



**SAFETY  
FIRST!**



# ***DIESEL ENGINES***

## **The Emergency Standby Power of Choice!**

### **DIESEL ENGINES — THE SOLUTION**

Diesel-fueled engines meet or exceed all of the performance and reliability criteria noted previously and provide the following advantages:

**Extremely Quick Start-Up Time** - Diesel engines can meet the high performance standards and be quickly available for the production of emergency power. Other sources may require up to two minutes to get up to full speed and load.

**Load-Following Ability** - Diesels provide a steady supply of power that can easily respond to significant changes in load. Diesel engines ramp up very quickly and characteristically do not flicker or dip in power output in response to increasing loads. Diesel-fueled engines also respond well to variable loads and do not lose efficiency when handling load fluctuations.

**Independent Fuel Supply** - Diesel fuel is readily available and capable of safely being stored on-site. This enables diesel engines to operate when off-site sources of fuel from transmission lines or pipelines are cut-off. Fuel storage is also portable, compact, and safe. The readily available nature of diesel fuel makes refueling simple.

**Reliability and Durability** - Diesel engines are among the most durable and maintenance-free power generation systems available. Their minimal maintenance requirements and operating characteristics make them one of the most reliable sources of electricity.

**Portability** - Diesel engines and their fuel sources can be placed virtually anywhere making them excellent power sources for remote locations or in situations where portable power is needed.

**Power Density / Fuel Efficiency** - Diesel-fueled engines are extremely efficient and can provide twice the power for a given engine displacement size compared to other alternatives. Typical standby efficiencies are in the 35-40% range. Additionally, diesel fuel is inherently high in energy content, and more energy is released per unit than from other fuel sources. For emergency situations, this fuel efficiency translates into longer operating time for a given volume of fuel.

**Availability and Cost** - Diesel technology is proven, readily available, and cost effective. Engines and generators are available in a number of sizes and capacities. Their efficient use of fuel means that diesels are an economical source of reliable standby power.

### **REGULATORY APPROACH**

When considering air quality regulations for emergency standby power, states should:

**Assure that the primary safety functions and performance requirements of emergency standby engines are maintained**

**Establish appropriate regulatory exemptions for emergency standby engines**

**Adopt emission standards and implementation dates that are consistent with US EPA Tier 2 and Tier 3 standards for non-road diesel engines**

**Allow at least 100 hours of annual operation to assure proper maintenance, testing and exercising**

**Impose no restrictions on hours of operation during emergency conditions**

### **DIESEL-FUELED EMERGENCY STANDBY POWER IS THE SOLUTION!**

In sum, when all of the relevant factors are considered - safety, performance, reliability, operational advantages and environmental protection - diesel-fueled engines are the clear choice for standby power. In fact, diesel-fueled engines are the only technology that can meet and exceed all of the performance standards needed to ensure reliable standby power for our nation's essential safety systems.

### **RELIABILITY, AVAILABILITY, SAFETY, COST-EFFECTIVENESS AND HIGH PERFORMANCE**

More than ever, the public and private sectors rely on electricity to power essential systems, protect human life, and prevent economic loss. The continuous availability of electricity has become a necessity. When primary power fails, emergency and standby generators that automatically supply electricity are the solutions to ensuring public safety and the ability to maintain critical services and business operations. And today, homeland security concerns further increase the need for reliable standby power. Because of their performance and engineered characteristics, diesel-fueled compression-ignition engines are the best solution to satisfy the country's growing need for safe, reliable and cost-effective standby power.

### **SAFETY AND PROTECTION — THE NEED FOR DEPENDABLE STANDBY POWER GENERATION**

Failures in critical functions at facilities such as hospitals, police and fire departments, flood control pumping stations, military defense facilities, and safety systems for nuclear power plants can result in catastrophic damage and the loss of human life. Therefore, public safety must be the first priority when selecting a dependable,

reliable standby power solution. Government has long recognized the need to maintain essential services in the event of a natural disaster, accident or other emergency. Consequently, various laws and standards are in place to ensure that the failure of the electric power grid does not jeopardize or interrupt the delivery of these critical services. These standards require that standby power be available with virtually no interruption to the continuation of essential services.

It is critical for the business community to have reliable standby power as well to protect companies from disruption of services and to ensure continuity of operations. Individual companies make decisions whether to install emergency standby generators based upon risk analysis and the potential economic impact from a loss of the normal power source.

