



CAT® GAS SOLUTIONS





97 MW of Cat® coal seam methane power in New South Wales, Australia

SMARTER ENERGY SOLUTIONS

From natural gas combined heat and power (CHP) for facilities to alternative biogas electric utility power, Caterpillar has reliable solutions to fit your needs. From powerful gas generator sets to unsurpassed dealer service and support, Caterpillar offers standard turnkey solutions for your industry.

PRODUCT SOLUTIONS

COMBINED HEAT AND POWER (CHP)

Whether your operations require steam, hot water or even hot air, Caterpillar offers CHP modules that recover the heat from the engine jacket and aftercooler water circuits, and/or from the exhaust gas. Caterpillar offers a standard or customized CHP design to match customers' needs with the cooling configuration, system pressures and temperatures associated with each Cat® gas engine.

CONTROLS AND SWITCHGEAR

Whether operating on natural gas, biogas or manufactured gas, Caterpillar offers switchgear controls that match regional requirements. Cat paralleling, control and monitoring systems are offered to serve UL specification markets in the Americas or International Electrotechnical Commission (IEC) standards in Europe, Russia, the Middle East, Asia and Africa.

All controls are microprocessor-based with redundant backup master controls via the individual generator control processors. Full monitoring and control are offered locally via a 5.7 to 17 inch (145 to 432 mm) color touch screen interface.

FUEL SYSTEMS

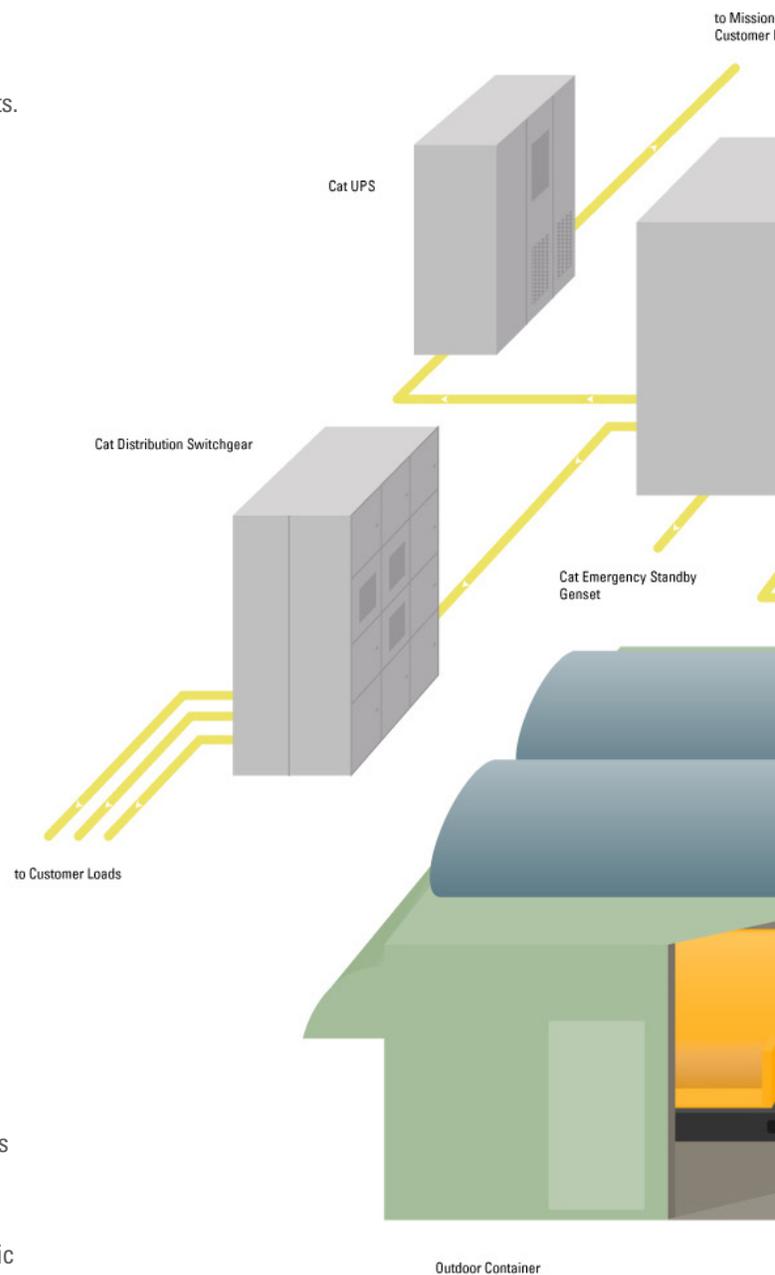
Whether your natural gas project requires simple fuel pressure regulation and safety, or if your biogas generator set requires filtration of hydrogen sulfide and siloxane contaminants, a complete offering of fuel train equipment is available to meet the specific needs of your project. For low energy fuels, your Cat Dealer will analyze your fuel sample to ensure compliance with Cat engine fuel requirements over time.

