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We are excited to share that [Penske Truck Leasing](#) used Volt Vault™, our patent-pending EV charger, at our [#LasVegas](#) location! 🇺🇸 🇻🇪

Their [Volvo Trucks](#) Class 8 truck left our location fully charged and ready to showcase at this week's [ACT Expo / ACT News](#).

📍 Want to see Volt Vault for yourself while you're onsite at ACT? Visit us just outside the Ride and Drive area or inside the expo hall in booth #3604. Don't miss this opportunity to witness the future of sustainable vehicle charging!

[#SustainableEnergy](#) [#ElectricVehicles](#) [#ACTExpo](#) [#VoltVault](#) [#PenskeTruckLeasing](#)



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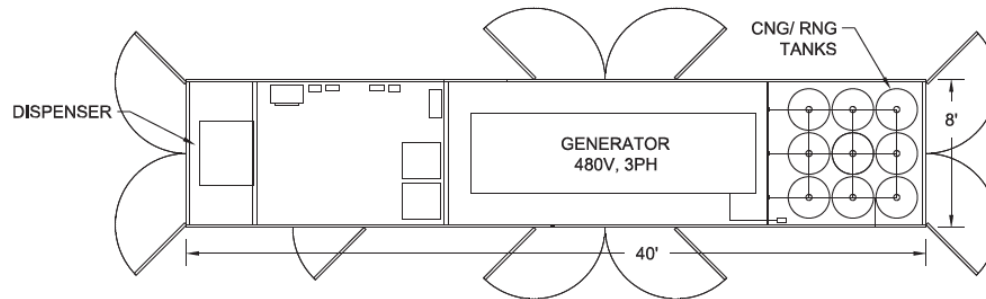
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VOLT VAULT™

REDEPLOYABLE EV CHARGING

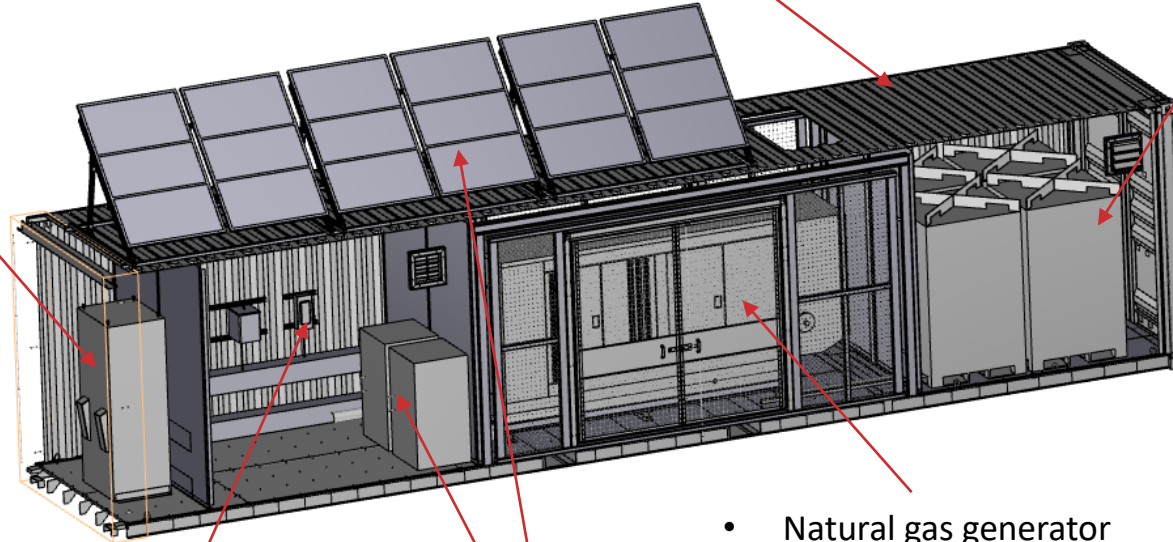
Volt Vault is a patent-pending natural gas supplied, redeployable EV charger. Volt Vault's onsite power generation provides DC fast charging up to 180kW with a level 3 charger or up to ten level 2 chargers.



