



# CATERPILLAR ON ENERGY:

Supplying solutions  
for a demanding world.

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## CHAIRMAN'S MESSAGE



Douglas R. Oberhelman  
Chairman and CEO

## CATERPILLAR ON ENERGY

I HAVE NEVER BEEN MORE COMMITTED TO SUSTAINABLE DEVELOPMENT THAN I AM TODAY. I TRAVEL THE WORLD AND SEE FIRST HAND HOW THE WORLD NEEDS THE PRODUCTS, SERVICES AND SOLUTIONS THAT CATERPILLAR PROVIDES. AND I SEE A WORLD POPULATION THAT IS GROWING AND MODERNIZING. ALL OF THESE THINGS LEAD TO THE QUESTION, "WHAT DOES THE WORLD NEED?"

Ask 10 people what the world needs, and you'll probably get 10 different answers. At Caterpillar, we've got quite a list of what the world needs – freer trade, rational regulations, more energy, quality education, quality healthcare, clean water, modern infrastructure, improved standards of living around the globe, just to mention a few. I could talk on the importance of any of these subjects; but this year, I want to focus on energy. The world needs reliable, cleaner energy.

Some 2.7 billion people live without access to adequate energy services. Approximately 1.3 billion people, nearly one fifth of the global population, have no access to electricity at all. It's hard to imagine. It's also within our grasp to change. Given the abundant supplies of energy resources and the technology available today, there is no reason why we can't expand energy access to those who are living without it. In many cases, the biggest difference between a developing nation and a developed nation is access to electricity. Our challenge is how to extend that access in the most sustainable way possible.

(continued)

## CHAIRMAN'S MESSAGE

**1.3** Approximately 1.3 billion people, nearly one fifth of the global population, have no access to electricity at all. It's hard to imagine.

We all have a role when it comes to energy. At Caterpillar, our role is clear and significant. We are a global manufacturer; and, as we build products, we use energy. We have to be as efficient in the use of this energy as possible. We employ efficiency programs like the Caterpillar Production System to make the best use of energy in our production lines. Our logistics business strives to find the most efficient ways to get parts and components to facilities around the world. We build new facilities to efficient building standards. And we monitor energy use at our facilities and take proactive steps to reduce energy waste.

We also work with customers who are focused on their own energy consumption and on providing the energy the world needs. As communities, states or countries grow their economies and improve quality of life for citizens, they have to think about energy. Collectively, we all need to think more about sources and impacts of energy – both production and consumption.

We are all on this planet together and need to be informed on the issues surrounding energy. Here's what we believe at Caterpillar:

- **Energy sources need to be developed and used in an environmentally responsible manner.** We use energy, and we have a responsibility to develop energy sources sustainably. Caterpillar is continually enhancing the efficiency of its equipment and improving product technologies. While the consumption of energy for our products is only a very small part of global energy consumption, it is a significant component of the business of our customers and, therefore, a key focus for us.

- **There is no one single solution to providing globally abundant, reliable, secure, clean and reasonably priced energy.** We need all sources of energy, including alternatives/renewables like wind, solar, biomass, waste and used oil. But, we also need to develop traditional sources of energy, like nuclear, natural gas and coal. Nuclear is the lowest emitting base load energy source available today. Natural gas is the fastest-growing fuel, now accounting for approximately 23 percent of the world's energy consumption. And demand is growing. Coal is abundantly available and has the scale to meet the primary energy needs of the world's rising population and expected economic growth over the next several decades. All energy sources have an impact on the planet. We need to work together to limit those impacts wherever possible.
- **Caterpillar supports market-based, cost-efficient energy solutions to help meet the world's growing energy demands.** We need energy policies and an atmosphere in which the best companies, experts, researchers, inventors and entrepreneurs have the freedom to innovate and the flexibility and resources to develop cleaner, more secure energy – and more of it. We need policies and flexible mechanisms that harness the marketplace to drive innovation, mobilize investment and allow the sharing of clean, efficient technologies.
- **Access to affordable and dependable energy resources is critical for energy security, economic prosperity and growing economies.** Look at the world. Energy consumption is rising rapidly, driven by worldwide population growth, swiftly developing economies, improving global living standards and the burgeoning use of ever more energy-dependent technologies. The global demand for energy is expected to increase significantly over the next 20 years.

The energy challenges are great. And we all have a role in helping shape a future where everyone has access to affordable, clean energy. We take our responsibilities seriously in terms of our own operations and in helping our employees, communities and civic leaders understand our perspective in the energy debate; but that's only a small part of our interest in energy.

(continued)

### CHAIRMAN'S MESSAGE



**Caterpillar customers play a major role in satisfying the world's increasing demand for reliable energy sources and clean, more efficient energy use. And our business is all about serving our customers.**

Energy is at the core of our business.

Caterpillar customers play a major role in satisfying the world's increasing demand for reliable energy sources and clean, more efficient energy use. And our business is all about serving our customers.

For decades, we've been working with customers to use alternative fuels to power our reciprocating engines and gas turbines. And while it represents a small percentage of our sales today, we're working to grow that business every day. Within this year's report, you will read how we convert waste energy into clean, useful energy. Today, one of our largest businesses is mining. Mining is at the heart of much of today's traditional energy sources. We also supply the global oil and gas industries. We provide an entire suite of services to help customers extract energy resources more efficiently and enable more sustainable harvesting techniques.

We are also focused on energy used for transportation. You'll find industry-leading efficiency in Cat marine engines in many ocean-going vessels, and we are investing heavily in rail and locomotive power – and re-power.

Caterpillar's role is clear. Our customers are in the energy business, and we are working to find ways to help them provide the energy the world needs in a more sustainable manner. We are helping them succeed by helping them become more sustainable and efficient.

Doug Oberhelman  
Chairman and Chief Executive Officer  
of Caterpillar Inc.

## OUR APPROACH



## OUR APPROACH

### CORPORATE PROFILE

For more than 85 years, Caterpillar Inc. has been making sustainable progress possible and driving positive change on every continent. With 2011 sales and revenues of \$60.14 billion, Caterpillar is the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. The company also is a leading services provider through Caterpillar Financial Services Corporation, Caterpillar Remanufacturing Services, Caterpillar Logistics Inc. and Progress Rail Services Corporation.

Caterpillar is a global leader, a worldwide enabler of sustainable progress. Caterpillar operates hundreds of offices and facilities across the world and has more than 125,000 employees. Caterpillar's global presence, product breadth and financial strength enable us to win in today's competitive marketplaces. We serve customers in more than 180 countries around the globe with more than 300 products. <http://www.caterpillar.com>.

## OUR APPROACH



## GOVERNANCE & ETHICS

### CORPORATE GOVERNANCE

Caterpillar's corporate governance is designed to serve the interests of stockholders and other stakeholders with the highest standards of responsibility, integrity and in compliance with applicable laws. These standards are developed and implemented by our Board of Directors and global management team, who oversee the company's performance and governance policies.

<http://www.caterpillar.com/company/governance>

### CODE OF CONDUCT

Our Values in Action – Caterpillar's Worldwide Code of Conduct, first published in 1974 and updated most recently in 2010 in conjunction with our corporate strategy update, defines what we stand for and believe in, documenting the uncompromisingly high ethical standards our company has upheld since its founding in 1925. The Code of Conduct helps Caterpillar employees put the values and principles expressed in our Code of Conduct into action every day by providing detailed guidance on the behaviors and actions that support our values of Integrity, Excellence, Teamwork and Commitment.

<http://www.caterpillar.com/company/strategy/code-of-conduct>

(continued)

## OUR APPROACH

**GOVERNANCE & ETHICS (CONT.)****SUPPORTING HUMAN RIGHTS**

We are asked from time to time about our commitment to human rights. We believe that Our Values in Action – Caterpillar’s Worldwide Code of Conduct, effectively articulates our long-standing support for, and commitment to, human rights and the dignity of all people. Caterpillar values teamwork with our employees, dealers, suppliers and other stakeholders. We seek suppliers and business allies who also demonstrate strong values and ethical principles. We avoid those who violate the law or fail to comply with the sound business practices we promote. We feel strongly that Our Values in Action creates a work environment that recognizes the rights of our employees around the globe. Therefore, we do not see a need to become signatories to other voluntary conventions, frameworks and standards that offer direction on how to promote the rights and freedoms of people, including those brought forward by the United Nations and other intergovernmental organizations. Our employees and management receive regular training and participate in annual assessments to ensure that they are aware of and able to apply the principles contained in Our Values in Action. We also maintain internal reporting mechanisms to hold employees and management accountable for failing to comply with Our Values in Action.

**OPPOSING BRIBERY AND CORRUPTION**

Caterpillar believes fair competition based on quality, innovation and overall value is fundamental to free enterprise and economic growth. Bribery and corruption can have serious social, environmental and economic consequences – impeding trade, competition, investment and economic growth, and limiting a nation’s ability to reduce poverty and improve standards of living. In some areas of the world where Caterpillar does business, bribery and corruption are significant issues. As a result, we strongly advocate and enforce anticorruption policies throughout our businesses.



