

Alternative Power Solutions for a Variety of Energy Applications

AUGUST 14 | 1PM EST



Housekeeping

Webinar and Q&A Format

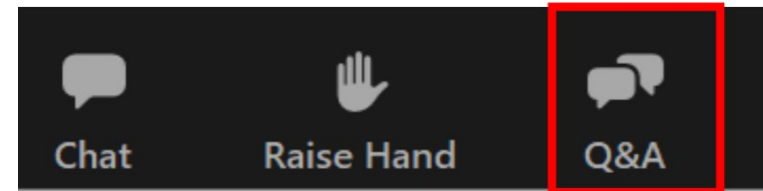
This webinar is scheduled for 60 minutes, including the presentation and time for Q&A, which will take place following the panel discussion. Please submit any questions in the Q&A box. If needed, the webinar will extend past the hour to answer as many audience questions as we can.

This webinar will be recorded

and streamed on the IDEA website within 24 hours of the conclusion of this webinar. Registrants will also be sent a follow-up email with links to the recording and presentation slides. A link to the presentation slides is also provided in the chat box if you want to print out and follow along.

How to Submit Questions

Please submit questions via the “Q&A” box during the presentation portion of the webinar. The Q&A icon can be found in the menu bar at the bottom of your screen. Questions will be reviewed by IDEA and posed to the presenters by the host at the conclusion of their presentation.



If you are having any technical issues, please send a note via the Chat Box to our host, Jason Beal.

Meet Your Cummins Experts



Harshil Angre

*Business Development Manager
– South USA*



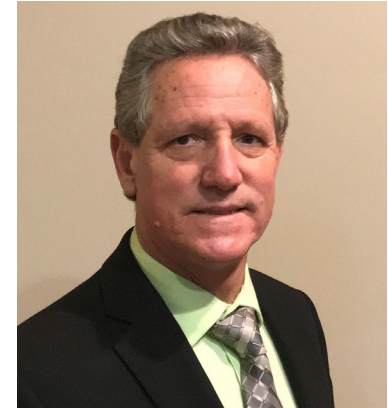
Emiliano Pantner

*Business Development Manager
– Latin America & Caribbean*



Augusto Tubino

*Business Development Manager
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Kelly S Samons

*Sales Director – Integrated
Gas and Microgrid Business*

Webinar Objectives

Modern district energy systems face the dual challenges of providing power to densely populated cities and facilities while attempting to maximize efficiency and decarbonize their operations. The latest advancements in microgrid power solutions for applications such as central energy plants, peak shaving solutions, and fleet electrification allow district energy system owners and operators to juggle multiple priorities without sacrificing reliability and cost-effectiveness.

After completing this webinar, participants will be able to:

- Identify the key elements of a microgrid.
- Understand how various energy sources can be optimized to meet varying load conditions.
- Identify applications that are best suited to microgrid and other on-site generation solutions.
- Know where to start the process to explore, develop and implement energy upgrades.

01

Cummins Overview

02

Microgrid Overview

03

Power Solution Applications

04

Cummins Support



AGENDA

Cummins Overview

Powering
a more
prosperous
world

190 Countries and territories*

75,500 Global employees

105 Years of industry leadership

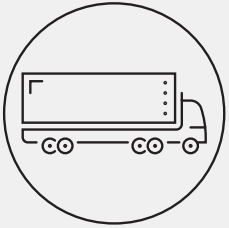
19,000 Cummins certified dealer locations

\$1.4B Invested in research and technology in 2023

** Approximation of countries and territories with Cummins service*

As published on cummins.com.

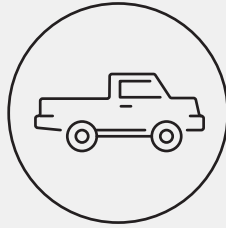
Applications



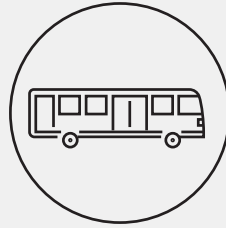
Heavy-duty Truck



Medium-duty Truck



Pickup Truck



Bus



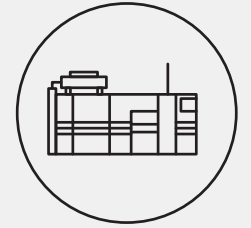
Construction



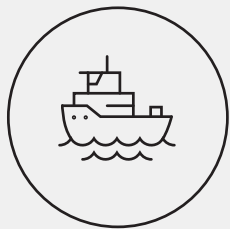
Oil & Gas



Fire & Emergency



Electrolysis



Marine



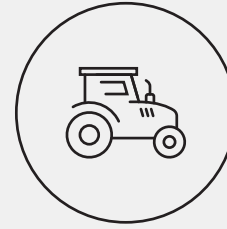
Mining



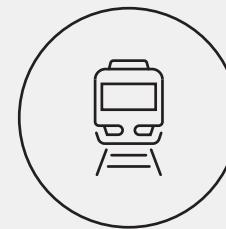
Recreational Vehicle



Defense



Agriculture



Rail



Power Generation

This is not an exhaustive display of Cummins-powered markets. Please refer to cummins.com for the most updated product information.