Volt Vault uses industrial-grade components sourced from vendors with decades of experience within power generation and EV charging. Only vendors and products that have large networks of distributors and technicians across North America were considered when designing Volt Vault.

System Overview

- EVSE = "Charger"
- Two ports = charge 2 EVs at once
- Standard high bay 40' shipping container
- Onboard fuel storage
- CNG/RNG at 3,600 PSI
- 2 stage regulation system to get PSI down to 2 – 5 PSI



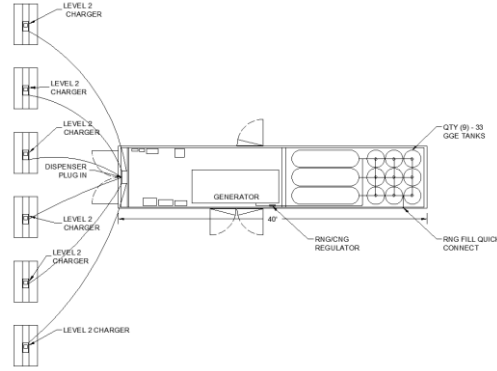
- Utility interconnect allows for low voltage input to support hotel power needs.
- This could remove the need for solar and battery
- Natural gas generator
- Prime rated for 180 or more KW
- Solar panels and Battery make up the Hotel Power system
- Hotel Power = lights, exhaust, heat, WiFi, so on

Four Main Variants

Level 2 Charging 6 - 10 ports

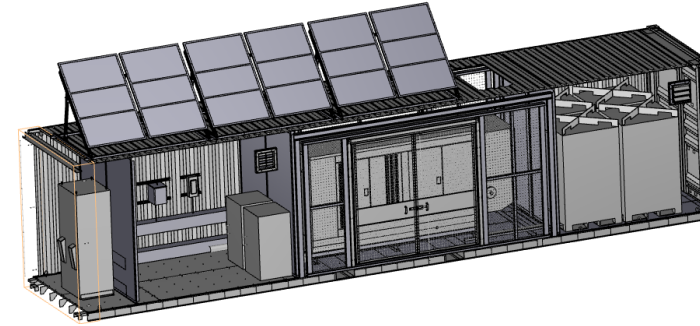
Charging Rate: up to 15.4kW/port

Onboard Gas
Fuel Capacity: 260 – 350GGE

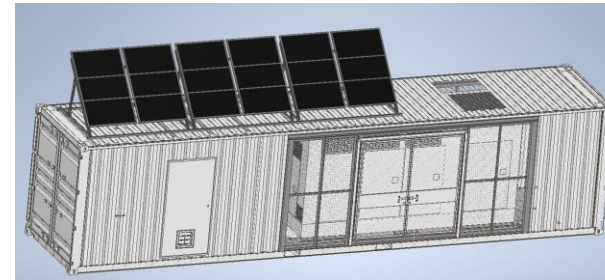
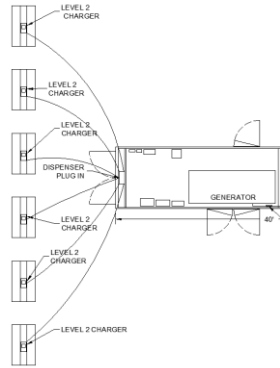


Level 3 Charging 2 ports

Charging Rate: up to 180kW single port



Pipeline Gas
Fuel Capacity: unlimited



Each variant can accept low voltage grid power, eliminating the need for Hotel Power

How long to charge my truck?