OUR APPROACH

# VISION, MISSION & STRATEGY

Our vision is a world in which all people’s basic requirements – such as shelter, clean water, sanitation and reliable power – are fulfilled in a way that sustains our environment.

Our mission is to enable economic growth through infrastructure and energy development, and to provide solutions that protect people and preserve the planet.

Our strategy is to provide work environments, products, services and solutions that make efficient use of the world’s natural resources and reduce unnecessary impacts on people, the environment and the economy. This means that we leverage resources, including technology and innovation, to:

- Promote and protect individual safety and well-being
- Provide employment, education and training
- Minimize the use of energy, materials, water and land
- Maximize recycling
- Minimize emissions
- Optimize the use of renewable resources

**CRITICAL SUCCESS FACTORS**

**Culture.** Create a culture of sustainable development in all our business units and in all our daily work.

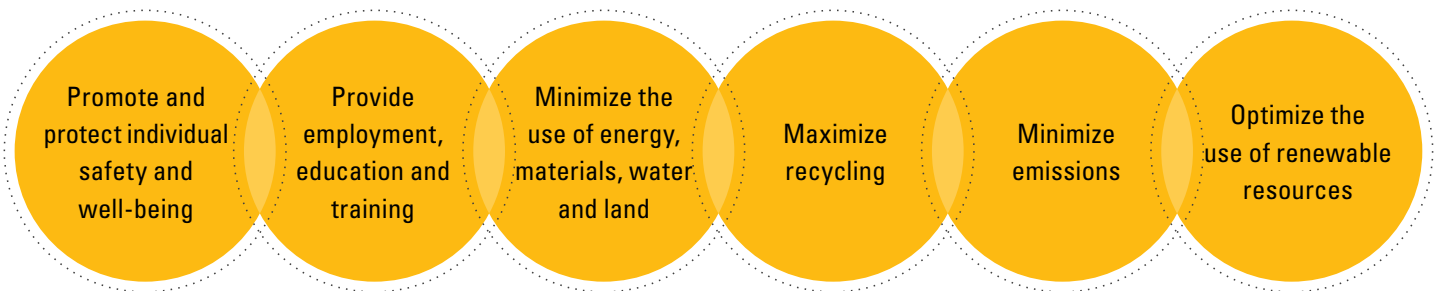
**Progress:** We identify and share best practices to promote our employees’ awareness and understanding of sustainability. We continue to foster a corporate culture of transparency, disclosure and engagement.

**Operations.** Be consistent with our sustainability principles and contribute to enterprise sustainable development goals.

**Progress:** The Caterpillar Production System provides the recipe for efficiency and sustaining excellence in our facilities. We actively encourage employees to conserve resources and be more efficient. Operating in a more efficient and sustainable manner will reduce impacts on people and the environment, and help us and our customers save money.

**Business Opportunities.** Identify and pursue business growth opportunities created by sustainable development.

**Progress:** We are working to embed sustainability into our Caterpillar brand portfolio, our new product development process and our technologies. Our business leaders continue to drive growth in sales of products, services and solutions that help customers meet their sustainability challenges. We utilize 6 Sigma methodologies to focus our work and drive measurable benefits.



*We will execute our strategy by working to meet our long-term aspirational goals. We set yearly targets where possible and are working on additional targets to help us measure our annual progress.*

OUR APPROACH

# ROADMAP MILESTONES

- 2000** Diesel Technology Forum founding member
- 2001** Joined World Business Council for Sustainable Development
- 2002** Lead corporate sponsor for Nature Conservancy's Illinois River Emiquon Preserve restoration and preservation project
- 2003** Vision Zero Safety Goal  
U.S. EPA Climate Leaders  
Developed innovative battery materials technology  
First delivery of reduced-impact logging certified lumber in the United States, resulting from Tropical Forest Foundation program, supported by Caterpillar
- 2005** First Sustainability Report  
Revised and relaunched worldwide Code of Conduct  
Sustainable Development becomes Enterprise Strategic Area of Improvement  
Lead corporate sponsor for Nature Conservancy's Great Rivers Project
- 2006** Dow Jones Sustainability World Index Industrial Engineering Sector Leader  
Acquired Progress Rail Services, Inc.  
Co-leading corporate sponsor of the World Resources Institute Center for Transport and the Environment EMBARQ project
- 2007** U.S. Climate Action Partnership (USCAP)  
Founding partner, Energy Technologies Institute in the United Kingdom
- 2008** First U.S. EPA International Combined Heat and Power Award – to customer in China  
Cat® D7E, electric drive track-type tractor introduced  
AC electric drive mining trucks introduced
- 2009** Sustainability Council formed to drive increased revenues  
Announced remanufacturing joint venture in China with Yuchai Machinery and opening of R&D center in China  
U.S. EPA Clean Air Excellence Award for Cat® D7E  
Leadership Energy and Environmental Design (LEED) Existing Building Gold Certification for Corporate Headquarters and Cat Financial Headquarters
- 2010** Revised and relaunched worldwide Code of Conduct  
Acquired Electro-Motive Diesel, Inc., manufacturer of diesel-electric locomotives  
Greenmark Gold Plus certification for Singapore remanufacturing facility  
LEED Gold certification for Suzhou, China, Medium Wheel Loader/Motor Grader facility; Wuxi, China, R&D facility; Tianjin, China, Asia Power Systems facility; and Washington, Ill., Instrument Applications Center  
LEED Silver certification for Wuxi, China, Perkins Shibaura engine facility and Beijing, China, office facility
- 2011** Acquired Bucyrus International, Inc., manufacturer of high-productivity mining equipment  
Acquired MWM Holding GmbH, Germany-based manufacturer of natural gas reciprocating engines  
First Annual Chairman's Sustainability Awards  
LEED Silver certification for Seguin, Texas, engine facility
- 2020** Achieve enterprise goals in the areas of workplace and product safety, energy efficiency, greenhouse gas emissions, water consumption, materials efficiency, waste reduction and LEED building criteria

## OUR APPROACH

# FORWARD-LOOKING STATEMENTS AND TRADEMARK INFORMATION

Certain statements in this 2011 Sustainability Report relate to future events and expectations and are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “believe,” “estimate,” “will be,” “will,” “would,” “expect,” “anticipate,” “plan,” “project,” “intend,” “could,” “should” or other similar words or expressions often identify forward-looking statements. All statements other than statements of historical fact are forward-looking statements, including, without limitation, statements regarding our outlook, projections, forecasts or trend descriptions. These statements do not guarantee future performance, and we do not undertake to update our forward-looking statements.

Caterpillar’s actual results may differ materially from those described or implied in our forward-looking statements based on a number of factors, including, but not limited to: (i) global economic conditions and economic conditions in the industries and markets we serve; (ii) government monetary or fiscal policies and infrastructure spending; (iii) commodity or component price increases and/or limited availability of raw materials and component products, including steel; (iv) our and our customers’, dealers’ and suppliers’ ability to access and manage liquidity; (v) political and economic risks and instability, including national or international conflicts and civil unrest; (vi) our and Cat Financial’s ability to: maintain credit ratings, avoid material increases in borrowing costs, and access capital markets; (vii) the financial condition and credit worthiness of Cat Financial’s customers; (viii) inability to realize expected benefits from acquisitions and divestitures, including the acquisition of Bucyrus International, Inc.; (ix) international trade and investment policies; (x) challenges related to Tier 4 emissions

compliance; (xi) market acceptance of our products and services; (xii) changes in the competitive environment, including market share, pricing and geographic and product mix of sales; (xiii) successful implementation of capacity expansion projects, cost reduction initiatives and efficiency or productivity initiatives, including the Caterpillar Production System; (xiv) sourcing practices of our dealers or original equipment manufacturers; (xv) compliance with environmental laws and regulations; (xvi) alleged or actual violations of trade or anti-corruption laws and regulations; (xvii) additional tax expense or exposure; (xviii) currency fluctuations; (xix) our or Cat Financial’s compliance with financial covenants; (xx) increased pension plan funding obligations; (xxi) union disputes or other employee relations issues; (xxii) significant legal proceedings, claims, lawsuits or investigations; (xxiii) compliance requirements imposed if carbon emissions legislation and/or regulations are adopted; (xxiv) changes in accounting standards; (xxv) failure or breach of IT security; (xxvi) adverse effects of natural disasters; and (xxvii) other factors described in more detail under “Item 1A. Risk Factors” in our Form 10-K filed with the SEC on February 21, 2012 for the year ended December 31, 2011. This filing is available on our website at [www.caterpillar.com/secfilings](http://www.caterpillar.com/secfilings).

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## OUR VIEWS



## OUR VIEWS

Caterpillar is a global company. With more than 450 facilities worldwide and more than half our sales outside the United States, we serve customers around the world.

We understand that there are many differing economic and political philosophies and forms of government globally. We acknowledge and respect the diversity of social customs and cultural traditions in the countries in which we operate. And we maintain the flexibility to adapt our business practices to them – to the extent that we can do so in keeping with Our Values in Action. In certain areas, however, our positions are clear and long standing. These include Energy & Climate, Growth & Trade, and People & Planet.