PLANET 2050 aspirational targets

DOING OUR PART TO ADDRESS CLIMATE CHANGE AND AIR EMISSIONS

2050 Targets

- ❑ Customer success powered by carbon neutral technologies that address air quality
- ❑ Carbon neutrality and near zero pollution in Cummins' facilities and operations

COMMUNITIES ARE BETTER BECAUSE WE ARE THERE

2050 Targets

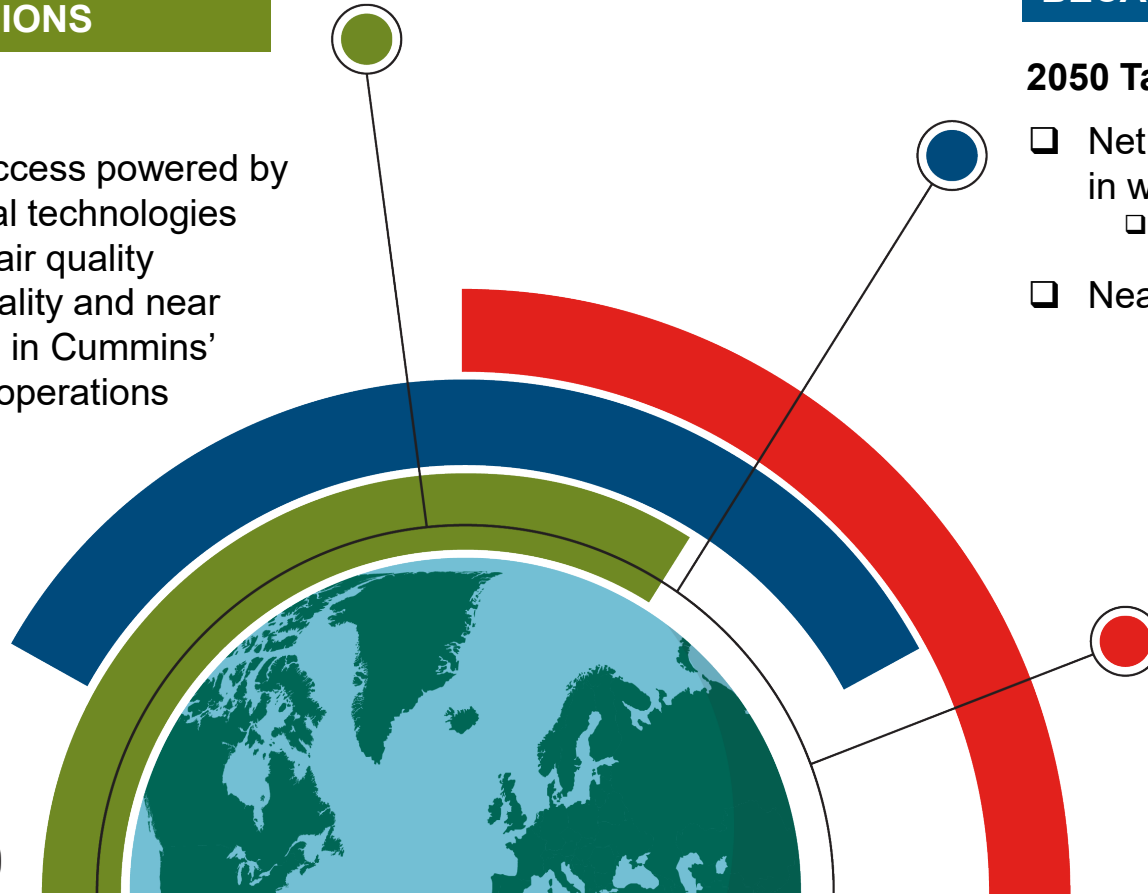
- ❑ Net positive impact in every community in which we operate
 - ❑ = *sum of environmental good > local environment footprint*
- ❑ Near zero local environmental impact

USING NATURAL RESOURCES IN THE MOST SUSTAINABLE WAY

2050 Targets

- ❑ Nothing wasted
 - ❑ Design out waste in products and processes
 - ❑ Use materials again for next life
 - ❑ Reuse water and return clean to the community

PLANET 2050



References to "facilities" relate to all consolidated operations and joint ventures subscribing to Cummins' Enterprise Environmental Management System. Goals will be periodically assessed for progress and continued practicability

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What is a Microgrid?

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Microgrid Applications

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Cummins Support – Case Studies



