

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

### Business challenge

This developer captures biogas at dozens of dairy locations in California and upgrades and injects it into existing gas pipelines as a net-zero carbon fuel to be used to power vehicles or generate electricity.

They needed a solution to produce electricity from biogas directly, both to power their facilities in parallel with the grid and to operate independently from the grid to provide clean resilient power at these remote dairies.

### Project highlights

**Mainspring Linear Generators run on dairy biogas and form the backbone power generation source for dairy digester operations.**

- Four 230 kW Mainspring Linear Generators
- Renewable, clean power for the facility with near-zero NOx emissions
- Ideal combination of dispatchability, high efficiency, and low total cost of ownership
- COD expected 2024



### Customer outcomes

Mainspring Linear Generators run on biogas to provide 100% of onsite power needs while improving the economics for the customer and their dairy farm partners. Key benefits include:

#### Cost Savings

Utilization of gas provides lower cost electricity compared to the grid and improves overall LCFS project economics.

#### Resilience

Onsite prime power with backup ensures resilience for operations.

#### Sustainability

Renewable power with near-zero NOx emissions.

“This project extends our success in landfill biogas into dairy, the leading agricultural commodity in California. These operations significantly reduce California’s dairy methane emissions and help make California dairies among the most sustainable in the world.”

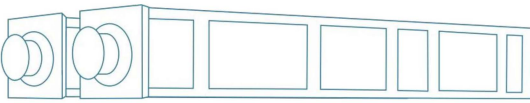
– Adam Simpson, Chief Product Officer, Mainspring Energy



# The Mainspring Linear Generator

**Local, scalable, fuel-flexible power for commercial and industrial customers, biogas developers, utilities, municipalities, and datacenters**

**Easy, modular installation**  
**High availability & low maintenance**  
**Up to 25 MW per acre scalability**



Each package contains two linear generator cores, operated in tandem



**Breakthrough design enables an unmatched combination of features and benefits.**

**High efficiency**  
 Direct conversion of linear motion into electricity

**Fuel flexibility**  
 Continuous, adaptive control without mechanical constraints

**Near-zero NOx**  
 Low-temperature, non-combustion reaction without a flame or burning

**Fully dispatchable**  
 Load-tracking, fast on/off, black start, and islanding

**Permitting anywhere**  
 Meets any air permitting requirements in the US

**Controllable & configurable**  
 Integrates seamlessly with site components & requirements

## Performance specifications

<b>Outputs<sup>1</sup></b>	Power (net AC)	250 kW
	Electrical	400/480 V, 3 Phase, 50/60 Hz
<b>Inputs</b>	Fuels	Any blend of Biogas <sup>2</sup> , Natural Gas, Hydrogen, and Propane
	Input Pressure	5-15 psig (10 psig nominal)
	Water Consumption	None
<b>Efficiency<sup>3</sup></b>	Electrical (LHV, net AC)	46%
	Heat Rate (HHV, net AC)	8,233 BTU/kWh
<b>Emissions<sup>4</sup></b>	NO <sub>x</sub>	< 2.5 ppm (<0.07 lb/MWh)
	Noise	< 70 dBA @ 6 feet
<b>Physical</b>	Weight	20 tonnes
	Dimensions (L x W x H)	20.5' x 8.5' x 9.5'

<b>Environment</b>	Temperature Range	-30 to 50 C
	Humidity	0 to 100%
<b>Operations</b>	Power Output Range	0 to 100% power output
	Grid Parallel to Island Transfer <sup>5</sup>	< 10 sec
	Maximum Step Load Building Soft Start Capability	300 kVA for up to 10 sec Yes
<b>Other</b>	• UL 2200 package	• Remote monitoring
	• UL 1741 SB grid-tie inverter	• Secure customer portal
	• Compliant with CA Rule 21	• Modbus interface

<sup>1</sup> Rated capacity may vary by fuel type.

<sup>2</sup> Relative humidity: <70% | Sulfur: < 50 ppmvd | Siloxanes: < 100 ppbvd | Oxygen and nitrogen: no limitations

<sup>3</sup> Measured according to ASME PTC 50 at 15 C and 1 atm on natural gas and biogas. Rated efficiency may vary by fuel type.

<sup>4</sup> Products comply with emissions limits in South Coast AQMD.

<sup>5</sup> Performance with purchase and installation of external site relays and controls equipment.

All data is subject to technical development and modification. R30202

## About Mainspring Energy

Driven by its vision of the affordable, reliable, zero carbon grid of the future, Mainspring is delivering a breakthrough new category of power generation - the linear generator - to customers to increase their energy resilience, generate cost savings, and meet their sustainability and climate goals.

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