OUR VIEWS



## ENERGY & CLIMATE

**2.7**

Some 2.7 billion people today do not have adequate access to energy, and approximately **1.3 billion** people do not have any access to electricity.

### CATERPILLAR ENERGY STATEMENT

Caterpillar has a fundamental interest in and understanding of energy as a global energy consumer, global industrial manufacturer, and a major manufacturer of energy conversion and power generation products. Caterpillar is one of the world's leading technology suppliers to various energy markets, and leverages its technology and innovation to meet the world's growing energy needs.

### THE CHALLENGE

Energy is a key requirement for sustainable progress and development around the world. As a result, energy consumption is rising rapidly, driven by worldwide population growth, swiftly developing economies, improving global living standards and the burgeoning use of ever more energy-dependent technologies. Global demand for energy is expected to increase significantly over the next 20 years.

### CATERPILLAR POSITIONS

- Energy sources need to be developed and used in an environmentally responsible manner.
- There is no one single solution to providing globally abundant, reliable, secure, clean and reasonably priced energy. Political and industry leadership is required to forge consensus and a commitment to providing global energy and related infrastructure needs that address economic development, stability and environmental impacts.
- Caterpillar supports market-based, cost efficient energy solutions to help meet the world's growing energy demands.
- Access to affordable and dependable energy resources is critical for energy security, economic prosperity, and growing economies. Caterpillar supports balanced and comprehensive energy policies that include the responsible development and utilization of all energy resources, including traditional sources of energy and expanded utilization of alternative energy technologies.
- Caterpillar supports regulatory structures that provide a competitive, technology neutral, and level playing field in which Caterpillar and our customers can operate.

(continued)

OUR VIEWS

## ENERGY & CLIMATE (CONT.)



Caterpillar supports the development and use of energy efficiency strategies and technologies, such as distributed generation, combined heat and power, electric drives, remanufacture, clean diesel and natural gas engines.

### ENERGY INNOVATION

The best companies, experts, researchers, inventors and entrepreneurs need the freedom, the flexibility and the resources to develop clean, more secure energy – and more of it. We encourage innovation that leads to new sources of energy and improved and more efficient use of existing, abundant resources.

Solar Turbines, a Caterpillar subsidiary, serves as a member of the Board of Directors of the Business Council for Sustainable Energy (BCSE), which advocates for the deployment of clean energy technologies, including renewable energy, energy efficiency and natural gas. The Council promotes the development of state, regional, federal and international energy and environmental policies that encourage the use of existing clean energy technologies as an immediate way to meet the world’s growing energy demand in an environmentally sound manner.

Caterpillar is a founding member of the UK Energy Technologies Institute (ETI) a UK government/industry collaboration to accelerate the development of technologies that address the challenges of climate change and provision of affordable energy access. The UK is a suitable location for this work, having some of the most aggressive targets, such as an 80 percent reduction in CO<sub>2</sub> by 2050. The ETI is developing scenarios and technology pathways to yield the most cost effective solutions. To accelerate the deployment of technologies, ETI has a \$100 million per year portfolio of technology development and demonstration projects across a wide energy spectrum including distributed energy, wind power, marine power technologies, energy infrastructure, transport including heavy duty vehicles, carbon capture and sequestration, bio-energy and demand side management for buildings.

### ENERGY POVERTY

Some 2.7 billion people today do not have adequate access to energy, and approximately 1.3 billion people do not have any access to electricity. So how do we get it to them? Today, the technology and the natural resources exist to rapidly expand energy access, but how is this accomplished in a more efficient manner?

The Copenhagen Accord affirms that social and economic development and poverty eradication are the primary goals of developing nations. One of the biggest differences between a developing nation and a developed nation is access to energy – so let’s increase that access, help economies grow and reduce energy poverty where it hits the hardest.

As energy is a key requirement for sustainable progress and development, we need to focus our talents on reducing emissions while increasing energy access. Caterpillar does this every day by leveraging technology to improve air quality and limit environmental impact. With distributed generation solutions, utilizing diesel and natural gas engines – and alternative fuels – Caterpillar is positioned to get power where it needs to be. Cat® equipment helps meet the demands of the mining and resources industries, getting raw materials to where they need to be to create increased access to power. Coal is an important fuel – both today and for the future. Coal is available in the quantity and locations needed to satisfy the world’s energy needs. All energy sources are important and should be developed, but coal is abundantly available and has the scale to meet the primary energy needs of the world’s rising population and expected economic growth over the next several decades.

Studies show that coal is about 70 percent cleaner burning today (from a particulate matter (PM), oxides of nitrogen (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>) and mercury perspective) than just a couple of decades ago. New coal-fired power plants are 15-45 percent more efficient than the oldest ones in operation around the world today. Carbon capture and sequestration technologies that can remove most of the CO<sub>2</sub>



(continued)

OUR VIEWS

**ENERGY & CLIMATE (CONT.)**



emissions are being demonstrated today. Efforts are needed to commercialize this technology around the globe as part of a path for low carbon-emitting energy. This energy can help the largest populations that don't have reliable energy today. Add new nuclear build outs (carbon-free electricity), new natural gas reserves, plus renewable energy sources like wind, photovoltaic, tidal and others, and you start to see a portfolio of power that helps eliminate energy poverty, raise standards of living and propel economic growth with less impact on the environment. This leads to more investment in research and development for new technologies that develop cleaner and more efficient fuel sources. Eliminating energy poverty is a vision that can be achieved.

**GLOBAL CLIMATE CHANGE**

Global climate change has many environmental and commercial implications, and a number of governmental and intergovernmental organizations are implementing mechanisms in an attempt to reduce greenhouse gas emissions. We support intelligent, responsible public policies addressing climate and energy policies and are:

- Investing in emissions reduction technologies that are important to our customers and represent significant areas of opportunity for our business.
- Committed to development and deployment of technologies such as combined heat and power, waste gas conversion to useful energy, clean diesel engines and carbon capture and sequestration.
- An active supporter of policies and flexible mechanisms that harness the marketplace to drive innovation, mobilize investment and allow the sharing of clean, efficient technologies.
- Encouraging the coordination of domestic and international programs to maximize the use of flexible, proven mechanisms to reduce emissions.

Through these activities, Caterpillar will continue making significant contributions to efforts designed to reduce greenhouse gas emissions.

**OPERATING IN A CARBON-CONSTRAINED WORLD**

At Caterpillar we believe in the importance of providing energy-efficient products and technologies for our customers and our facilities, as well as advocating for policy solutions that are both environmentally and economically sustainable.

Caterpillar works with policymakers on developing economy-wide emissions reduction programs in the United States that work in conjunction with international efforts to reduce greenhouse gas emissions.

Many countries already control greenhouse gas emissions, and more jurisdictions are evaluating plans to do so. Just as business cannot operate efficiently under 50 different sets of state standards in the United States, business will struggle with vastly differing approaches around the world. That is why we'll continue to advocate a comprehensive international approach that encompasses emissions reduction commitments from all major economies. We know we cannot reduce carbon emissions in isolation. We must look at the issue with an eye toward energy security, energy availability, technology, price and global competitiveness.

Innovation will be key to developing new energy sources, and we will continue to call for policies that encourage innovation to improve the use of existing energy resources – particularly coal, oil and natural gas. We cannot afford to overlook any solution.

Despite the divergent proposals under discussion worldwide – everything from carbon caps and carbon taxes to strict regulatory control of emissions – we all agree that technology plays a key role in any successful strategic approach to reduce emissions. The private sector must take the lead in developing and deploying technology solutions to reduce greenhouse gas emissions. Regulatory structures should provide a competitive, technology-neutral and level playing field. We believe we should not disparage any solution that hasn't been fully developed.

Ultimately, unilateral action to reduce greenhouse gas emissions will not be successful. We need national policies that integrate well into a global system of emissions reduction initiatives. Greenhouse gas emissions reductions are about improvements in energy efficiency – that is where the most immediate and measurable benefits can occur. We support legislation that's both environmentally effective and economically sustainable. And we encourage a constructive dialogue and a proactive approach to providing energy safely, efficiently and affordably to the billions of people that inhabit our planet.

It's a tall order – but one that's critical to the future of business.

OUR VIEWS



## GROWTH & TRADE

**Caterpillar has a long history of advocacy for free trade. Our support comes not from the perspective of any one country, but from a global context.**

### ADVOCATING FREE AND OPEN MARKETS

Caterpillar has long believed that the pursuit of business excellence and profit in a climate of free enterprise, free trade and unencumbered competition is the best means for efficient development and distribution of goods and services. Further, we believe such international exchange promotes better understanding across borders and cultures, leading to a more peaceful world. The enormous rise in post-World War II gross domestic product and living standards in countries participating significantly in international commerce has demonstrated such benefits. In contrast, countries that have been isolated as a result of lack of infrastructure, protectionist policies, conflict or economic sanctions have not enjoyed these advantages.

