



# CATERPILLAR NATURAL GAS ENGINES

**Lower Operating Costs, Proven Performance**

MINING  
OIL & GAS  
RAIL  
MARINE  
ELECTRIC POWER

**CATERPILLAR®**

# We're "all in" on a natural gas-powered future

You told us what you want from Caterpillar® engines: fuel flexibility, reduced operating costs and lower emissions. You want to tap into the cost savings of natural gas while retaining the traditional performance and durability of diesel engines.

Small wonder: natural gas is abundant, cheap and clean—it fits right in with sustainability trends. Just as important, it is clean burning while providing a real alternative to diesel fuel pricing. And the gas fueling infrastructure is growing.

That's why we are expanding our portfolio of natural gas engines in a variety of applications. We are also extending our technology to customers interested in retrofitting their existing engines. This is a new era where natural gas will be a major fuel source and bring significant bottom line cost savings to your businesses.

## Natural Gas Engine Technology

Caterpillar is a leader in natural gas technology with thousands of engines operating in the field. We are leveraging our experience and leading technology into other areas.

Today, we offer natural gas engines featuring spark ignited and Dynamic Gas Blending technologies. In the future, we will introduce a third technology: high-pressure direct injection (HPDI). In each case, we ensure the right technology is deployed into the right application, fully supporting your goals for performance, safety and reliability.

### Dynamic Gas Blending

Dynamic Gas Blending technology is a proprietary Caterpillar dual fuel technology that uses existing gas engine hardware to allow Caterpillar diesel engines to burn natural gas. Caterpillar engines fitted with this DGB technology:

- Reduce fuel costs by replacing up to 70 percent of diesel with gas
- Continuously adjust to changes in fuel quality and pressure for maximum performance
- Are available today for the oil & gas market, and coming soon to others.

### High Pressure Direct Injection (HPDI)

HPDI introduces natural gas directly into the combustion chamber of the engine and utilizes a small amount of diesel as the ignition source. HPDI technology:

- Replaces significantly more diesel fuel than DGB technology with lower cost natural gas while maintaining diesel engine performance and transient response
- Will be first available in mining trucks and locomotives
- Meets Tier 4 off-highway and rail standards using less aftertreatment emissions technology.



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### Responding to the need

“Burning gas offers a significant reduction in our customers’ total lifecycle cost, so that’s my number-one priority,” says Joel Feucht, general manager for large gas engines. “Our customers want to burn gas and do so in a way Caterpillar is famous for: the best performance with great reliability. We are making this happen with a sense of urgency.”



## What is natural gas?

Natural gas is available through an extensive pipeline infrastructure for industrial applications. Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG) are also available for mobile applications.

## Spark-ignited gas engines

We have been manufacturing natural gas-powered engines and generator sets since 1947 for stationary electric power and petroleum markets. Our acquisition of MWM in 2011 further strengthens our value to customers. MWM is a leading global supplier of sustainable, natural gas and alternative-fuel engines. Put the experience of thousands of globally installed megawatts to work for you.

- Fuel-flexible engines run on natural gas, field gas, propane, landfill gas and digester gas
- Project experience ranges from gas compression and cogeneration facilities to biogas utility power and greenhouses
- The solution you need, from a single gas engine to complete turnkey systems

## Medium-speed engines

As a leading manufacturer of medium-speed engines, we are leading the way in flexible-fuel use and lowest overall owning and operating costs.

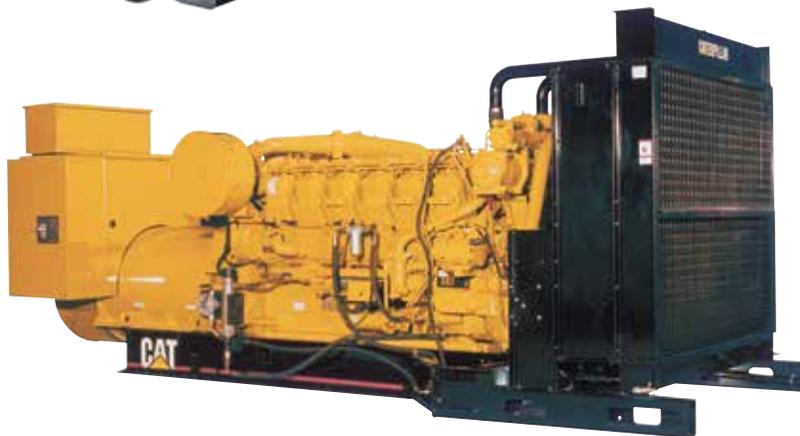
- Broad product line of engines from Caterpillar, EMD and MaK™ ranging from 1 to 16 MW
- Technology that supports diesel, natural gas, dual fuel, marine diesel, heavy fuel oil or crude
- Emissions compliant to IMO and EPA standards



# Why natural gas?

Your success depends on the tools you use. Natural gas offers significant fuel cost savings, low emissions and performance equivalent to diesel-fueled engines.

When we think about energy, we think about diesel and gas. Because when it comes to getting the job done right, the best fuel solution can be both of them. And that holds true whether you're looking at Cat, Electro-Motive Diesel, MWM or MaK engines.



For more information on the latest from Caterpillar on natural gas engines—visit us online at [www.caterpillar.com/naturalgas](http://www.caterpillar.com/naturalgas)



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