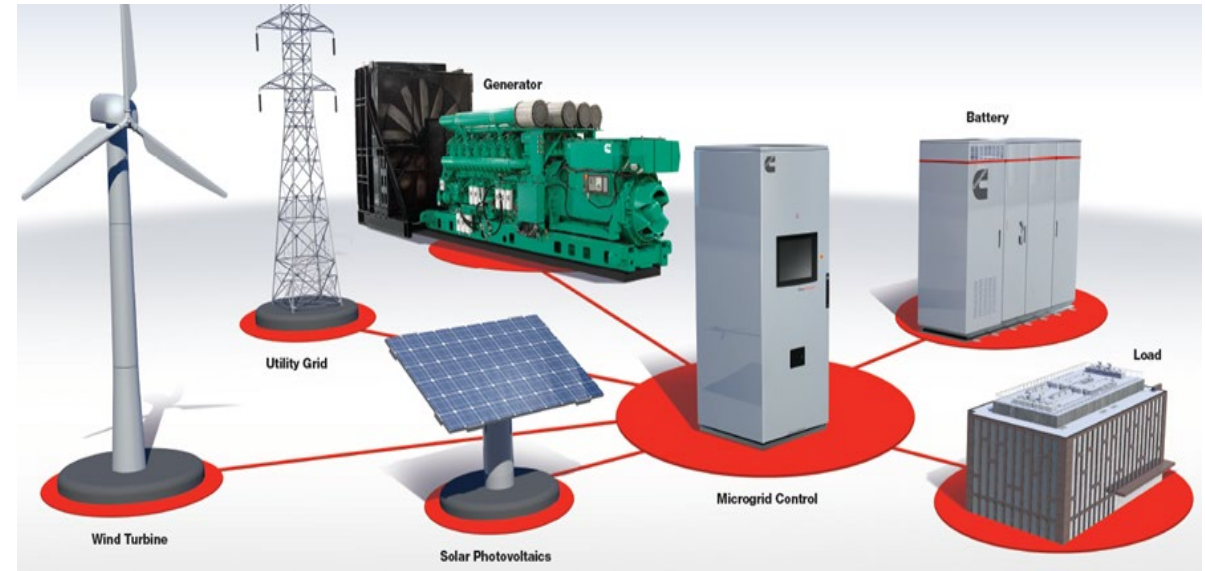
AGENDA

Overview of a Microgrid



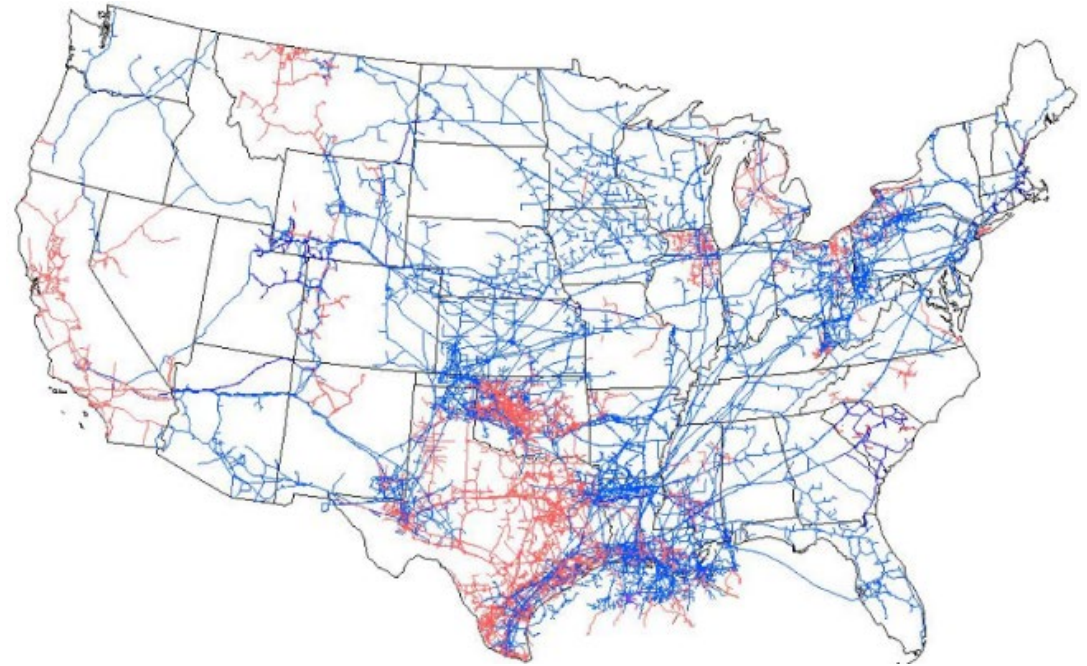
Components of Microgrid

- Renewable Energy Sources
 - Solar (most common)
 - Wind
- Battery Energy Storage Systems (BESS)
 - C Rating: 0.5/1/2/3
- Generators fueled by:
 - Natural Gas and other methane-based gases
 - Propane
 - Hydrogen
 - Diesel
- Microgrid Controller and Switchgear
 - Integrates all Power Sources; Utility, Generator, BESS, Solar
 - Controls Sequence of Operation



Growing Need of Natural Gas Solution for Distributed Generation

- Low-cost fuel, low operating cost on run-hour basis
- Abundant gas fuel infrastructure
- No on-site fuel storage required
- Reduced emissions with or without exhaust aftertreatment system
- Operational flexibility allows standby, peak shaving or operation for extended periods without shutdown
- Reliable, practical and proven technology