The economic growth brought about by international trade is essential for poverty reduction, but it doesn't come without challenges. Chief among them is the need to balance economic, environmental and social policies in support of sustainable development. When this happens, sustainable development can become a shared objective and provide a common frame of reference – allowing environmental and trade policymakers to engage stakeholders, analyze issues and evaluate policy more efficiently.

Caterpillar has a long history of advocacy for free trade. Our support comes not from the perspective of any one country, but from a global context. We believe that companies compete best in a free trade environment. When trade barriers are removed, we can better meet our global customer needs and grow more efficiently. Our suppliers benefit because they can more efficiently satisfy our global sourcing requirements. Our employees benefit from a higher standard of living as they have access to more product choices at lower prices. Because open markets lead to improved competitiveness, we believe free trade also allows us to provide more and better job opportunities.

(continued)



OUR VIEWS

## GROWTH & TRADE (CONT.)



Caterpillar will continue to promote policies that reduce – or, better yet, eliminate – trade and investment barriers. At the same time, we will continue to speak out against protectionist policies. We believe that developed countries should adopt policies that allow the benefits of the global economy to be extended to developing countries. Caterpillar also recognizes that in many of the world’s poorest countries, humanitarian and development assistance is necessary to fight disease, improve living conditions, combat corruption and provide the know-how to drive economic growth and trade. We support the goals of initiatives aimed at increasing economic growth and reducing poverty in developing countries.

### HARMONIZING GLOBAL STANDARDS

On an international level, Caterpillar is actively involved in developing International Standards Organization (ISO) criteria and chairs the committee that develops industry consensus standards for earthmoving equipment, including standards for visibility, rollover protection structures and braking. Our global standards and regulations team works closely with these organizations to enhance machine safety standards

worldwide. Caterpillar provides input to regulatory agencies to help ensure the smooth introduction of new technologies. We design products and services that help people and communities as they strive to create better lives for themselves. As the global population continues to grow, the availability of natural resources may diminish; and the need for Cat® products and services as enablers of sustainable development becomes even more important.

Caterpillar regularly makes its management and technical expertise available to regulatory bodies in advisory roles and to provide technical assistance as new product standards are developed. These activities include participation and leadership roles in organizations such as the ISO; membership in governmental and nongovernmental delegations to international bodies such as the International Maritime Organization; participation in formal European Union industry expertise panels and participation in Federal Advisory Committees chartered under the U.S. Environmental Protection Agency.



## OUR VIEWS



## PEOPLE & PLANET

**Our Vision:**  
Safely home.  
Everyone.  
Every day.™

### SAFETY

Caterpillar is dedicated to the safety of everyone at Caterpillar, including our extended family of employees, dealers, suppliers and customers. Caterpillar's Global Health & Safety team plays a key role in providing expertise and support to Caterpillar operations worldwide. Caterpillar also offers the SAFETY.CAT.COM™ website for environment, health and safety training. This site provides access to a wide range of interactive online training courses for safety, health and the environment – in full support of our vision: Safely home. Everyone. Every day.™ The low-cost solutions offered through this safety training library will help users of industry-specific equipment create a culture of safety on any job site.



### ENVIRONMENT

Caterpillar contributes to sound environmental stewardship in communities where it operates. We establish and adhere to environmentally compliant policies and practices in product design, engineering and manufacturing in all of our facilities worldwide. Caterpillar's Environment, Health & Safety Assurance framework helps ensure that Caterpillar complies with applicable laws and regulations, as well as remains an upstanding corporate citizen and good neighbor. Successfully identifying and managing environmental issues protects the environment we all live in and makes good business sense.

## ENERGY



## ENERGY

The world's increasing demand for energy will encourage discovery of new supplies, conservation of energy, use of alternative/renewable energy sources and the environmentally efficient use of existing energy sources.

While working to increase access to energy, Caterpillar focuses on reducing environmental impacts by boosting the energy efficiency of its products, services and solutions.

## ENERGY – POWER GENERATION



### IN THIS SECTION

New Cat® 3516C-HD Diesel  
Generator Set



Caterpillar Power Solutions for  
Reliable Energy Sources

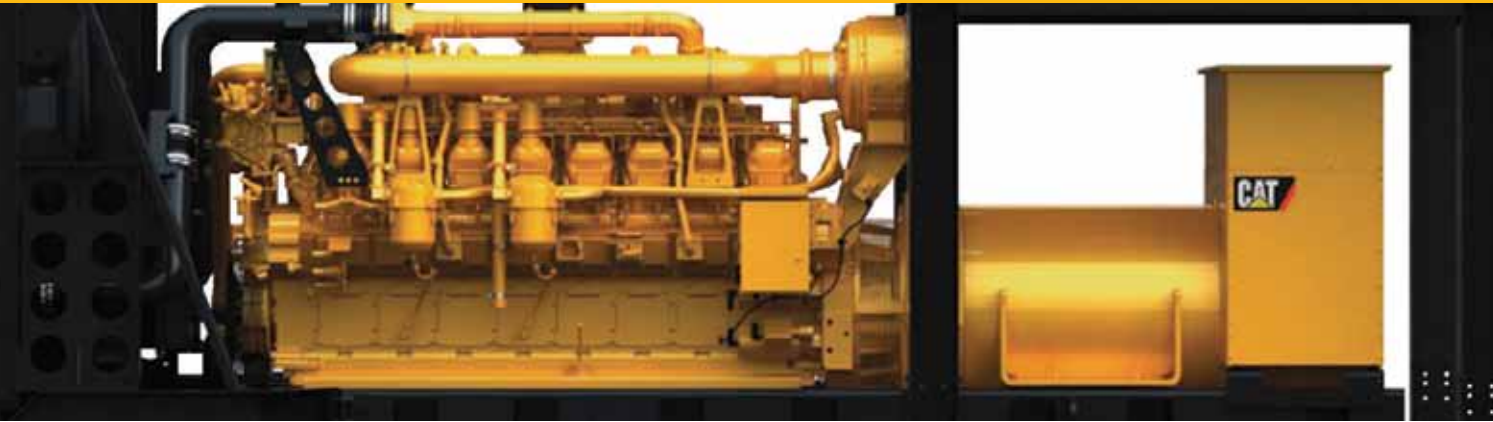


## BRIGHTENING PROSPECTS AROUND THE WORLD

AS ELECTRICITY USE RISES, CATERPILLAR IS MEETING EMERGENCY, STANDBY AND CONTINUOUS POWER GENERATION NEEDS WITH AN UNPARALLELED LINE OF DIESEL GENERATOR SETS, NATURAL GAS GENERATOR SETS AND INTEGRATED POWER SYSTEMS.

In 2011, we announced the purchase of MWM Holding GmbH (MWM), a leading global supplier of sustainable, natural gas and alternative-fuel engines. The acquisition of MWM will enable Caterpillar to significantly expand customer options for sustainable power generation solutions and help its customers become more efficient.

## ENERGY – POWER GENERATION



### NEW CAT® 3516C-HD DIESEL GENERATOR SET

The new Cat® 3516C-HD diesel generator set offers highly efficient fuel consumption rates and lower emissions. The generator set is certified to meet U.S. Environmental Protection Agency (EPA) Tier 4 Interim standards. These emissions regulations set by the EPA call for dramatic reductions in outputs of carbon monoxide, hydrocarbons, particulate matter and oxides of nitrogen.

“This is the first diesel generator set producing more than 2MW that has been certified to Tier 4 Interim standards,” said Robert Koval, investment projects general manager of Caterpillar Electric Power Division. “Tier 4 Interim certified generator sets are required for high-hour applications, such as rock crushers, peaking plants and remote installations. Our emergency standby customers will also realize benefits with this generator set, particularly in areas with stringent local standards. The lower emissions from the Tier 4 Interim generator set should eliminate or minimize the amount of additional aftertreatment needed to comply with local emissions regulations.”

The Cat® 3516C-HD offers flexible packaging options for easy installation and optimal performance, while minimizing impact on generator set space requirements and maintenance hours. The generator set is also available with a full range of factory designed and tested attachments to meet customer requirements.

To provide customers with the most economical and efficient emissions solutions, Caterpillar continues to develop generator sets engineered to deliver flexibility, expandability, reliability and cost-effectiveness, while at the same time addressing the emission reduction levels required by EPA regulations.

**“This is the first diesel generator set producing more than 2MW that has been certified to Tier 4 Interim standards.”**

*– Robert Koval, investment projects general manager of Caterpillar Electric Power Division*

Ranging from 455 kW to 2500 kW, Caterpillar now offers the widest range of Tier 4 Interim certified generator sets in the industry. To support these products, Cat® dealers and technicians are factory trained in emissions technology installation and service.

ENERGY – POWER GENERATION



**CATERPILLAR POWER SOLUTIONS FOR RELIABLE ENERGY SOURCES**

When the power goes out, it's often Cat® emergency generator sets that are responsible for providing back-up power.