Make	Model	Battery Size	SOC - Start	SOC - End	Charge Time (one EV at a time)
Ford	eLightning	375V, 120kWH	20%	80%	33 minutes
Ford	eTransit	375V, 67kWH	50%	80%	9 minutes
Oshkosh	USPS	375V, 60kWH	20%	80%	17 minutes
Mack	MD Electric	375V, 240kWH	20%	80%	66 minutes
Mack	LR Electric	600V, 376kWH	20%	80%	90 minutes
Freightliner	eCascadia	400V, 440kWH	20%	80%	122 minutes

* All times rounded up by 10%



Gas fueled microgrids

Anders Thulin
Transportation Sector Lead



Power related challenges for EV operators



Speed

Long lead times for interconnection



Resilience

Power outages impacting core operations



Cost

High price rates, TOUs, demand charges



Emissions

Emissions out of your control and heavily emitting backup systems

Solving power problems for EV operators



Speed

Permanent power in less than one year



Resilience

Continuously available with or without grid



Emissions

Permittable as prime power
Switch at any time to zero CO2 fuel



Cost

Low, consistent energy cost
Dispatchable to meet evolving demand



Ultimate flexibility in onsite power generation

The Linear Generator: Better today and future proof

Any Fuel

Natural gas, hydrogen,
ammonia, biogas

Any Time

Dispatches to firm
renewables
Baseload or backup

Any Scale

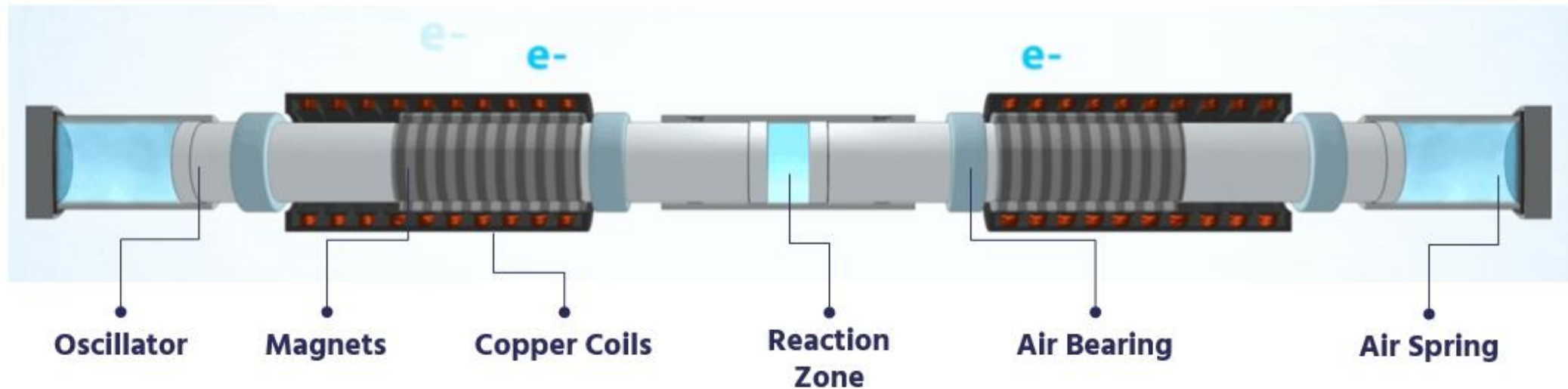
Modular design
250 kW - 100 MW+

Anywhere

Permitted in the
toughest locations in
the world



Core technology enables 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

The largest EV microgrid in the country



Problem

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



Pre-interconnection solution

Microgrid with 3 MW of linear generators and 6 MW / 18 MWh of batteries capable of simultaneously charging 96 heavy duty EV trucks



Phased Value Approach

Prime power → Peak-hour shaving → Clean resilience



Impact

Reduced time to power from 36+ months to 12 months; lower cost/kWh; lead emissions reduction

*Gas-fed Mainspring linear generators
enable quickly deployed, cost effective,
low and no emission power*



HYLIION[®]