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AGENDA

Microgrid Applications



Standby Power

Clean, reliable and cost-effective standby power when you need it



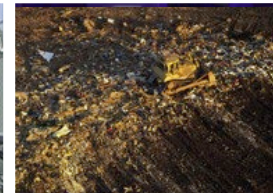
Peaking Power

Economical, adaptable and reliable solutions to meet your peak demands



Prime Power

Reliable continuous power for any location, day or night



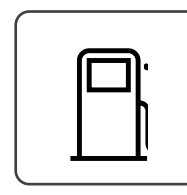
Cogeneration

Combined heat and power solutions for a sustainable future



Waste-to-Energy

Converting wasted gaseous fuels into profitable and sustainable power

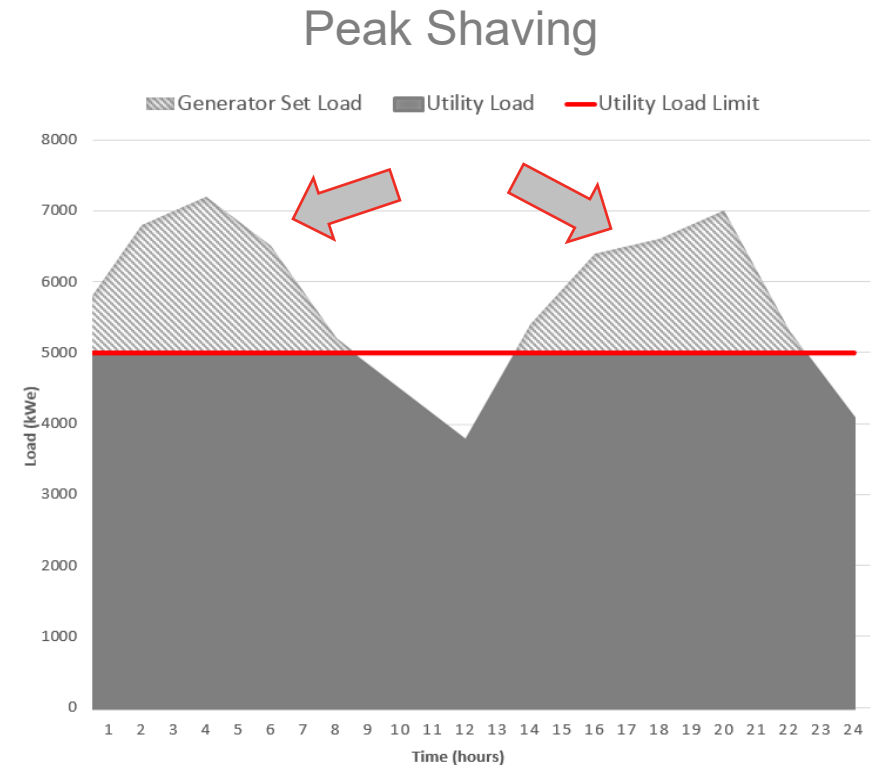


Electric Vehicle (EV) Charging

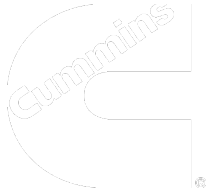
Fleet electrification infrastructure support using reliable and independent power

Microgrid Applications | Peaking Power

- **Demand Response** is an energy solution that helps customers reduce energy consumption during periods of high stress on the electric grid and generate savings for using less during peak demand
- Also referred to as peak shaving or rate curtailment
- Some applications will request a power generator / storage system to start when asked by the utility or when the electricity cost/demand is predicted to increase



Microgrid Applications | Cogeneration



CHP: Combined Heat and Power

- The utilization of both heat and electric energy from a single fuel source
- Also known as Co-generation or Co-Gen
- US EPA uses the term Co-generation

Cogeneration systems can provide hot water, steam, chilled water, or all 3 simultaneously with electricity

Types:

- Combined-cycle power plant
- Steam turbine CHP Plant
- **Internal Combustion Engine CHP**
- Gas Turbine CHP