Fulfilling this role can be critical. The American Hospital in Dubai, for instance, uses Cat® C175-16 diesel-powered generator sets to provide standby and uninterruptible power supply (UPS) to sustain the reliable and high-quality energy supply required for patient care and diagnostics. The C175-16 generator sets combine high power density with efficient operation and low emissions. The Cat® UPS system uses an energy storage system that is immediately available to power up a critical load in the event of grid outage. Elsewhere, Cat® generator sets provide essential back-up power.

**The American Hospital in Dubai uses Cat® C175-16 diesel-powered generator sets to provide standby and uninterruptible power supply (UPS).**

In Puerto Rico, the wholesale fuel supplier Cabo Rojo Gas uses Cat® generator sets to ensure its fuel pumps at five distribution centers are always working during the June to November hurricane season, delivering uninterrupted supplies of gasoline, diesel

fuel and propane to homes, businesses and hospitals on the island. Access to gas and propane can be a matter of life and death for island residents during a long disruption of primary power.

In the Mtwara and Lindi regions of Tanzania, Cat® generator sets also perform a vital function. Natural and agricultural resources in the area are plentiful, but economic development had been hampered by an unreliable hydroelectric power supply that was hit by drought conditions and other natural catastrophes. Now, however, nine Cat® generator sets provide power generation for the first privately supplied electric power franchise in Tanzania, supplied by offshore gas supplies. This has at last given local industries such as cashew nut factories a chance to grow, based on the assurance that power will be available. Adequate and reliable electric power to the region provides the crucial foundation for economic and commercial development.

The reliability and low fuel consumption and operating costs of Cat® equipment are factors that drive demand for our products around the world. In 2011, we secured an order for eight generator sets to provide emergency back-up power for gas compression stations that service the Asian Gas Pipeline, which runs from Turkmenistan and Kazakhstan to China and will be completed in 2014. The pipeline, which will deliver 40 billion cubic meters of natural gas – 2 percent of China's energy requirements – needs the generator sets to keep supplies going around the clock to industry and homes.

## ENERGY – ALTERNATIVE/RENEWABLE ENERGY



### IN THIS SECTION

#### Coke Oven Gas



#### Wind Turbines and Remanufacturing



## CONVERTING POWERFUL ALTERNATIVES

CATERPILLAR HELPS CUSTOMERS PRODUCE POWER EFFICIENTLY – FROM ALTERNATIVE AND RENEWABLE FUELS, SUCH AS METHANE FROM LANDFILLS, LIVESTOCK MANURE, SEWAGE TREATMENT AND UNDERGROUND COAL MINES.

We offer financing solutions through Cat Financial, to build and maintain landfill gas, anaerobic digester and combined heat and power projects that generate alternative/renewable energy and reduce greenhouse gas emissions. Cat Financial is expanding efforts to support companies in other types of alternative/renewable energy projects, such as gasification and coal mine methane.

Cat World Trade gives Caterpillar customers an alternative way to finance the purchase of equipment and services, through the creation of nontraditional trade agreements. For example, Cat World Trade helps the forestry industry market woodchips and other biomass to renewable energy producers and also supports landfill operators, dairy farmers and other Caterpillar customers who convert biogas to energy. To maximize the efficient use of natural resources, Cat World Trade sells ferrous and nonferrous scrap to integrated steel mills and mini-mills. Reusable or recyclable materials including specialty alloys, copper and castings can also go to market through the Cat World Trade global network.

## ENERGY – ALTERNATIVE/RENEWABLE ENERGY

### COKE OVEN GAS

For many years it was common practice in China for enterprises producing coal derivative chemicals and products to bake the coke oven gas out of the coal and then emit it into the atmosphere, missing an opportunity to turn waste into energy and at the same time reduce emissions.

Caterpillar saw an opportunity to turn that wasted oven gas into energy – by burning it in a gas turbine. The key engineering challenge was not only to find an efficient way of using the coke oven gas, which is a by-product of the manufacture of coke for steel making, but to burn out some of the contaminants it harbors – such as hydrogen sulfide, tars and other chemicals.

A small group of Caterpillar experts got to work, and after two years of development, their first gas turbine power generation package was brought into operation at the Shandong Jinneng Coal Gasification plant. The combined heat and power (CHP) system, operated by a Solar™ gas turbine, operates at approximately 68 percent efficiency and uses approximately 26 percent less fuel than equivalent separate heat and power. The CHP system is estimated to reduce CO<sub>2</sub> emissions by 40,000 metric tons per year. This reduction is equivalent to removing the annual emissions from approximately 6,600 cars.

By the end of 2011, Caterpillar had turbines up and running that eliminates the equivalent of 540,000 metric tons of CO<sub>2</sub> emissions per year. The application is sustainable in several ways. First, pollutants are reduced in the combustion process. Second, electricity is produced which allows reduction in the coal consumed (and the emissions generated) by the local power plant. Third, the exhaust heat from the turbine is used to make steam to quench the coke and is used in other chemical processes at the plant.

Shandong Jinneng Coal Gasification Co. Ltd. became the first company outside the U.S. to win the U.S. Environmental Protection Agency's International CHP Award for exceptional leadership in energy use and management.

Caterpillar subsidiary, Solar Turbines, helps customers use coke oven gases as a fuel for highly efficient CHP generation. Solar™ turbines are helping Chinese coke makers recycle the gases into much-needed energy, while reducing overall impact on the environment.

Solar Turbines is now a leader for coke oven gas projects and currently has inquiries for coke oven gas projects all over the world. The success in China helps position us as a contender for a growing number of natural gas fired CHP projects currently being developed in that market.





ENERGY – ALTERNATIVE/RENEWABLE ENERGY



## WIND TURBINES AND REMANUFACTURING

In the fall of 2011, Caterpillar reached a 10-year, global agreement to remanufacture wind turbine components made by Vestas Wind Systems, a Danish wind turbine manufacturer that has 44,500 of its turbines installed and working around the world.

Caterpillar will supply Vestas with remanufacturing services that will return end-of-life components to “same-as-when-new” condition in terms of reliability, durability and performance. This reduces waste, minimizes the need for raw materials to produce new parts, and lowers costs.

Vestas wind turbine components will be remanufactured using Caterpillar’s existing facilities, equipment and suppliers. Remanufacturing will begin in Caterpillar’s North America facilities, followed by facilities in Europe and Asia.



The environmental and cost benefit of remanufacturing components is recognized globally. Demand from other customers is rising, and Caterpillar is expanding to meet that need.

In May 2011, Caterpillar opened a facility in Singapore that will provide remanufactured components for large off-highway trucks and other mining equipment. The facility will have advanced remanufacturing technologies on site to provide high quality, durable products. Together with a remanufacturing facility in Shanghai, China, Caterpillar provides an exceptional combination of availability, cost and regional support for Asia-Pacific customers.

Sustainability is also built into the Singapore facility itself, through a number of features such as energy use that will significantly reduce environmental impact. In recognition of these innovations, the facility received a Green Mark Gold Plus award from Singapore’s Building Construction Authority.

In August 2011, Caterpillar announced plans to significantly expand its remanufacturing facility in West Fargo, N.D. The expansion will help meet strong demand for remanufactured drivetrain components in the mining sector. Operations are expected to begin in June 2012. When the expansion is complete and fully operational, it is anticipated Caterpillar will add roughly 250 additional workers over a three-year period, bringing the total workforce to approximately 550 in West Fargo. The West Fargo facility has produced remanufactured components for the past 40 years.

ENERGY – CLEAN & EFFICIENT PRODUCTS



IN THIS SECTION

Revolutionary Dozer is Clean and Efficient



Emissions Control Technology for Diesel and Natural Gas Engines



Timber Harvesting With More Horsepower and Lower Emissions



## DRIVING BETTER PERFORMANCE

GLOBAL DEMAND FOR ENERGY, RISING FUEL PRICES AND TIGHTER EMISSIONS REGULATIONS ARE CHALLENGING OUR CUSTOMERS TO WORK MORE EFFICIENTLY.

Caterpillar is responding by enhancing the efficiency of its equipment and improving product technologies. Caterpillar is also meeting the U.S. Environmental Protection Agency Tier 4 / European Union Stage IIIB / Japan MLIT Step 4 product development challenge. Our customers will realize the value of our updated machines through features such as improved fuel economy, shorter cycle times, greater operator visibility and improved ergonomics.

## ENERGY – CLEAN & EFFICIENT PRODUCTS



### REVOLUTIONARY DOZER IS CLEAN AND EFFICIENT

The Cat® D7E is a midsize earthmoving vehicle in a category commonly referred to as ‘dozers.’ When it comes to moving earth in a more efficient fashion, the D7E electric drive track-type tractor is – well, earth moving.

In 350,000 hours of monitored activity by the D7E through the end of 2011, more than 840,000 gallons (2,680 metric tons) of diesel fuel were saved, reducing CO<sub>2</sub> emissions by more than 18 million pounds (8,500 metric tons).