EXHAUST AFTERTREATMENT

Caterpillar offers a suite of aftertreatment solutions to comply with any global regulation. Whether you're applying a lean burn engine oxidation catalyst to simply lower CO emissions, or applying a urea-based SCR system to all but eliminate NO_x for greenhouse fertilization, Cat Gas Solutions provides exhaust aftertreatment equipment tailored to your regional requirements.

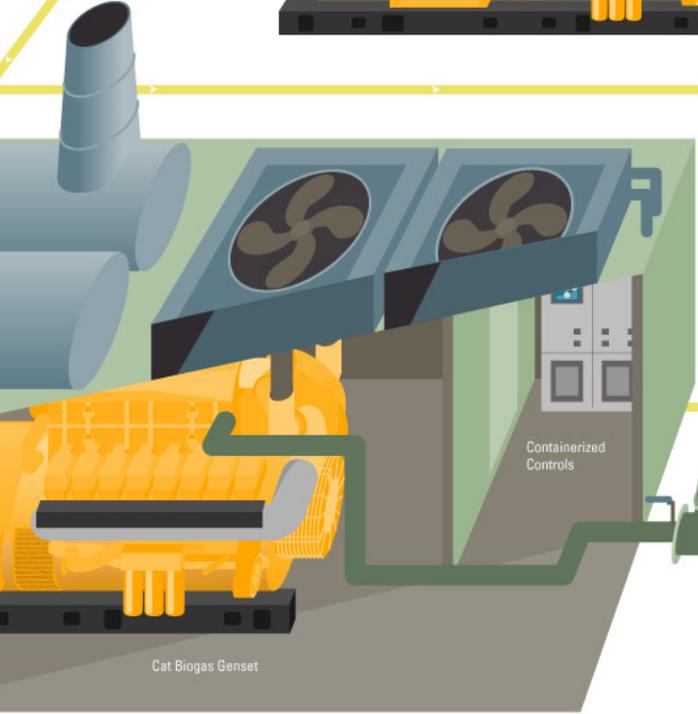
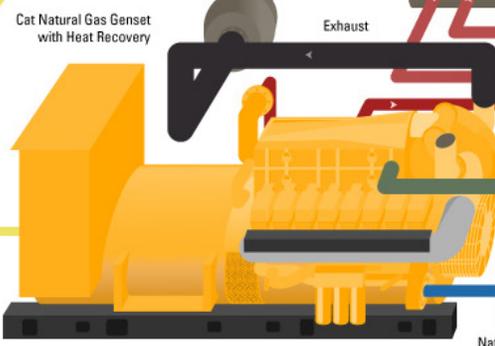
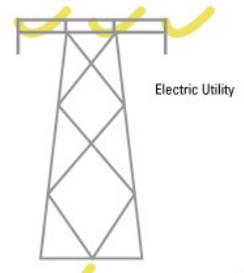
CONTAINERS AND ENCLOSURES

For both natural gas and low energy fuel applications, Caterpillar offers containerized power plants that include complete generator sets, paralleling controls, cooling system, oil system and ventilation for various ambient environments. Custom containers are offered for arctic grade -40°C (-40°F) and high ambient project locations up to 50°C (122°F).



