



# Providing Mission Critical Backup Power with Diesel Technology

PRESENTATION FOR THE ASSOCIATION OF AMERICAN PORT  
AUTHORITIES

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## The Diesel Technology Forum is supported by leaders in advanced diesel engines, vehicles, equipment, components and fuels.

- ▶ AGCO
- ▶ Bosch
- ▶ Caterpillar Inc.
- ▶ CNH Industrial
- ▶ Cummins Inc.
- ▶ Daimler
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- ▶ Deere & Company
- ▶ FCA
- ▶ General Motors
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- ▶ Umicore
- ▶ Volvo Group
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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

## Stored Energy Systems

Solar with storage,  
Flywheels

## Uninterruptible Power Supplies (UPS)

Battery Based

## Turbines

Combined heat and power

## Fuel Cell Systems

## Generator Sets

*(Internal combustion engine + electrical power generator + electrical controls/switchgear)*

- \* Diesel
- \* Gasoline
- \* Natural Gas
- \* Propane

# 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

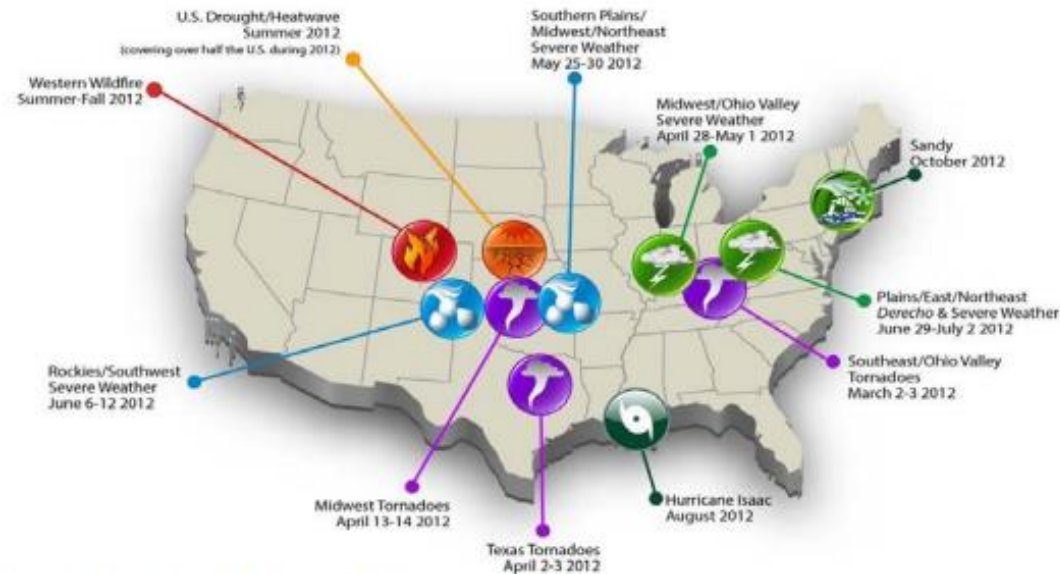
## ECONOMIC BENEFITS OF INCREASING ELECTRIC GRID RESILIENCE TO WEATHER OUTAGES

**2003 – 2012**

679 Severe Weather Events

Average Outage =  
**\$18 billion to \$33 billion**

U.S. 2012 Billion-dollar Weather and Climate Disasters



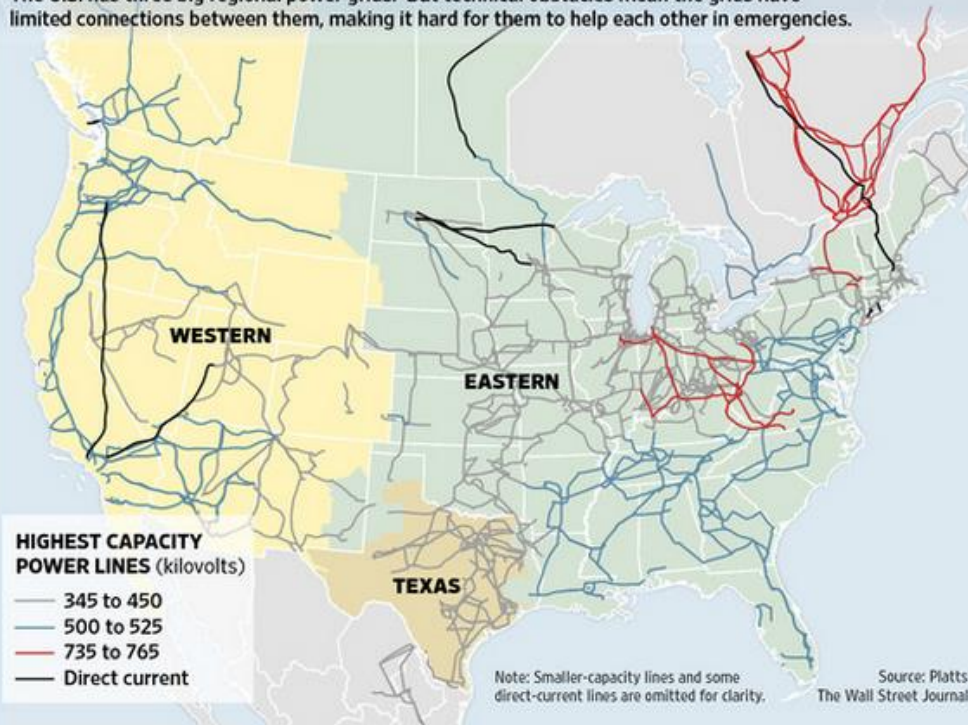
Source: National Oceanic and Atmospheric Administration