**DIESEL-FUELED STANDBY POWER IS THE SOLUTION!**

**FOR MORE INFORMATION CONTACT EMA**

# DIESEL ENGINES

THE CRITICAL CRITERIA FOR EMERGENCY STANDBY POWER SOLUTIONS

EXTREMELY QUICK START-UP

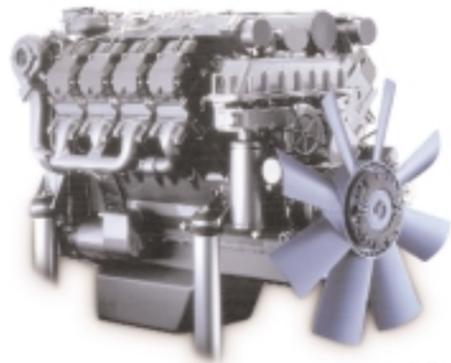
LOAD-FOLLOWING ABILITY

INDEPENDENT FUEL SOURCE

RELIABILITY AND DURABILITY

PORTABILITY

SAFETY



## PERFORMANCE AND RELIABILITY — CRITICAL CRITERIA FOR EMERGENCY STANDBY POWER SOLUTIONS

Standby and emergency power generators are required to meet very high performance and dependability standards. When an outage occurs, emergency generators must meet the following requirements:

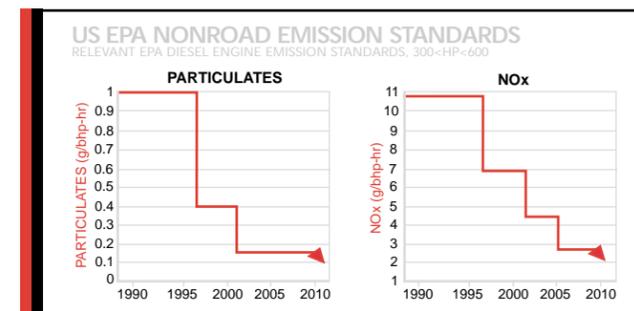
**Extremely Quick Start-Up** - Standards for the restoration of power require the emergency standby power supply to assume full load within ten seconds. This means that any generator set must actually start from cold conditions within 5 or 6 seconds to allow time for switching and load transfers.

**Load-Following Ability** - Besides being able to come up to power quickly, generators must be able to respond to changes in load instantaneously as power demands fluctuate. Engines must be able to follow loads with little or no loss in efficiency or reliability.

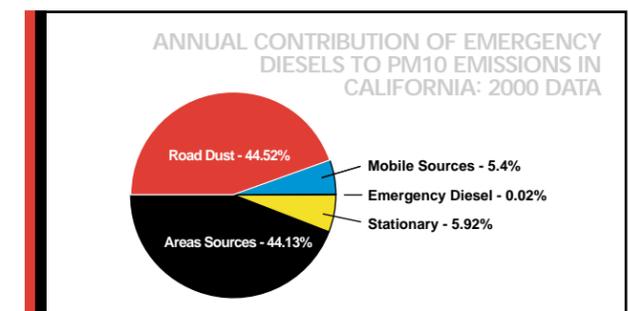
**Independent Fuel Source** - Standards and common sense require that emergency generators have access to fuel sources that cannot fail or be interrupted during an emergency situation. Since continuous access to off-site fuel sources is vulnerable to power failures, earthquakes, fires, or terrorist acts outside the control of the facility's management, the best option

# SECURING LIFE AND PROPERTY

## SAFETY AND RELIABILITY MUST COME FIRST IN EMERGENCIES



Source: US EPA



Source: CARB

is to have emergency power sources independently fueled from an on-site fuel storage tank.

**Reliability and Durability** - Generally, only one emergency standby electric supply is required by codes and standards. Since this emergency source must operate in case of a power outage, the source of power must be extremely reliable and durable; a failure of the standby system when it is most needed could directly cause loss of life.

**Portability** - In some instances, for example emergency flood pumps, lighting generators, or temporary triage centers, a portable supply of electricity is needed to run essential services. Generators must be able to supply power where it is needed.

**Safety** - Emergency equipment must operate under a variety of conditions including fire, physical and mechanical stress, and harsh environments. Equipment and fuel must be appropriate and safe for these varied and extreme conditions.

## ENVIRONMENTAL PERFORMANCE — DISPELLING THE MYTH

As with any fuel combustion process, diesel-fueled engines emit emissions as a consequence of converting fuel to energy. The concern that using diesel engines for emergency standby power could cause air quality problems is simply not true.

## JUST THE FACTS

Some groups contend that emissions from emergency generators could potentially impact air quality or raise public health issues. A review of the facts reveals that these concerns are unfounded.

First, the US EPA regulates emissions from engines in numerous applications, and engines will continue to become cleaner as manufacturers and EPA work together to reduce emission levels even further (see chart). EPA-certified nonroad engines are commonly used in stationary emergency standby applications. Thus, it is simply untrue to say that diesel standby generators are uncontrolled.

Second, emergency standby generators generally operate very few hours per year. Such limited operation cannot and does not create air quality burdens.

Third, California has estimated the annual total emissions from all diesel standby generators assuming they operated 50 hours per year. The resultant nitrogen oxides (NOx) emissions represent only 0.2% of total statewide NOx emissions, and particulate matter (PM) emissions were just 0.02% of total PM emissions. Standby diesel generators contribute an insignificant portion to the state's emissions inventory (see chart).

Modern diesel engines emit greatly reduced NOx and PM emissions compared to engines produced just several years ago. As noted above, diesel-fueled engines certified to US EPA standards for nonroad engines are now readily available for emergency standby applications. NOx emissions from these engines have been reduced by more than 60% over the last several years and PM emissions have been reduced by more than 80%. Regulatory activity by the US EPA affecting nonroad engine standards will significantly reduce these emissions even further.