Critical Load

Cat Paralleling Switchgear / Master Controls



Containerized Controls

Fuel Regulation & Safety

SCR Exhaust Aftertreatment

Exhaust Silencer Heat Exchanger

Exhaust Oxidation Catalyst

Exhaust

Pump

Pump

Jacket Water & Aftercooler Heat Exchangers

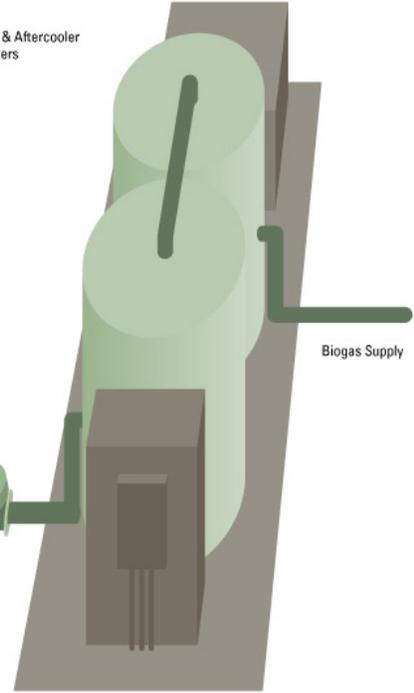
Secondary Exhaust Heat Exchanger

CO₂ Recovery

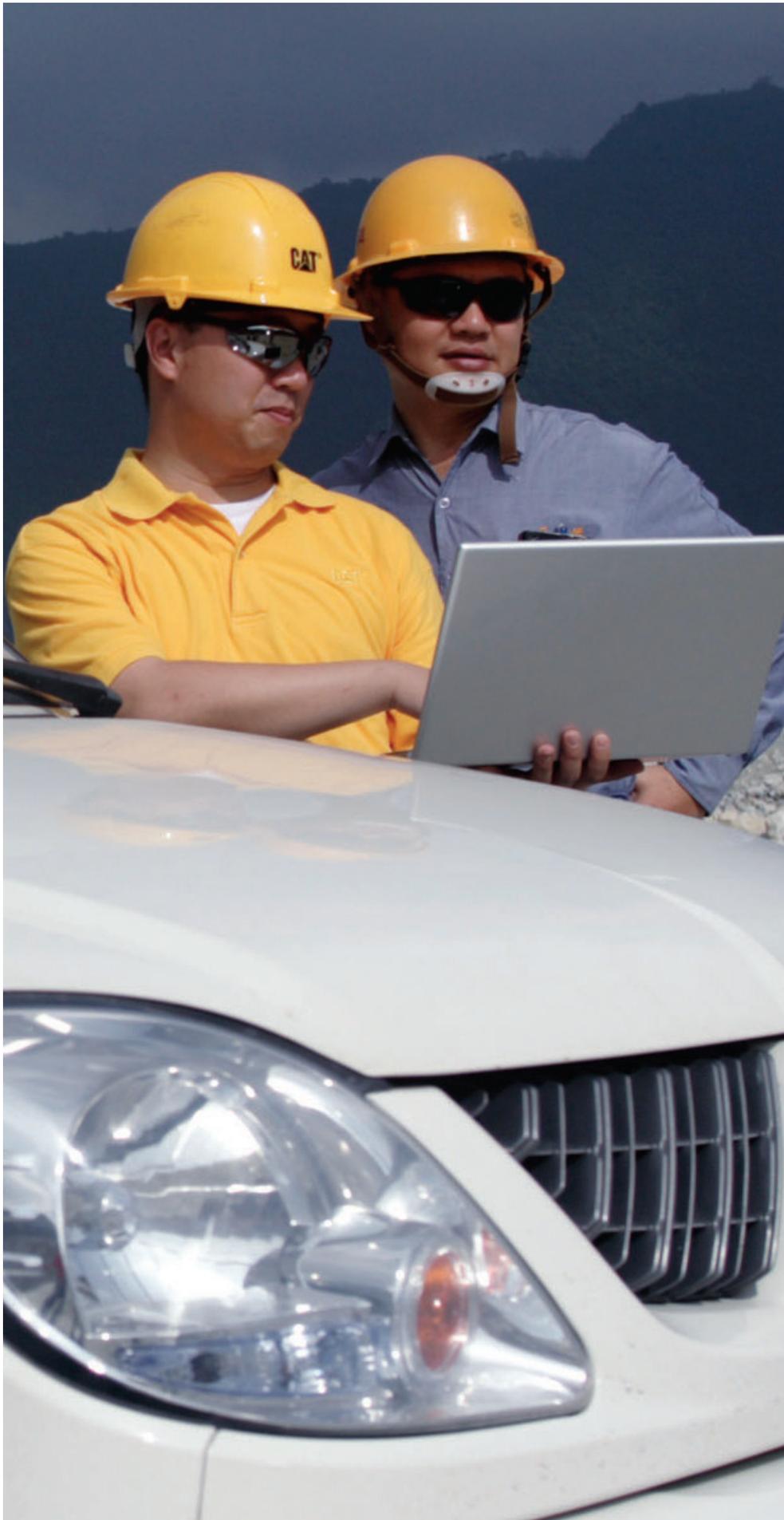
Exhaust Stack

Hot Customer Return Water

Cold Customer Supply Water



Biogas Fuel Treatment System





SERVICE SOLUTIONS

PRODUCT SUPPORT

From a 12-month basic warranty and scheduled oil sampling to a 12-year Customer Support Agreement, your local Cat Dealer provides different maintenance and repair options to match customer requirements. For generator sets and switchgear, Cat Insurance offers various Extended Service Coverage (ESC) plans to protect against the parts and labor costs associated with unplanned repairs after the