# Gensets Supporting Grid Resiliency

## Separate Systems

The U.S. has three big regional power grids. But technical obstacles mean the grids have limited connections between them, making it hard for them to help each other in emergencies.



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



# Diesel Provides Mission Critical Power... Globally

## Factbox: Massive earthquake shuts Hokkaido refining, all power plants

**September 6, 2018**

**S&P Global**  
Platts

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



One of the 28 Cummins 2750kV backup generators at the CloudHQ Manassas Corporate Center 1 data center. (Photo: Rich Miller)

43 Megawatts of Data Center Space

460,000 Sq Ft

28 diesel generators

200,000 gallons of fuel

48 Hour Backup

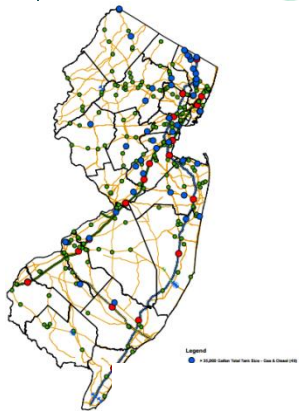
# Benefits of Mobile Diesel Gensets Help Recovery & Resiliency



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

**250 retail fuel centers located with ¼ mile of an evacuation route**

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



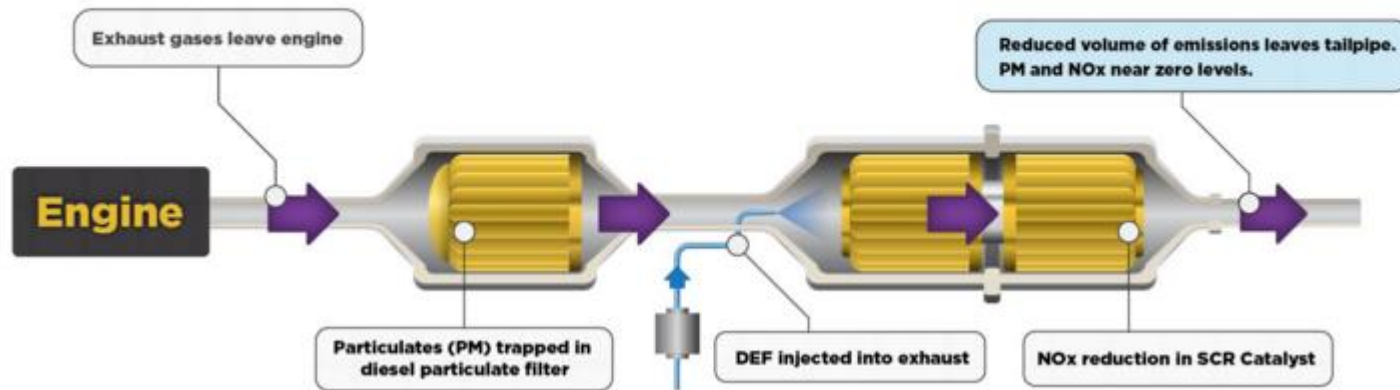
## **Generator Law – 192 h**

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

## Diesel Emissions Control System



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



3516C Tier 4 Interim rear view

# Latest Clean Diesel Technology Generates Air Quality Benefits

	T4i (752–1207 hp)	T4i (>1207 hp)	T4F (>751 hp)
On Jan 1 of	2011	2011	2015
NOx	3.50	0.67	0.67
HC	0.40	0.40	0.19
CO	3.50	3.50	3.50
PM	0.10	0.10	0.03



91%



70%

(All figures are in g/kW-hr)



# 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

## COVERING ALL THE BASES

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



[www.dieselforum.org](http://www.dieselforum.org)



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**



**NESTE**

40,000 gallons of renewable diesel fuel powered Tier 4 generators to provide power to Super Bowl City and cut **238 tons of CO<sub>2</sub>**

# 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.

 **DIESEL**  
TECHNOLOGY FORUM

[www.dieselforum.org](http://www.dieselforum.org)





# Thank You

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