HYLN
NYSE



KARNO GENERATOR



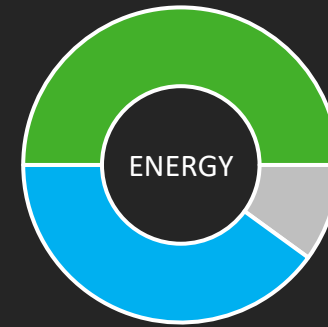
How KARNO works

An innovative, **heat-powered** linear generator that leverages Stirling technology and Flameless Oxidation to **produce electricity**

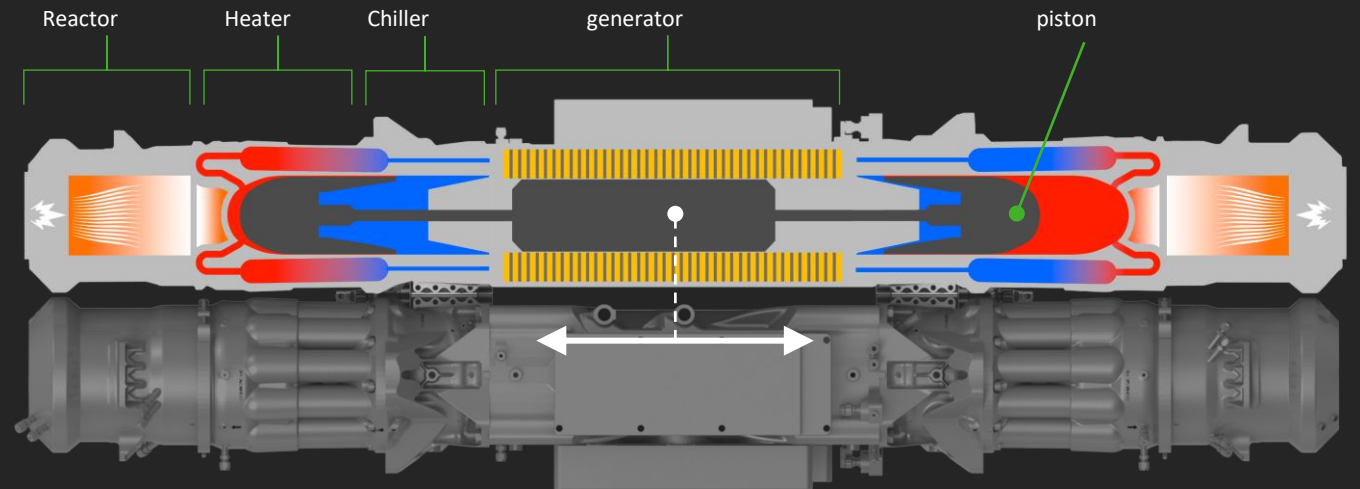
Efficiency

Electricity, 50%

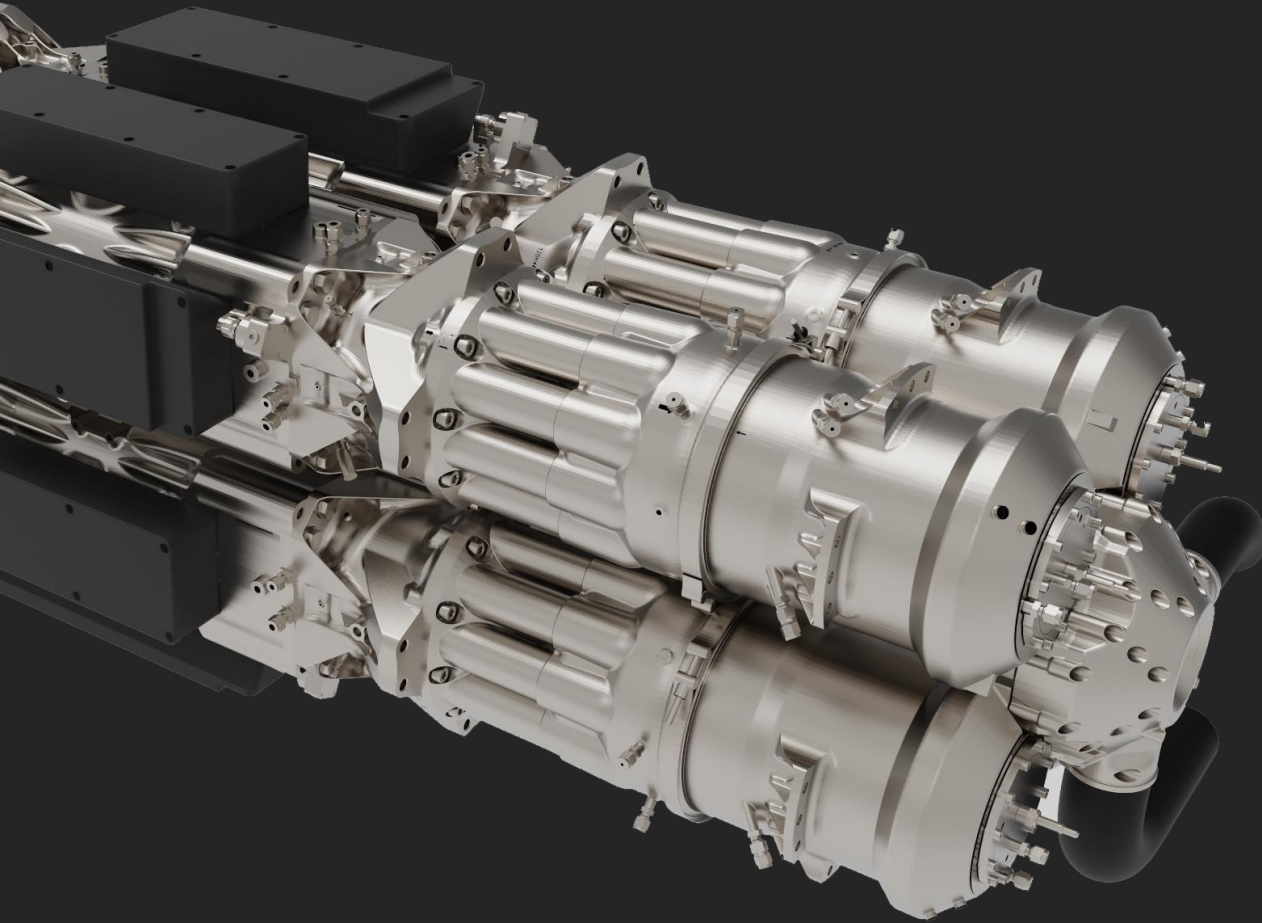
Useful Heat, 40%



Unrecoverable Losses, 10%



KARNO BENEFITS



FUEL AGNOSTIC



ULTRA-LOW EMISSIONS



SUPERIOR EFFICIENCY