standard warranty period. In addition, 1- to 5-year Overhaul Protection Coverage (OPC) is offered on both parts and service associated with an engine overhaul. Your Cat Dealer can provide a suite of options tailored toward project specific needs.

FINANCE

Cat Financial is a full service finance company offering both loans and leases at competitive interest rates and flexible terms on equipment and projects powered by Cat engines. Construction and term project financing is available for up to 80 percent of the total project cost, including engineering, equipment, permitting and soft costs.

TRADE

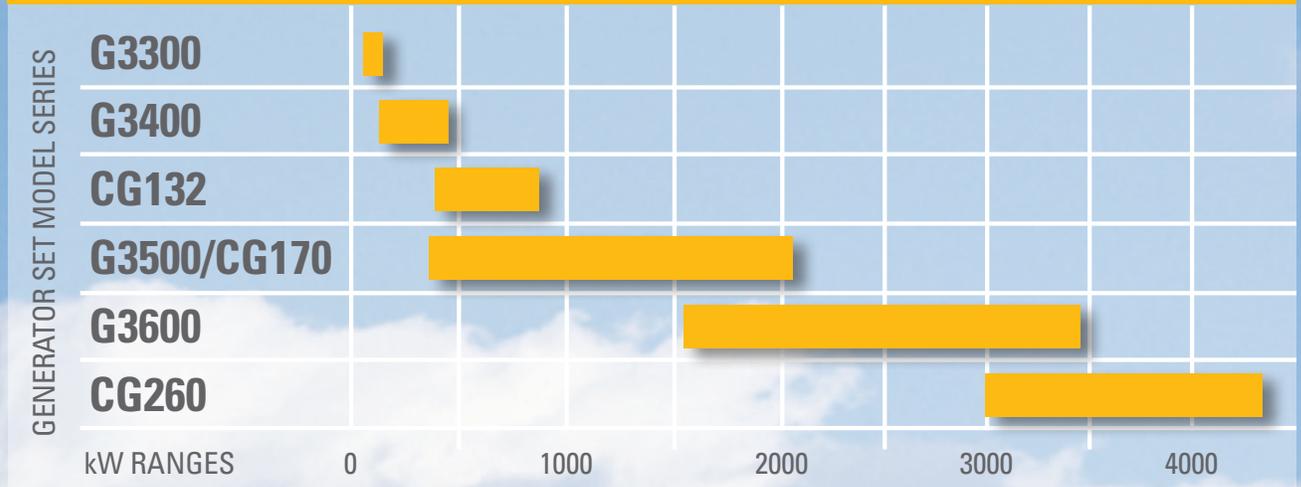
For more than 30 years, Cat World Trade has helped companies with an alternative means of purchasing Cat equipment through innovative commodity trade agreements. Cat World Trade can also help generate more revenue through the sale of carbon, renewable energy or emission reduction credits.