Thanks to a revolutionary diesel-electric drivetrain – the first of its kind – the D7E’s fuel consumption is between 10 and 30 percent lower than the conventionally powered D7R Series 2 that it replaced; while due to its speed and power-to-ground efficiency, the D7E moves 10 percent more material each hour. Overall, this adds up to approximately a 25 percent improvement in material moved per gallon of fuel. Lower fuel consumption also results in lower lifetime greenhouse gas emissions. The D7E is designed to consume fewer resources during its working life, to reduce the impact on the environment while preserving valuable resources for future generations.

The revolutionary electric drive power train has 60 percent fewer moving parts than a drivetrain with a powershift transmission. Oil and filters need to be changed less often, and intervals between routine maintenance are extended. All this saves resources.

The modular air conditioner in the D7E is estimated to reduce refrigerant leaks four-fold as a result of elimination of the belt driven air conditioning compressor and air conditioning hoses; it also dramatically reduced the number of lines and connections.

The D7E has also reaped business benefits for Caterpillar. Most customers and operators like the machine’s efficiency and productivity, continuously variable transmission, smooth directional changes, superior visibility, spacious and quiet cab and exceptional uptime.

The full value of the technology developed on the D7E is yet to be realized as this breakthrough technology is applied to other Caterpillar products.



## ENERGY – CLEAN & EFFICIENT PRODUCTS



### EMISSIONS CONTROL TECHNOLOGY FOR DIESEL AND NATURAL GAS ENGINES

The Pinedale Anticline Project Area (PAPA) is one of the largest gas fields in the continental U.S. providing natural gas energy. The field is located in the Wyoming Sublette County Green River Valley in Pinedale, Wyo., and covers approximately 197,000 acres of federal, state and private lands.

The PAPA contains natural gas reserves estimated at up to 40 trillion cubic feet (1.1 cubic meters), with 20–25 trillion cubic feet (0.6–0.7 cubic meters) of that recoverable – enough to supply 10 million U.S. homes for more than 30 years.

PAPA requires drilling engines in the anticline to be equipped with Selective Catalytic Reduction (SCR) systems capable of achieving greater than 90 percent oxides of nitrogen (NOx) reduction, and required reductions to be met by January 1, 2012. Drilling rigs that remain unequipped with SCR, or are unable to pass quarterly emissions demonstration tests, will not be allowed to operate.

Cat Dealer Wyoming Machinery offered the CleanAIR Systems E-POD as a retrofit solution for drilling rigs in the Pinedale, Wyo., oil fields. The E-POD demonstrates a constant 90 percent plus NOx reduction. Since total emissions output per year for each rig are regulated, E-POD use enables the drill rig owners to operate longer hours. At the end of 2011, 42 E-POD systems have been installed on 14 drilling rigs in the Pinedale, Wyo., oil fields.

The E-POD is an all-in-one emissions control unit utilizing SCR coupled with diesel oxidation catalysts (DOCs) or diesel particulate filters (DPFs). The product features proprietary technology housed within a stainless steel silencer shell. Using iron zeolite SCR catalysts, the E-POD offers dramatic reductions of NOx, particulate matter (PM), commonly known as soot, hydrocarbons (HC) and carbon monoxide (CO). The E-POD with DPFs reduces NOx by more than 95 percent, PM by greater than 85 percent, and HC and CO by up to 95 percent. The E-POD with DPFs offers Tier 4 Final equivalent levels for Tier 1 and Tier 2 diesel stationary engines, and some unregulated engines.

As an integrated system, each E-POD can be moved by one service truck, versus competitive SCR systems that require additional tear down and setup. Reduced emissions enable the customer to operate for more hours, increasing overall productivity.



## ENERGY – CLEAN & EFFICIENT PRODUCTS



### TIMBER HARVESTING WITH MORE HORSEPOWER AND LOWER EMISSIONS

Our new Cat® wheel feller bunchers – machines that harvest timber – deliver more horsepower but use less fuel. This means lower emissions (reducing impact on the environment) and reduced operating costs (good for our customers).

The change is the result of advances in Caterpillar’s engine technology and machine design. The C Series engine generates power at lower revolutions per minute than previous models, and a new technology called PowerDirect Plus delivers power selectively, where and when it is needed. This optimizes machine efficiency, performance and productivity.



The engine also meets the U.S. Environmental Protection Agency Tier 4 Interim and EU Stage IIIB emissions standards. Yet the changes needed to meet these requirements were made without compromising uptime or shortening the life of the vehicle.

When designing the new wheel feller bunchers, our focus was on keeping the machine cool, which improves performance and fuel efficiency. The oversized, hydraulically driven fan spins at a slower speed overall and only turns as fast as needed to keep temperatures at the right level. In colder weather or when the machine is first started, the fan spins more slowly to conserve fuel and reduce noise.

As well as maximizing energy efficiency, the new Cat® feller bunchers are designed to conserve resources. All major parts are designed to be rebuilt, reducing waste and replacement costs. With fewer parts and longer component life, there is less to replace or throw away.

Operator safety has also been a key consideration in the upgrade. With the new design, the engine is placed at the back, producing better weight distribution and balance between the front and rear axles. This revolutionary design provides exceptional stability – even when carrying big pieces of timber on steep or uneven terrain. A three-piece front windshield, large rear windows and skylight give the operator excellent visibility.

The new Cat® feller buncher C Series is also the first and only wheel feller buncher that can be fueled on the ground. In addition, the engine, hydraulic pumps and key components can be accessed from ground level, enabling safer and easier servicing.

## ENERGY – RESOURCE EXTRACTION



### IN THIS SECTION

Autonomous Mining Trucks  
Drive Efficiency and Save Energy



Efficient Truck Built  
Closer to Customers



Sustainability in Mining



## BRINGING IT UP RIGHT

THE RAPID DEVELOPMENT OF THE WORLD'S EMERGING MARKETS IS DRIVING AN INCREASING NEED FOR MINED COMMODITIES, AS BILLIONS OF PEOPLE AROUND THE WORLD SEEK TO IMPROVE THEIR STANDARDS OF LIVING.

Caterpillar is engaged in the mining industry at every level, working alongside customers to help them mine efficiently and productively while protecting the health and safety of miners.

In 2011, Caterpillar completed the acquisition of Bucyrus International, Inc., expanding its leadership and support for customers in the mining industry. The acquisition enables Caterpillar to offer the broadest range of surface and underground mining products and solutions to customers in the industry and to help those customers to become even more efficient.

## ENERGY – RESOURCE EXTRACTION



### AUTONOMOUS MINING TRUCKS DRIVE EFFICIENCY AND SAVE ENERGY

The idea of a fleet of autonomous trucks working round the clock at a mine site while a technician supervises them from the comfort of a control room may appear to be a work of science fiction. But in one part of the world it will soon become fact.

Starting in third quarter 2012, six Cat® 793F autonomous trucks will begin working at the Solomon iron ore mine run by Fortescue Metals Group in Western Australia. At full operational capacity, it is anticipated the Solomon mine will have approximately 45 autonomous trucks by 2015 – all operating without an operator onboard.

But there's more to autonomy than just trucks. Cat Command for hauling utilizes wireless communication, global positioning and a broader suite of technologies, known as Cat® MineStar™ System, to enable remote monitoring of the trucks while they go about their business of collecting loads and dumping them in assigned positions.



The large mining trucks follow assigned lanes through an ever-changing map of the mine, follow the best path from where they are to where the system tells them to go and even stop when something unexpected appears in the road in front of them. The result of all these technologies working together is safer, more predictable and more productive hauling operations.

Onboard technology ensures optimum efficiency – programming trucks to operate exactly as intended, reducing use of fuel and wear and tear. One of the greatest efficiencies in mining processes results when there's less energy used. Autonomous mining trucks use energy in a more effective way, lessening impact on the environment.

There are other sustainability points. Traditional machines stop periodically for operator breaks and shift changes. Command for hauling improves productivity by running continuously day and night, only stopping for fueling and planned maintenance intervals. Autonomous operations bring fundamental changes to mining processes, making the entire operation, not just the trucks, more efficient while reducing infrastructure needs and lessening the impact on the environment even further.

Caterpillar is developing autonomous versions of other mining machines. This industry-changing technology offers our mining customers a competitive advantage.

## ENERGY – RESOURCE EXTRACTION



### EFFICIENT TRUCK BUILT CLOSER TO CUSTOMERS

Caterpillar has launched in-country production of Cat® 773E trucks in Tosno, Russia, to support the demand for mining trucks across Russia and the Commonwealth of Independent States. The trucks will be used by customers to extract resources vital to accelerating infrastructure development in the coming decades.

“More than half the world’s population now lives in cities, and the population of the world is expected to grow more than 60 million a year for the next 30 years. The demand that is expected to be placed on mining, which provides the raw materials for building housing, infrastructure, supplying clean water and other things that make cities work, is vast,” Caterpillar Group President Steve Wunning explained.