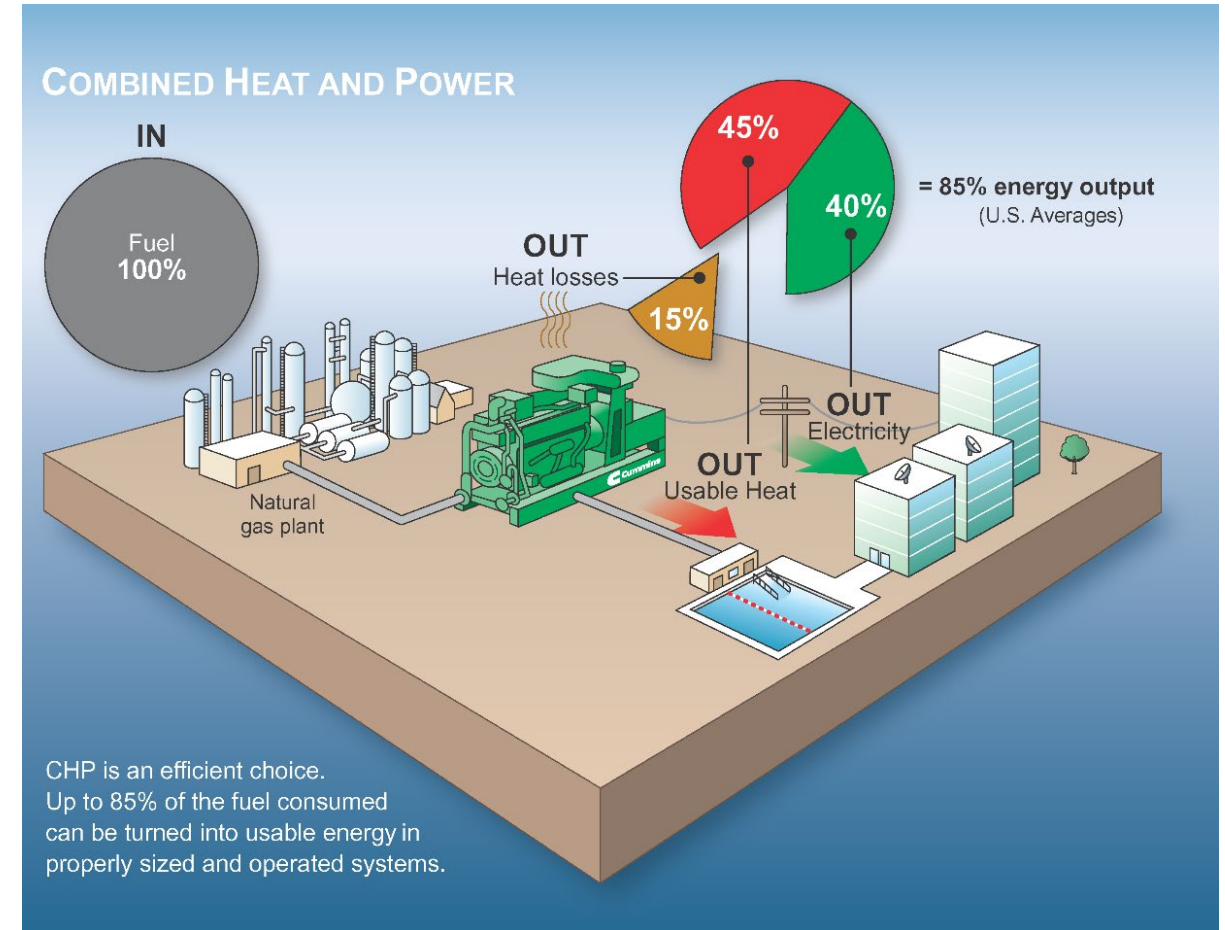
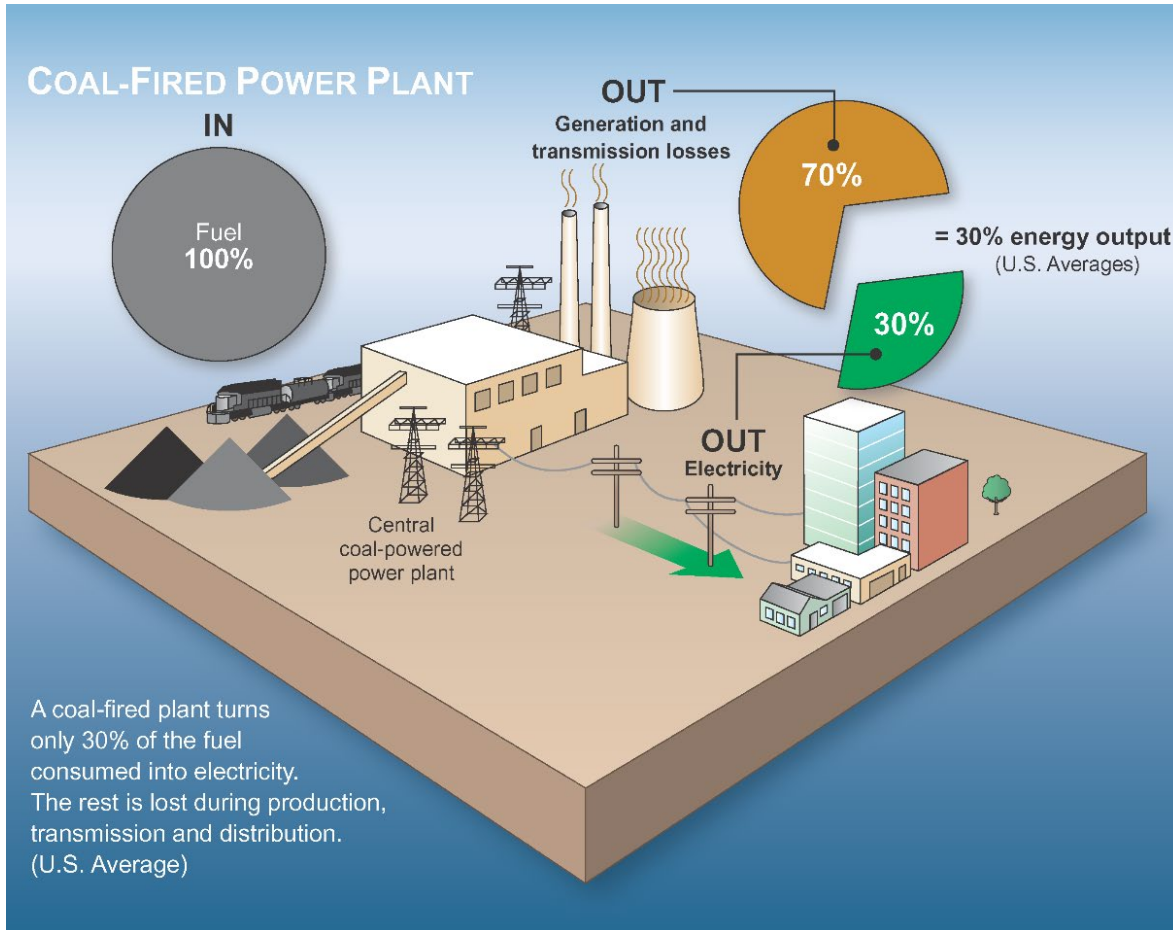
Fuel