GAS RENTAL POWER

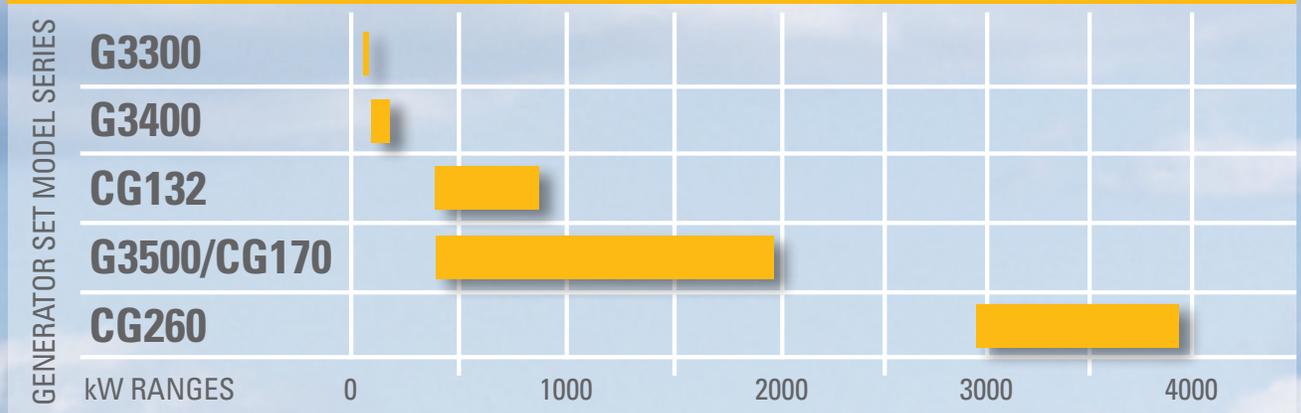
Sometimes bridge electric power solutions are required to close the gap during major construction projects, utility power shortages or expansions of commercial or industrial operations. Cat Rental Power via the global network of Cat Rental Power Dealers and International Power Project Providers offer containerized, mobile generator sets that can operate on natural gas fuel, individually or paralleled together, on a monthly or annual contract basis.