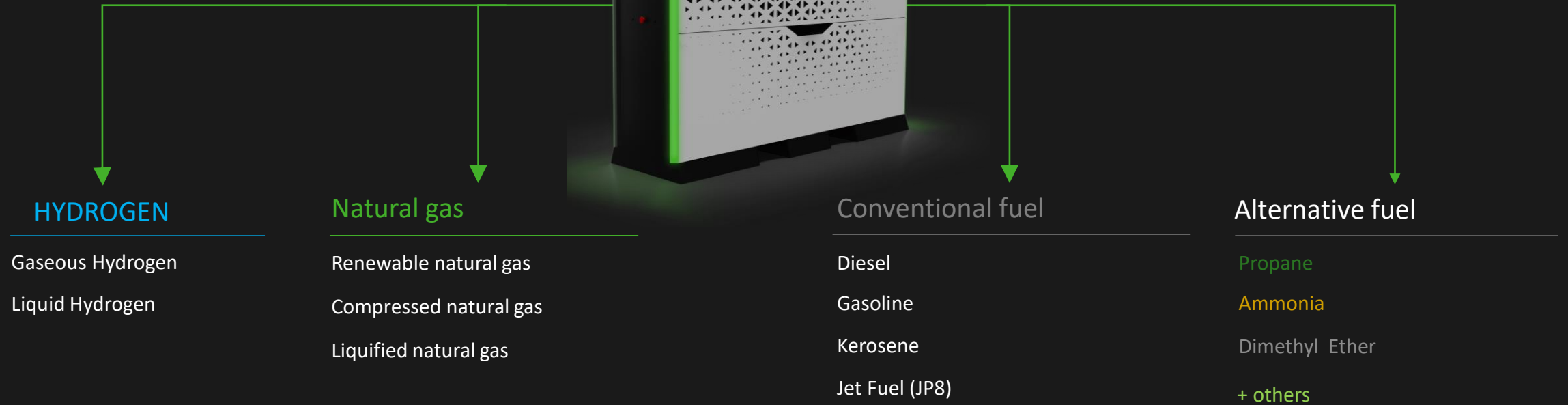


LOW MAINTENANCE COST



LOW NOISE

Fuel agnostic and reduced emissions



Emissions Standards

The KARNO™ generator is expected to comply with all current and foreseeable emissions standards, specifically from CARB and EPA, even when utilizing conventional fuels.¹

Hydrogen capable

The KARNO™ generator is expected to operate on Hydrogen at efficiency levels that even surpass most of today's leading fuel cell solutions.¹

ADDRESSABLE MARKETS