The 773E will be sold to extractive industries across the country. By building the trucks closer to mining customers, Caterpillar will reduce delivery costs as well as reduce the environmental impact of shipping parts. Caterpillar will also be able to provide better after-sale maintenance, increasing product life and reducing waste. New jobs will also be created to support the 773E manufacturing operations.

The 773E, which achieves emissions levels equivalent to those of EU Stage II emissions standards, is also very efficient. For a start, it can move more material per unit of fuel. Fuel injection is electronically controlled to match specific load requirements. An economy mode reduces fuel use, engine noise and operating costs in conditions when the vehicle is at a standstill, waiting to be loaded.

The hydraulic tank has been constructed to be compatible with biodegradable oil. The 773E is also built to be rebuilt. Once a component reaches the end of its service life, it can be remanufactured. This makes both economic and environmental sense because it reduces waste and consumption of raw materials, and provides a lower cost to the customer.





ENERGY – RESOURCE EXTRACTION



**SUSTAINABILITY IN MINING**

When it comes to improving sustainability performance, there is more that Caterpillar can do for its customers than providing energy efficient equipment. Across the world we are expanding our support for customers in the mining industry by coming up with new solutions to reduce costs, save resources and reduce environmental impacts.

At Cargill Deicing Technology’s underground salt mine, for instance, Cat Dealer Milton Cat developed a solution to extend the life of machinery – enabling the mine to be more efficient while reducing waste.

Cargill Deicing Technology’s Cayuga mine is located 701 meters (2,300 feet) under a picturesque lake in New York. Getting parts and machines into the mine can be a challenging endeavor. In fact, when it’s time to repair or replace large pieces of equipment, they must be dismantled above ground and then reassembled in the mine.

Cat® Certified Rebuilds (CCRs) were selected to improve the performance of the Cayuga mine fleet of Cat® R1700G load-haul-dump (LHD) loaders. A CCR typically costs approximately 60 percent of the cost of buying a new machine. And the CCR could be done without ever removing the machine from its underground home.



CCRs take advantage of the “second life” built into the Cat® LHDs. And for the first time ever, the rebuilds would be completed underground – a challenge that has been met and that is now a recognized solution for other underground fleets.

At Boliden mining company’s Aitik mine in Sweden, Caterpillar has helped improve productivity and reduced environmental impact by being the first mine in the world to put into production the new Cat® 795F AC trucks on a site in the Arctic Circle. The 345-ton electric drive trucks are so big they have increased the payload capacity dramatically, contributing to a significant boost in annual production to what is already one of the largest copper mines in Europe.

(continued)

ENERGY – RESOURCE EXTRACTION

SUSTAINABILITY IN MINING (CONT.)



Productivity is also enhanced by the 795's Cat® C175 diesel engine. The Cat® C175 meets the European Union's emissions requirements, yet it delivers 2,535 kilowatts (3,400 horsepower) of power.

Caterpillar is also helping Boliden reduce its environmental impact at the Aitik mine by providing training on the importance of avoiding contamination of fuel. The training draws on the expertise of Caterpillar technicians from around the world and emphasizes that better management of hydraulic oil filters, transmission fluid and axle oil extends the life of many components, improving energy efficiency.

In China, the Guangxi aluminum mine owned by Chalco has been rewarded many times for its achievements in environmental protection. The site has achieved significant social, economic and environmental benefits, setting new benchmarks for mining enterprises across the country. Zhou Zhiqiang, business supervisor at the site's equipment administration center, says the mine has come to rely on Cat® equipment's low failure rate and high availability. Productivity and availability have a direct impact on work performance.

**The Cat® C175 meets the European Union's emissions requirements, yet it delivers 2,535 kilowatts (3,400 horsepower) of power.**

The philosophy of "mining with minimal environmental impact" has been put into practice with significant results. Chalco's advanced management methodology and the strong sense of responsibility for protecting the environment set a role model for China's mining companies. Caterpillar and Chalco are working together on various projects all over the world.



ENERGY – CUSTOMER SOLUTIONS



IN THIS SECTION

Locomotive Repowers  
Save Resources



Fleet Management Drives  
Efficiency and Reduces Waste



## SAVING ENERGY ON THE JOB

AS ELECTRICITY USE RISES, CATERPILLAR IS POSITIONED TO PROMOTE SUSTAINABLE PROGRESS BY HELPING CUSTOMERS BE MORE EFFICIENT AND TO ENABLE GROWTH AND DEVELOPMENT IN SUSTAINABLE WAYS.

Caterpillar takes a holistic view of customer sites to improve overall efficiency and safety, focusing on a life cycle approach that evaluates the environmental, economic, social and regulatory implications of our products and services throughout their lives. Our products and services provide total solutions to our customers' needs. We help them increase revenue, increase efficiency, reduce cost and reduce environmental impact.

As technology continues to develop, Caterpillar is constantly refining advanced technologies to help make customers' equipment more productive and efficient, and to help customers more effectively manage equipment fleets and operations – for efficiencies in time, fuel burn and emissions reductions. We also help our customers reduce costs by taking near end-of-life parts and restoring them to original engineering specifications through remanufacturing, an advanced form of recycling.

ENERGY – CUSTOMER SOLUTIONS



## LOCOMOTIVE REPOWERS SAVE RESOURCES

Canadian Pacific Railway’s locomotive fleet has long operated on one of the world’s most famous cross-continental railroads. While the fleet has been in operation for years and beaten a well-worn path on service routes, it does not meet modern day sustainability standards – nor has it remained particularly efficient or reliable. It would seem logical to consign the fleet to the scrap yard and buy new stock.

But replacement locomotives can be expensive – and wasteful. So Caterpillar’s wholly owned subsidiaries, Progress Rail Services and Electro-Motive Diesel, have stepped in to help the railway repower its locomotives with fuel-efficient engines with reduced emissions.

Progress Rail Services, Electro-Motive Diesel, and Canadian Pacific Railway are in the process of reconfiguring up to 500 locomotives dating back to the 1950s, eliminating the need to produce more than 15,000 tons (13,600 metric tons) of steel for new locomotives and the generation of more than 18,000 tons (16,300 metric tons) of CO<sub>2</sub>.

Initially, the locomotive modernization and repowering effort will reconfigure 150 locomotives built in the early 1950s. The locomotives will be modernized by reusing 25 percent of the original content and repowered by upgrading to run on biodiesel. The repowered engines will meet the latest emissions regulations.

There are plans to modernize 350 more locomotives that date from the 1970s. The total order of 500 locomotives will result in significant fuel and maintenance savings.

Progress Rail has also been working with Pacific Harbor Line to repower 16 locomotives that service the ports of Long Beach and Los Angeles, Calif. Thanks to a new Cat® 3512C HD engine and a custom-made diesel particulate filter, the repowered locomotives not only cost less than new models, the repowered locomotives also reduce emissions of particulate matter by around 90 percent compared to the older model. This is an important consideration in the Los Angeles basin area, where there are strict requirements on exhaust emissions. By using repurposed steel and repowering with new engines, the project will save approximately 53 tons (48 metric tons) of new steel per locomotive, the production of which would have generated approximately 60 tons (54 metric tons) of CO<sub>2</sub> per locomotive.

In addition to the benefits in energy and materials efficiency and reduced emissions, the projects have been well received by customers, and have given Caterpillar a competitive edge over companies providing new locomotives. Even better, the repowered locomotives can eventually be upgraded again, meaning that the character of the old rolling stock can be retained for decades to come.



ENERGY – CUSTOMER SOLUTIONS



**FLEET MANAGEMENT DRIVES EFFICIENCY AND REDUCES WASTE**

Caterpillar takes a holistic view of its customer sites to increase productivity and improve sustainability. Working with customers and Cat® dealers to carefully manage the fleet of Cat® machines working a site, Caterpillar Job Site Solutions helps customers improve fuel consumption, reduce emissions and increase safety. The lifecycle of equipment is also maximized through component and full machine rebuilds. Job Site Solutions drives fuel efficiency for our customers by making sites as efficient as possible through improvements in site planning, equipment updates, right-sizing of fleets and increased operator performance.

Collaborative innovation between Caterpillar, a Cat® dealer and a customer of a quarry site allowed the customer to reduce fuel consumed to produce one million tonnes of rock. The sustainability benefits have come in the form of a reduction in safety related machine fault codes, improvement in raw material usage by extending the life of equipment on site, and improvement in both the reduced demand for fuel and a significant reduction in emissions.

Safely increasing haul road speeds and improving loading cycle times allowed the customer to increase production by 110 tonnes per hour – resulting in a potential annual 17,500 gallon (49 metric ton) reduction in fuel consumption and representing a \$75,000 savings. Equally important is that the fleet achieves this additional productivity with fewer operating hours. This reduction adds another \$100,000 in savings.

Caterpillar fleet management technologies will also monitor more than 700 pieces of heavy machinery, including 186 earthmoving products, as work progresses to build Belo Monte Dam, the world’s third-largest hydroelectric dam complex, in Pará, Brazil. The construction fleet will be managed via Cat® Product Link satellite machine control and guidance and condition monitoring technology to enable maximum efficiency, increase productivity, reduce demand for fuel and lower owning and operating costs for the fleet. Part of the Brazil government’s Growth Acceleration Program, the Belo Monte Dam project on the Xingu River will provide 11,233 MW of renewable hydroelectric power.