PRODUCT RANGES

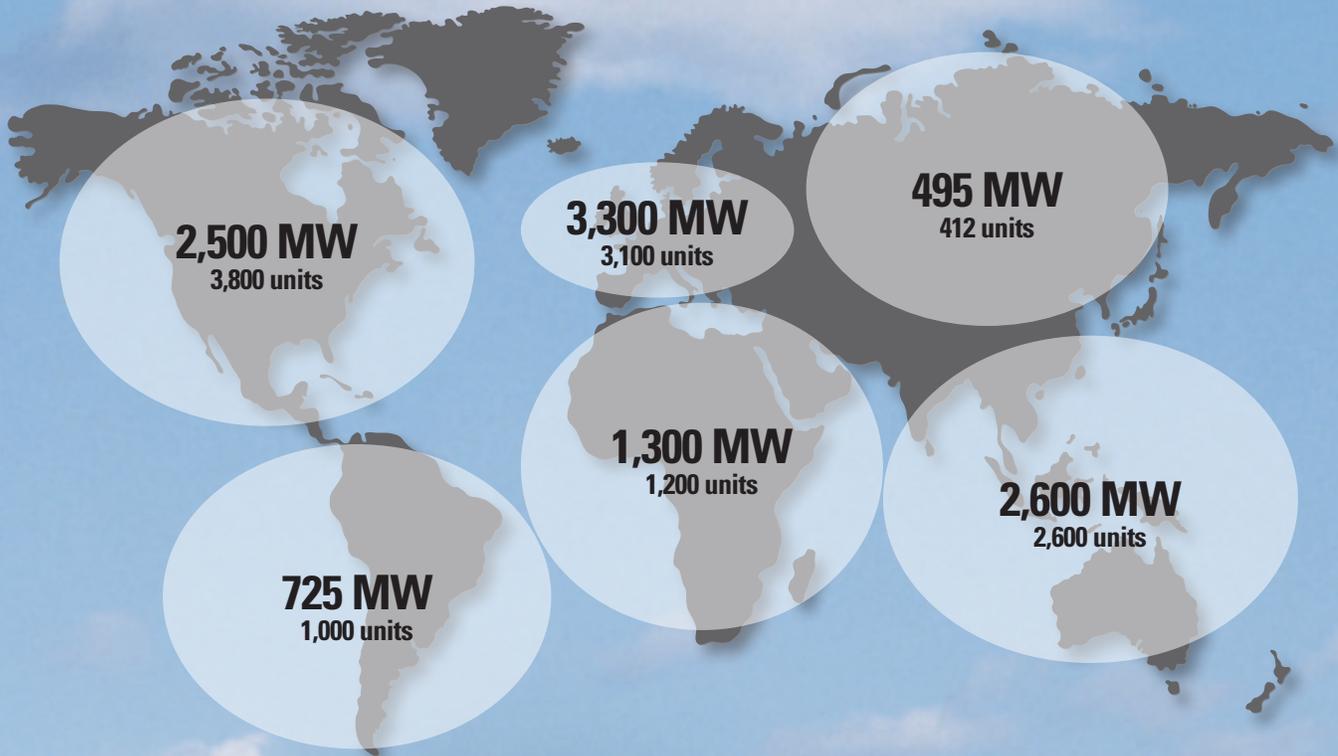
Natural Gas



Biogas



INSTALLED GAS GENERATOR SETS (1995 – 2010)



COMMERCIAL AND INDUSTRIAL FACILITIES

Combined heat and power (CHP) reduces operating costs

Many commercial facilities such as resorts, shopping malls, high-rise office buildings, universities, data centers and hospitals, as well as industrial plants, refineries and district heating plants can reduce operating costs by implementing a Cat CHP system using clean pipeline natural gas as a fuel source.

GREENHOUSES

High-efficiency power systems

Greenhouse facilities also utilize natural gas with a Cat CHP system. Cat gas generator sets can provide electricity for electrical loads, heat energy for warming of the greenhouses and recycled carbon dioxide from the engine exhaust as an organic fertilizer.

Electricity from CHP systems can also create a revenue stream for the facility, when electricity produced at a greenhouse exceeds the local demand. Many countries incentivize high-efficiency electric power generation via production credits. In other parts of the world, grid instability and pure economics are driving greenhouse agriculture toward similar solutions.

UTILITIES

Meeting base or peak loads with natural gas

Electric utilities can operate Cat gas generator sets continuously to serve base electrical loads. This is particularly advantageous in the absence of a reliable centralized power plant, or where the economics and availability of natural gas fuel are key drivers.

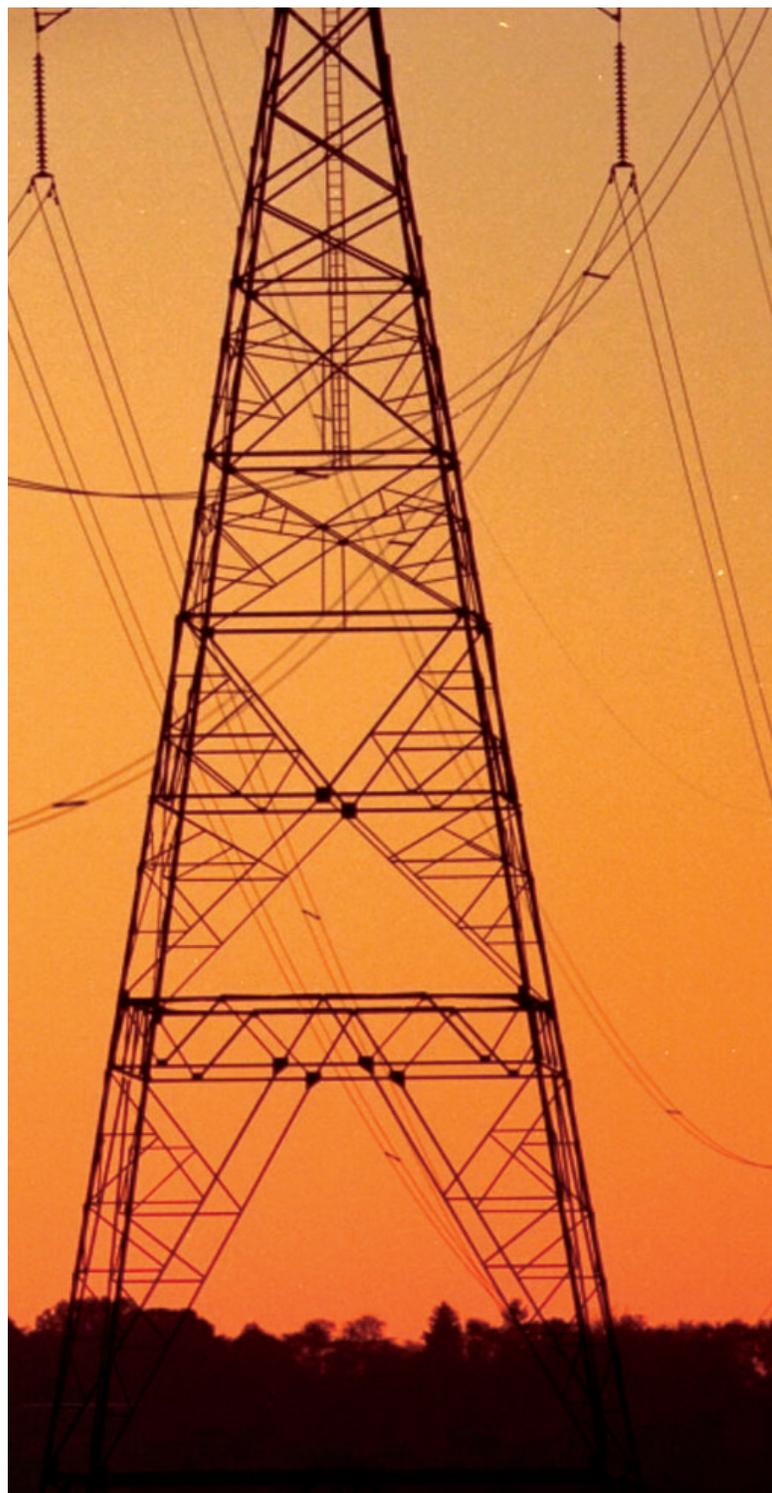
Cat gas generator sets are also commonly applied to economically address peak utility demands that occur daily or seasonally.

