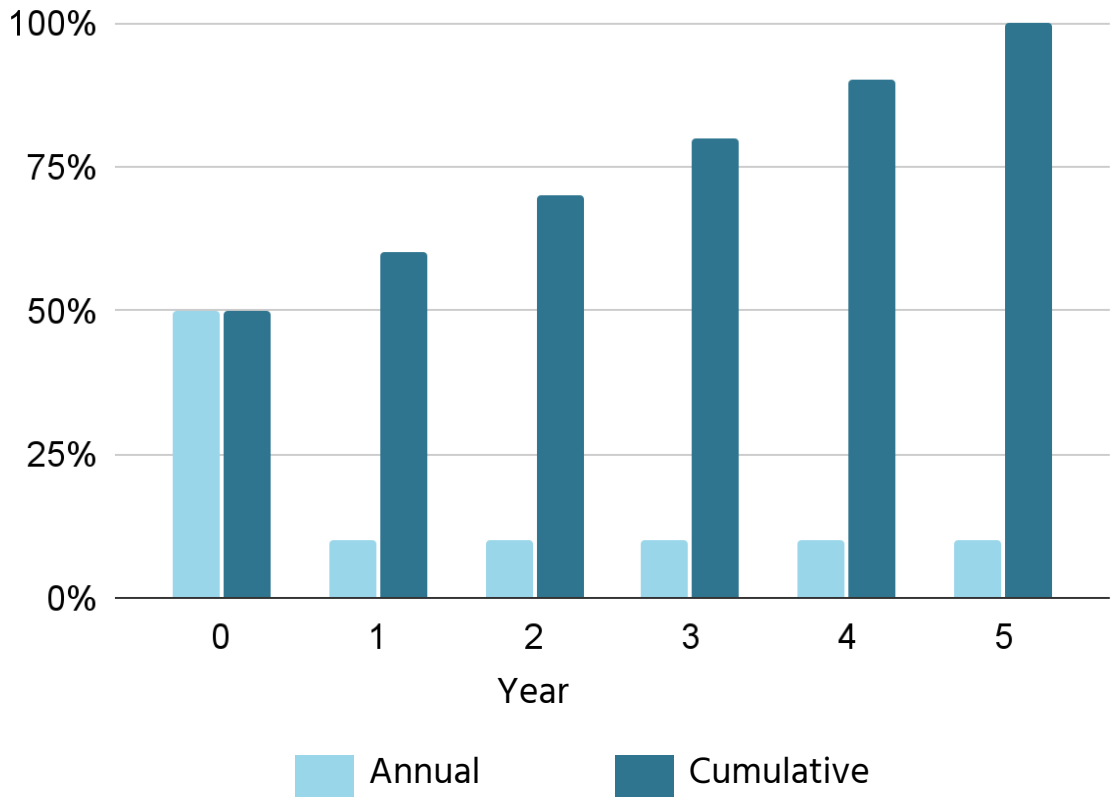
In-field power generation experience

50+ years core run time	4 years customer operation	Consistently beats NERC availability rate

Kroger · Lineage · PROLOGIS · NapaSan · FPL · PG&E · American Electric Power · NextEra Energy Resources

California Self-Generation Incentive Program

Incentive Payment Schedule



Program Benefits

- $2,000/kW base incentive
- $2,500/kW resilience adder for eligible projects
- Incentives paid out over five years based on the schedule to the left

Project Requirements

- 100% renewable power generation
  - Onsite biogas
  - Renewable natural gas / directed biogas
  - Green hydrogen
- 15% minimum capacity factor
- Grid interconnection
- Resilience adder requires the onsite generation to power defined facilities in designated fire prone areas

Case study Leading dairy developer

Clean, onsite energy generation using biogas for a leading dairy digester developer in California

Problem

Desire to maximize value of available biogas and LCFS credits while minimizing emissions to meet compliance requirements

Solution

1 MW linear generators produce electricity from biogas directly, both to power facilities in parallel with the grid and to operate independently from the grid for clean resilient power at remote dairies

Impact

Improved overall project economics while enabling clean resilience with near-zero NOx emissions

Case study Lineage Logistics

Clean on-site power generation for the world's largest and most innovative temperature controlled supply chain company

Problem

Net-zero commitments coupled with unpredictable utility rate increases and grid outages which threatened business operations

Solution

7 MW of linear generators deployed across 13 locations providing energy cost savings, predictability, solar firming and resilience against outages

Impact

Exceeding energy cost savings targets while also providing the desired predictability and pathway to support Lineage's net zero carbon commitments

Case study EV microgrid

Clean, onsite EV charging infrastructure for a global leader in logistics real estate

Problem

Utility could not meet 10 MW capacity need for EV charging infrastructure at shipping port

Pre-interconnection solution

Microgrid with 3 MW of linear generators and 6 MW / 18 MWh of battery storage

Post-interconnection optionality

Prime power Peak-hour shaving Clean resilience

Impact

Reduced time to power from 36+ months to 12 months

Affordable

Dispatchable

Clean

Kaelen McCrane
(406) 640-2412
kaelen.mccrane@mainspringenergy.com