Providing Mission Critical Backup Power with Diesel Technology

PRESENTATION FOR THE ASSOCIATION OF AMERICAN PORT AUTHORITIES
SEPTEMBER 12, 2018
The Diesel Technology Forum is supported by leaders in advanced diesel engines, vehicles, equipment, components and fuels.

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<th>AGCO</th>
<th>Isuzu Motors</th>
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<td>Bosch</td>
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<td>Caterpillar Inc.</td>
<td>Mazda North American Operations</td>
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<td>CNH Industrial</td>
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<td>Cummins Inc.</td>
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<td>Daimler</td>
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<td>Delphi Automotive</td>
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<td>Deere &amp; Company</td>
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**Allied Members**
- National Biodiesel Board
- Western States Petroleum Association
Overview

- Power outages are multi-billion dollar events
- Many choices are available to provide emergency backup
- Diesel is a prime technology that can fit many needs including mobile units and portability of fuel
- Diesel Gensets are in the field today providing mission critical services to communities across the globe
- The latest near-zero emissions innovations are ready and capable of meeting resiliency, preparedness and recovery needs
## Technology Choices for Standby & Prime Power

### Generator Sets
*(Internal combustion engine + electrical power generator + electrical controls/switchgear)*
- Diesel
- Gasoline
- Natural Gas
- Propane

### Stored Energy Systems
- Solar with storage, Flywheels

### Uninterruptible Power Supplies (UPS)
- Battery Based

### Turbines
- Combined heat and power

### Fuel Cell Systems
Why Diesel for Emergency Power?

Quick start-up time/load handling ability
10 seconds or less to start-up and load handling. Other fuel sources may take up to two minutes, which may be too long in many emergency situations and out of compliance with state and federal laws.

Power density, fuel efficiency and reliability

Disaster utility

Diesel generators have their own storage for clean diesel fuel, which is readily available and replenishable.

Portability
Weather Related Power Outages Cost Big Money

ECONOMIC BENEFITS OF INCREASING ELECTRIC GRID RESILIENCE TO WEATHER OUTAGES

2003 – 2012

679 Severe Weather Events

Average Outage = $18 billion to $33 billion
March 12, 2014: The U.S. could suffer a coast-to-coast blackout if saboteurs knocked out just nine of the country's 55,000 electric-transmission substations on a scorching summer day, according to a previously unreported federal analysis.
Diesel Generators Support Local Communities

160 Diesel Generators Owned by DC Government

- Schools
- Fire & Police Departments
- Shelters
- Universities
- Utilities
- Storm & wastewater facilities
- Correctional facilities
- Government Buildings
- Libraries
- Courts
In the wake of power outages, Hokkaido Electric has also started to supply power from its idled Tomari nuclear power plants from three emergency diesel-fueled power generators to cool used fuel rods at the idled No. 1, No. 2 and No. 3 nuclear reactors, the officials said.

The utility currently has sufficient diesel for about 10 days to fuel its 4,740 KW emergency generators each for its 579 MW No. 1 nuclear unit and its 579 MW No.2 reactor, as well as for its 5,900 KW emergency generator for the 912 MW No. 3 nuclear unit at the Tomari nuclear power plant, the official said.
Diesel Helps Make Sure We Are All Connected

CloudHQ Unveils Massive New Manassas Data Center

BY RICH MILLER - AUGUST 8, 2017 — 1 COMMENT

43 Megawatts of Data Center Space

460,000 Sq Ft

28 diesel generators

200,000 gallons of fuel

48 Hour Backup
Benefits of Mobile Diesel Gensets Help Recovery & Resiliency

Grants offset the cost of installing a stationary generator or electrical switchgear to accept a mobile generator.

250 retail fuel centers located within ¼ mile of an evacuation route

- $15,000 to install a transfer switch
- $65,000 for onsite power

Generator Law – 192 h
All retail fuel locations within ½ mile of a highway exit or hurricane evacuation route must install a transfer switch.
Diesel is a Platform for Continuous Improvement

- Advanced Emission Control Solutions to Meet Tier 4 Requirements

Depending on horsepower range, Tier 4 final clean diesel equipment delivers 85% to 95% reduction in emissions for NOx and PM.
Electric Power Generation – Tier 4 technology

Caterpillar 3516 Unit

Clean Emissions Module (SCR, et al) – top left view
## Latest Clean Diesel Technology Generates Air Quality Benefits

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<th>T4i (752–1207 hp)</th>
<th>T4i (&gt;1207 hp)</th>
<th>T4F (&gt;751 hp)</th>
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<tr>
<td>On Jan 1 of</td>
<td>2011</td>
<td>2011</td>
<td>2015</td>
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<tr>
<td>NOx</td>
<td>3.50</td>
<td>0.67</td>
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<tr>
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<tr>
<td>PM</td>
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<td>0.10</td>
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(All figures are in g/kW-hr)

- 91% reduction in NOx emissions
- 70% reduction in PM emissions
Near Zero Emissions is Ready Today for Portable Emergency Prep

Cummins Newsroom: Generators

Cummins Releases Upgraded Tier 4 Final Rental Solutions for Two Key Nodes

Near Zero Emissions
Portable
Provides 100 kW of Power
A word about Microgrids

Renewables that you want (solar, wind) with the reliability that you need (clean diesel): Sustainable Power for the Future

Microgrid equipment at the National Wind Technology Center in Colorado. | Photo courtesy of the National Renewable Energy Lab.
Benefits of Advanced Biofuels in Prime Power Applications

**PRESS RELEASE**

PRO FOOTBALL’S MAIN EVENT KICKS-OFF WITH CLEAN DIESEL TECHNOLOGY AND RENEWABLE FUEL

40,000 gallons of renewable diesel fuel powered Tier 4 generators to provide power to Super Bowl City and cut 238 tonnes of CO2.
Summing it all up....

• Diesel is a leading choice for emergency backup power

• Mobile generators are integral for resiliency and recovery

• The latest clean diesel innovations are ready to provide mission critical services

WHENEVER YOU NEED US, WE’LL BE THERE.

During power outages, diesel generators provide reliable, immediate and full strength emergency backup electricity to keep your cellphone network up and running.

www.dieselforum.org
Thank You

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