Heat + Electricity

Transformation Process

Traditional vs CHP Generation



CHP Benefits

Energy efficiency

- Can achieve overall efficiency of 85% or more

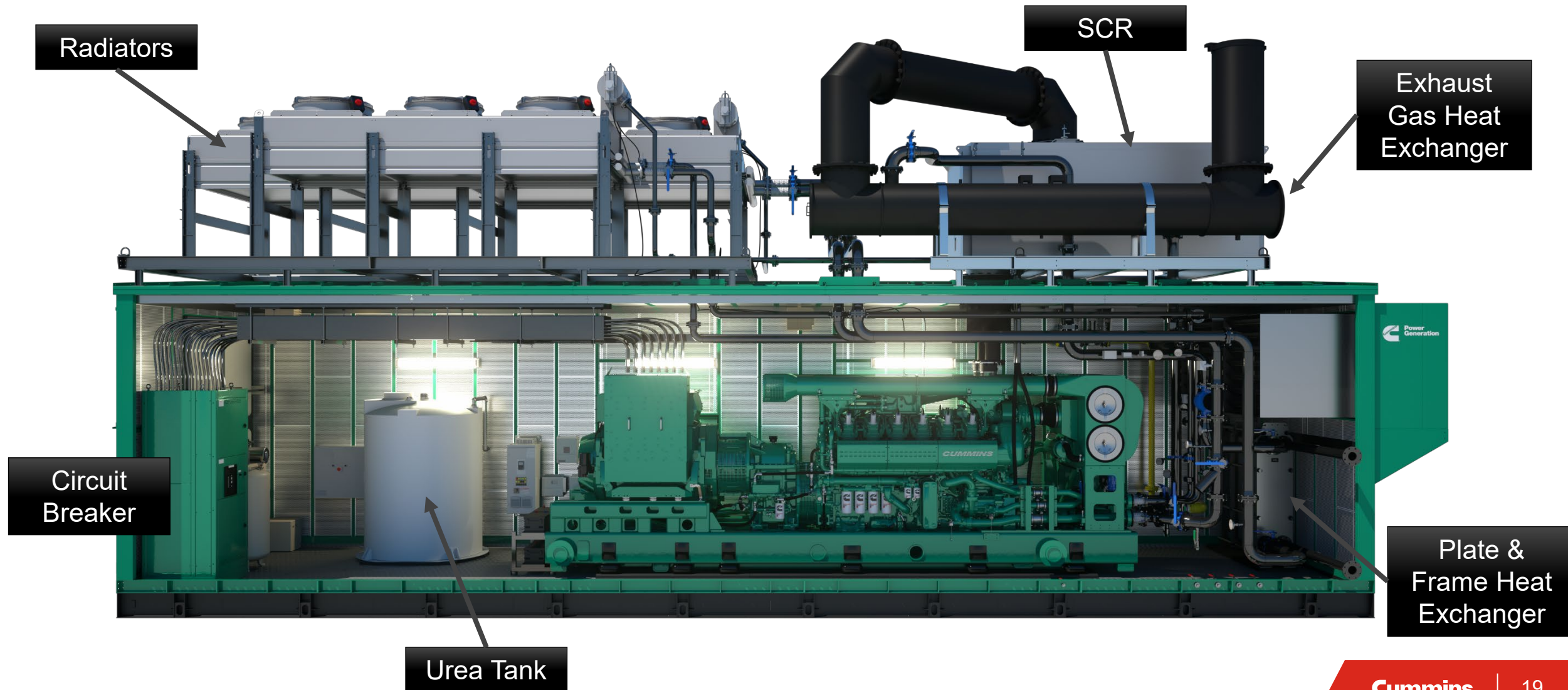
Financial savings

- Energy cost savings
- Attractive return on investment (ROI)
 - Spark spread – Fuel cost (on-site generation) vs electric utility rates
 - Thermal energy savings
- Financial incentives for fuel efficiency and emissions reduction (rebates, grants, tax incentives)

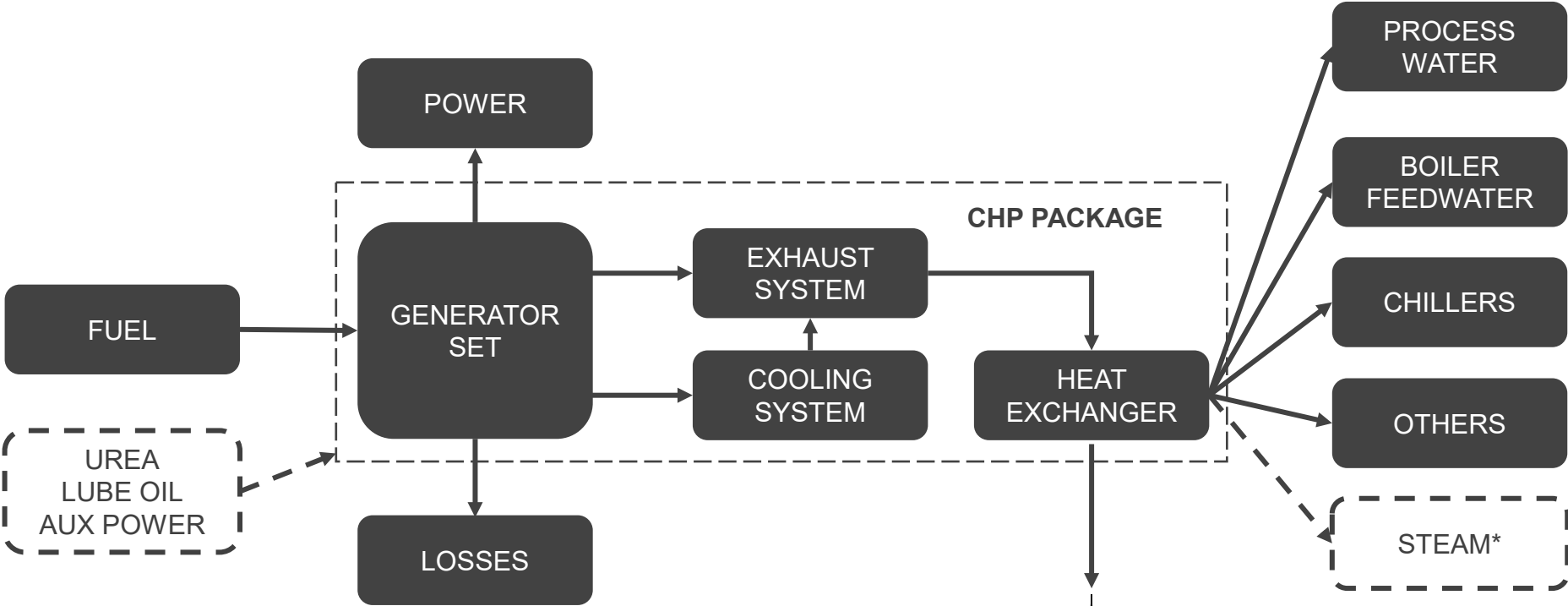
Environmental

- Reduced environmental footprint
 - Reduction in CO₂, NO_x, and particulates compared to central power plant
- Higher efficiency means conservation of natural resources