EV Charging

Waste Gas

Prime Power

Mobility

Stationary

Mobile

Landfill

Syngas

Oil & Gas

Commercial Buildings

Industrial

Microgrids

Data Centers

Marine

ADDITIVE MANUFACTURING



Breakthroughs in **Additive Manufacturing**
(3-D Metal Printing) are the main driver behind the KARNO generator's
unparalleled efficiency

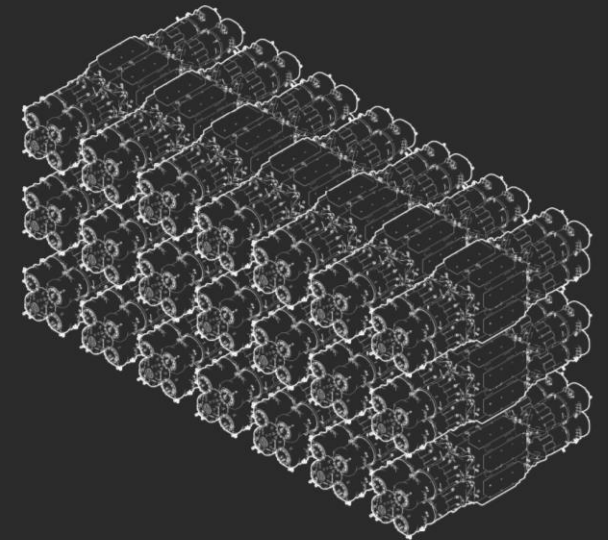
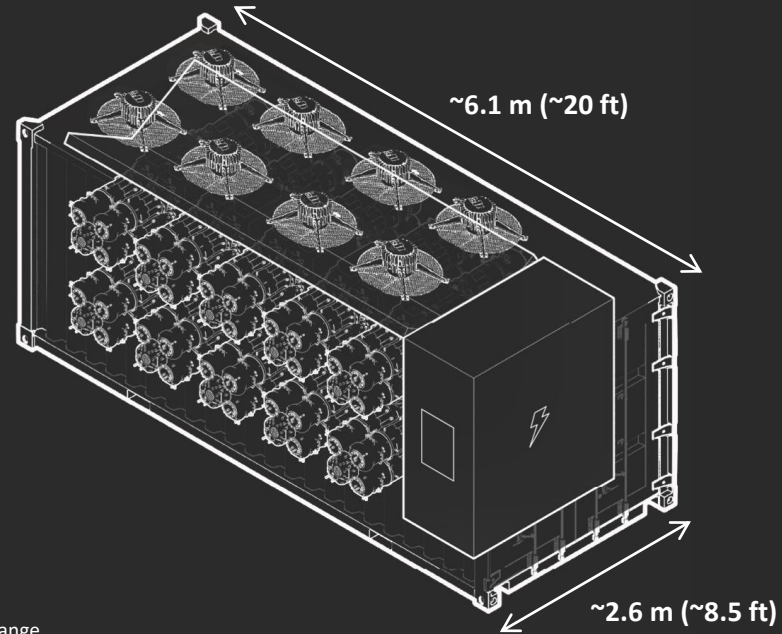
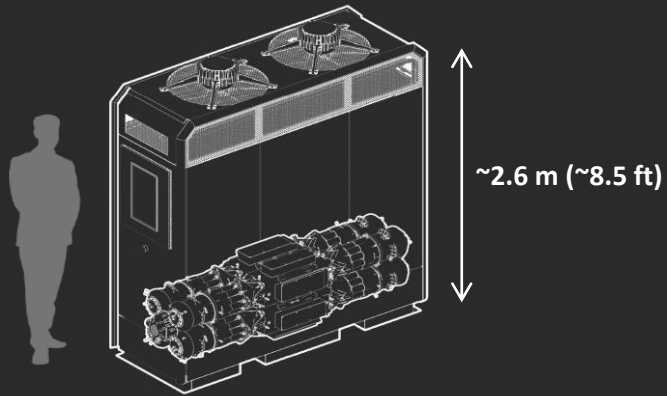
POWER LEVELS