AGRICULTURE AND FOOD PROCESSING

Sustainable power using biogas

Biogas, derived as a byproduct of many agricultural, food processing and industrial processes, is used as a fuel source for Cat generator sets. Cat gas generator sets specifically designed to operate on biogas can reduce total operating costs. Cat low-energy fuel generator sets are engineered to handle fuel with variations in methane content typical of biogas operations.

Cat switchgear and master controls parallel the generator set to the local electrical grid to export renewable power at a premium to the local electric utility. Otherwise power can be distributed and used locally. For more remote installations, the power produced can be consumed by the facilities on site.





LANDFILLS

Renewable power with landfill gas

Landfill gas, composed mostly of methane and carbon dioxide, is produced naturally as organic waste decomposes in landfills. Driven by mandate of carbon reduction goals, modern sanitary landfills capture this gas for use as a renewable fuel in specially configured Cat landfill power systems. These systems deliver reliable and environmentally sound electricity to the local community.

WASTEWATER TREATMENT PLANTS

Sewage gas for power production

Many wastewater treatment facilities use waste methane gas from plant processes as a fuel source. This gas is comprised of methane and carbon dioxide generated by wastewater digesters used in the water treatment process. Cat gas generator sets utilize the fuel to provide the plant with electricity and heat to serve plant thermal loads and accelerate the wastewater treatment process.

COAL MINES

Maximizing available fuel resources at mining sites

Cat natural gas power plants can reliably support the operations associated with mining minerals such as copper, iron ore, gold and silver in the absence of a reliable centralized electric utility. Mining power systems are designed to handle mining operations demanding transient load cycles.

For coal mining operations, coal mine methane (CMM) gas is a byproduct of coal formations in subterranean coal seams, and is released before or during active coal mining. Caterpillar has developed generator sets specifically for use with CMM gas.

SPECIALTY APPLICATIONS

Another alternative for electric power generation

Worldwide, population growth is driving an increasing demand for new sources of electric power generation. At the same time, an increasing focus on efficiency and reduced waste in the power generation sector is driving change in the use of alternative gaseous fuels.

Today, Caterpillar is collaborating with dealers and customers around the world to develop Cat generator sets that can operate on specialty fuels such as syngas, coke oven gas, blast furnace gas and high energy gas. Due to the large variation in the composition and contaminants in these fuels, Caterpillar works closely with the local Cat Dealer and customer to evaluate a potential power solution.

For more information or to locate your Cat Dealer,
visit www.catelectricpowerinfo.com/gas

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