CHP Package

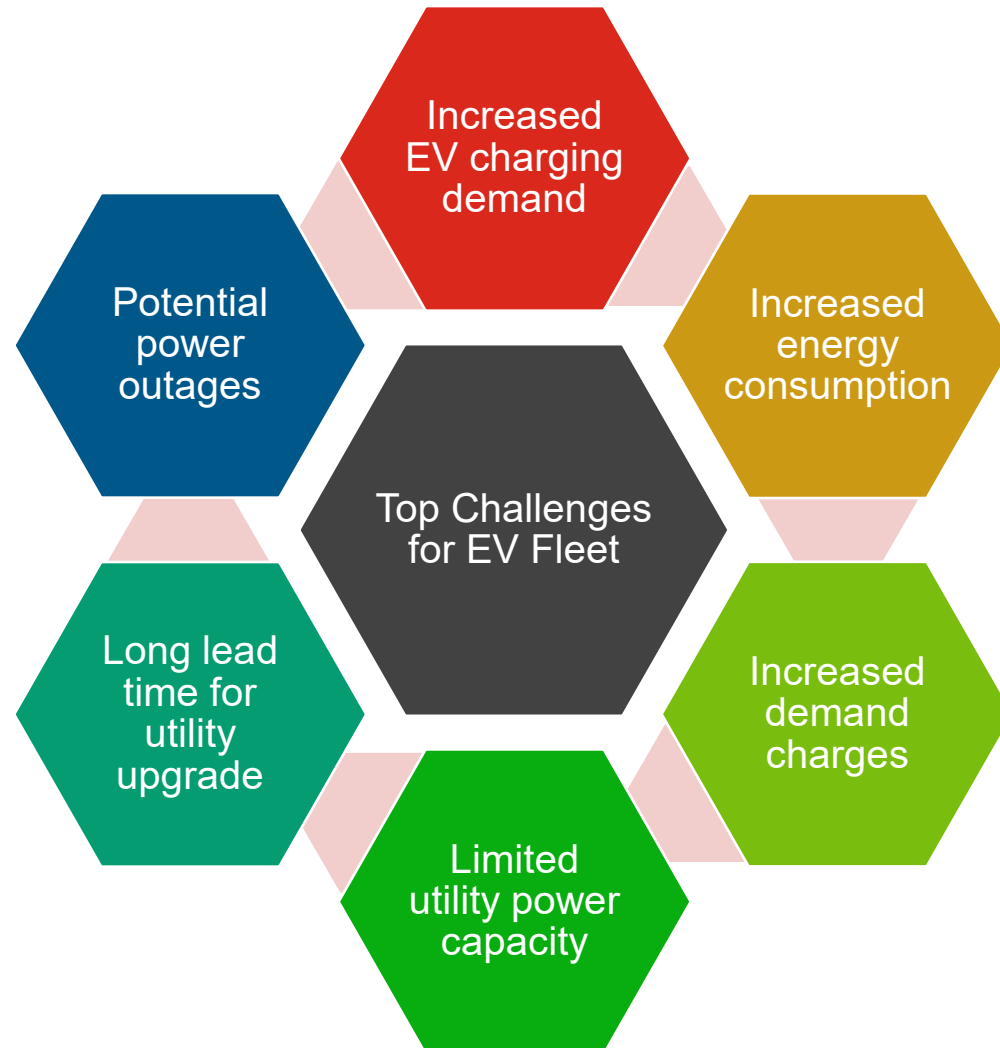


CHP ENCLOSURE CONCEPTS



Electric Output	Heat Recovery (MMBTU/hr)	Water Flowrate (gal/min)	Water Temperature Gain (°F)
2MWe	7.1	483	170-200

Microgrid Applications | Electric Vehicle (EV) Charging Applications



Converting Bus Depot for EV Fleet



** for reference only, not an actual project*

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Cummins Support



AGENDA

MICROGRID AT A GLANCE

PROVIDING A SOLUTION FOR EACH STEP OF YOUR JOURNEY

DESIGN

EQUIPMENT

SOFTWARE

INSTALL

O&M
SERVICE

Grant Funding Support

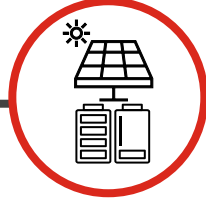
Utility, Local, State, Federal offer Grants, Incentives, Rebates & Credits



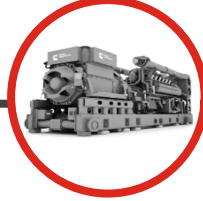
System
Design



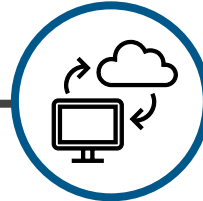
Bring the
Right
Products



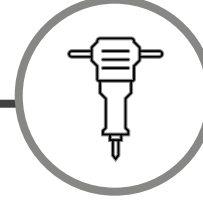
Deliver
Energy
Savings



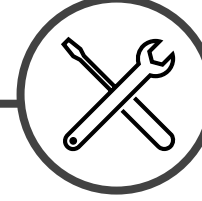
Provide
Microgrid
Resiliency



Complete
Digital
Connectivity



Partner in
Installation &
Construction



Extensive
Service
Network

No matter where you are on your journey, **Cummins and our infrastructure partners** are ready to engage in each area to deliver the solutions with dependability you can count on.