200 kWe

2 MWe

CUSTOMIZABLE POWER OUTPUT



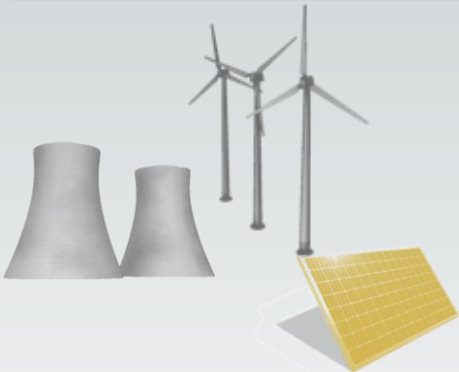
Images for illustration purposes only. Final Design, system architecture, and scale are subject to change.

Energy Solutions for Charging

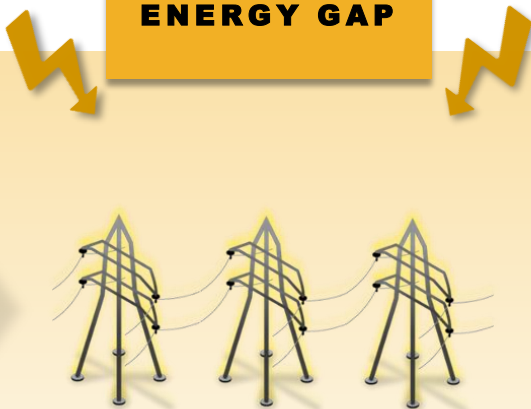
Rob Schueffner
Energy Transition Growth Director
Caterpillar Electric Power Division

Solution Provider

**RENEWABLES
INCREASE VARIABILITY**

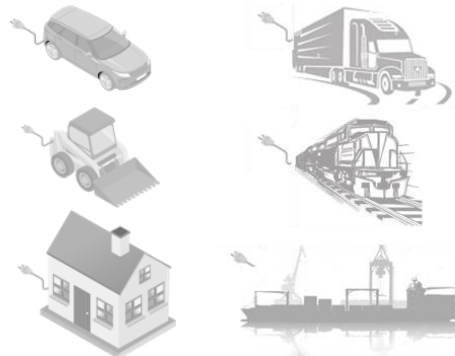


ENERGY GAP



DISTRIBUTED GENERATION MICROGRID

**DEMAND LOAD
INCREASES AND SHIFTS**



DISTRIBUTED GENERATION MICROGRID

PARTNERING TO HELP YOU DELIVER THE POWER