MICROGRID AT A GLANCE

GENERATING ENERGY INDEPENDENCE AND RESILIENCY

TOP 3 ENERGY CHALLENGES

CHALLENGE

CUMMINS SOLUTION

UTILITY & GRID
OUTAGE

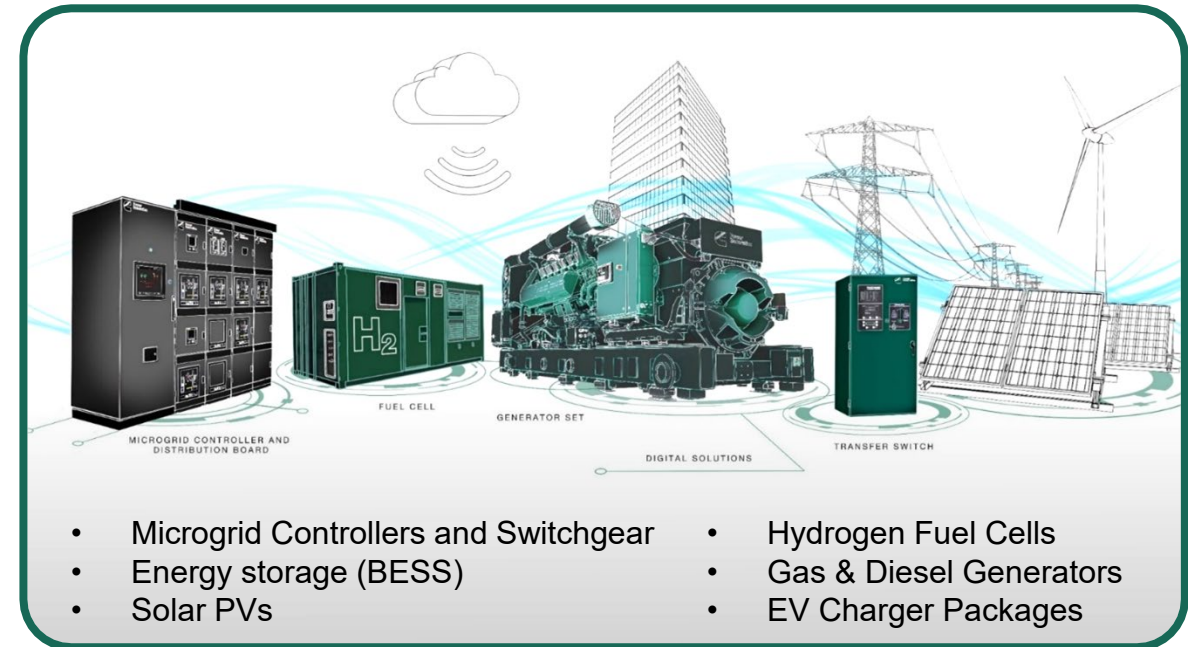
POWER RESILIENCY
THROUGH MICROGRID
SOLUTIONS

INCREASE IN
POWER DEMAND

POWER BEYOND UTILITY
CAPACITY IN PARALLEL OR
ISLAND MODE

RISE IN ENERGY
CONSUMPTION

OPTIMIZE AVAILABLE
RESOURCES TO REDUCE
ENERGY COSTS THROUGH
SMART CONTROLLERS



CUMMINS CAN MODEL, DESIGN, IMPLEMENT, AND MAINTAIN AS YOUR ONE-STOP ENERGY SOLUTION PROVIDER

MICROGRID AT A GLANCE

PROVIDING ENERGY SOLUTION IN STAGES TO ENSURE SUCCESS

EXPLORATORY STAGE

Energy Modeling and System Design Services

- Help understand the financial aspect of microgrid configuration options up-front
- Tools to determine total investment, cost of energy, and payback for multiple configurations while comparing each design
- Support for government funding and grant applications

EXECUTION STAGE

Full End to End Energy Solutions Value Package

- Bring project and application engineering from start to end
- Project management and partnership readiness
- Installation assurance with on-site Start-up & Commissioning

OPERATIONAL STAGE

Aftermarket Support for UpTime Excellence

- Service level agreements and packages
- Field service repairs with remote service capabilities
- Customer care call center with technical support



Thank you! Please submit additional questions in the Q&A section.

Thank You – Connect With Us



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What's Next at IDEA?



Save the date and make plans to join us in Boston for CampusEnergy2025, taking place at the Westin Boston Seaport District February 3-6, 2025.

We expect record attendance for this conference, exceeding 1200 attendees. Registration will open in mid-September.

Stay connected for updates and bookmark the conference site at <https://bit.ly/CampusEnergy2025Home>.

Looking to exhibit or sponsor? Get your contract in ASAP, the exhibit hall will sell out soon.

Exhibit:
<https://bit.ly/ExhibitCampus2025>

Sponsor:
<https://bit.ly/SponsorCampus2025>

Join IDEA in 2025!

In the coming weeks, IDEA will begin to accept applications for membership for the 2025 calendar year.

If you're not an IDEA member, now is a great time to join. Contact Scott Szycher at scott.idea@districtenergy.org for details on a special offer to get you started as our newest member right now.

Additional Online Education

If you missed any of our previous online educational programming, please visit the IDEA Webinars page and stream them today.

<https://www.districtenergy.org/events/webinars>