**Safely increasing haul road speeds and improving loading cycle times allowed the customer to increase production by 110 tonnes per hour – resulting in a potential annual 17,500 gallon (49 metric ton) reduction in fuel consumption and representing a \$75,000 savings.**

PEOPLE



## PEOPLE

Caterpillar is dedicated to the safety of its employees, dealers, customers and suppliers. Our uniform safety standards enable our employees to identify and make safety-conscious choices, both inside and outside of the workplace. The safety of our people is primary in everything we do. We believe that continually improving our safety practices, processes and performance supports the business excellence for which Caterpillar people worldwide are known.

As individual citizens, we can help solve local problems and contribute to the welfare and prosperity of our communities. As a global company, we can use our strength and resources to improve and rebuild communities around the world. Caterpillar's involvement in strategic collaborations supports its commitment to conserving the earth's resources and efforts to pursue development in new and more sustainable ways.

A company can make important contributions to the communities in which it operates. Through strategic philanthropy, Caterpillar seeks out issues where it has unique capabilities, relationships or expertise to offer – and works with nonprofit and other organizations to leverage these assets to benefit both the company and society.

Caterpillar is in a unique position to react when disaster occurs. Cat® machines are essential to relief, recovery and rebuilding efforts. Cat® power generation equipment provides critical emergency and back-up power for businesses, hospitals and other organizations. With hundreds of facilities and Cat® dealers worldwide, Caterpillar can quickly respond with products, services, people and funds.

PEOPLE – LEADING IN SAFETY



## LEADING IN SAFETY

Caterpillar's vision is to be recognized as a leader in our industry for creating and maintaining world-class workplace safety. We are committed to improving employee safety through:

**Holding leaders at all levels accountable for safety improvement.** Leadership toward safety excellence is an expectation across the enterprise.

**Replicating and sharing best practices.** Our injury reporting process helps to pinpoint where improvement is needed and which facilities need more focus.

We have identified best practices – supported by tools and templates – to help Caterpillar facilities worldwide develop strong safety processes and positive cultures:

1. Managers will be held accountable for the safety performance of their organization.
2. Supervisors and facility leadership will perform safety walks to demonstrate their commitment to employees, gather information about conditions and behaviors, provide on-the-spot correction of unsafe activities and recognize efforts by employees to improve safety.
3. Safety will be embedded into existing business processes such as the Caterpillar Production System, purchasing and performance management.
4. Safety issues and results will be communicated frequently, and employees will have regular opportunities to discuss safety with their supervisors.
5. Each facility or department will maintain an Incident Notification and Review Process for managers and employees.
6. Each facility or department will develop a safety learning plan for managers and employees.
7. We will carefully evaluate our performance on a regular basis and make improvements when necessary, using 6 Sigma to guide our activities.
8. Each facility will develop a list of best practices to define expectations for activities and behaviors and establish a system for measuring performance against them.
9. Each division will establish a program to recognize facilities with superior performance in safety, and each facility will establish a program to recognize safety performance at the department or individual level.

We will continue to strengthen our processes to help all our facilities succeed –and ensure we all return home as safe and healthy as when we came to work.

PEOPLE – INVESTING IN COMMUNITIES AROUND THE WORLD



## INVESTING IN COMMUNITIES AROUND THE WORLD

The Caterpillar Foundation makes sustainable progress possible in our communities in the areas of basic human needs, disaster relief, education and environmental programs. The Foundation has invested more than \$500 million since its inception in 1952. Historically those investments were made in and around our headquarters in central Illinois. Today, the Foundation supports communities around the world, with 50 percent of its dollars invested in 2011 outside the United States.

Investments in 2011 include:

- A five-year, \$12.5 million grant to the World Resources Institute (WRI) to promote the concept of sustainable cities in China, India and Brazil – countries in which rapid urbanization poses substantial challenges. WRI will develop low-carbon city models and – by partnering with up to five urban centers – will demonstrate how cities can improve energy efficiency, reduce greenhouse gas emissions, and improve water quality, mobility and land use.
- A \$10,000 grant to the Winston-Salem Sustainability Resource Center to improve the energy efficiency of homes in North Carolina, U.S. Through collaboration with neighborhood organizations, the program provides energy consumption monitoring, educational workshops, installation of energy efficient products and technical support for homeowners.
- A \$1 million pledge to the Dealer Environmental Sustainability Fund (DESF). The DESF is a partnership between the Caterpillar Foundation, participating Cat® dealers worldwide and eligible nonprofit environmental organizations to promote environmental sustainability around the world.
- A \$3 million pledge to Water.org, a non-profit organization that aims to provide more than 218,000 people with clean water and sanitation over the next three years.
- A \$3.5 million investment in disaster relief to assist in relief, repair and rebuilding.



PEOPLE – FOSTERING DEVELOPMENT AROUND THE WORLD



## FOSTERING DEVELOPMENT AROUND THE WORLD

Caterpillar strives to enable economic growth through infrastructure and energy development, and to provide solutions that preserve the planet. Cat® equipment is being used around the world to foster sustainable development.

In the state of Washington, Cat® machines can be seen at work on the largest dam removal project in U.S. history. In September 2011, a three-year process began to remove the Elwha and Glines Canyon dams in order to restore a free-flowing river. Water flow from Washington’s Elwha River has been limited from its source in the Olympic Mountains for nearly a century and lacked passage for migrating salmon. The river restoration reopens more than 70 miles of pristine spawning and rearing habitat in the Elwha River and its tributaries. Salmon populations are expected to swell.

In Belfast, Northern Ireland, Caterpillar is providing generator sets to produce alternative power from a former landfill site, which is planned for redevelopment into a public park. The Belfast City Council identified a former landfill site – Dargan Road – as a redevelopment opportunity and proposed to create a landmark public park on the site. The 220-acre Giant’s Park went into operation in the summer of 2009; and future development is expected to include sports fields, a nature reserve, an educational facility and a festival space.

To produce electricity, the methane rich landfill gas is collected from a network of gas wells and pipes. The gas is then pumped into generator sets to convert to electricity. Cat® dealer Finning (UK) Ltd provides power generation and ancillary equipment to run this innovative project. Five Cat® G3516A generator sets were supplied to produce the alternative power. Each generator set is rated at 1150 kW, thus providing a combined output of up to 5.5 MW of continuous power to the local grid.

The landfill site will generate electricity from methane for up to 20 years, producing five million watts of electricity for export to the local grid. This could provide power to as many as 6,000 households in the area.

In Pará, Brazil, Caterpillar is providing more than 700 pieces of heavy machinery, including 186 earth-moving products, as work progresses to build Belo Monte Dam, the world’s third-largest hydroelectric dam complex. Part of the Brazilian government’s Growth Acceleration Program, the project on the Xingu River is expected to provide 11,233 MW of renewable hydroelectric power. The Brazilian government says Belo Monte is essential to meet Brazil’s rising energy needs. Upon full completion, planned for 2019, an estimated 70 percent of the dam’s energy output is expected to go toward public use.

PEOPLE – SUPPORTING HEALTHCARE AND EDUCATION PROGRAMS



## SUPPORTING HEALTHCARE AND EDUCATION PROGRAMS

Caterpillar works to build strong relationships with our customers and the communities in which they work. That is why we invest in local mining communities through educational and health initiatives.

In South Africa, many children near our customers’ mines have never had the opportunity to have their teeth checked by a dentist. Caterpillar sponsors a free mobile dental care service for disadvantaged children. We ask our customers to select communities they feel would benefit most from the initiative. Each unit also offers hygiene tips to help children care for their teeth in the future and provides a gift pack consisting of a toothbrush, rinse cup and toothpaste.

More than 2,000 children were reached in 2011. Of those screened, approximately 60 percent were suffering from painful tooth decay. Fifty percent of these needed fillings and 49 percent required tooth extraction, evidence of how important the initiative is to the dental health of local communities.

In the Andes Mountains in Peru, children who live near our customer’s Antamina mine have limited educational opportunities. In 2011, Caterpillar Peru initiated a program to improve children’s reading ability. With the help of a specialist institute, a program was developed that aims to raise reading comprehension by 50 percent among a group of 37 children. Results are already very promising, with reading skills improved by 38 percent in initial tests. Plans are to replicate the program in other primary schools in rural areas near our customers.

Benefits include:








- improved reading comprehension among potential future employees to our customers, as they need to hire employees from communities near the mines operations
- improved community and customer relationships where we do business
- improved relationship between mines and communities

GOALS & PROGRESS

# GOALS & PROGRESS

Caterpillar has set aspirational, long-term goals for its operations as well as its products, services and solutions. We believe these higher standards affirm our determination to lead our industry to a more sustainable future. (Baseline 2006)

## 2020 GOALS FOR OPERATIONS

 <p><b>Reduce recordable workplace injury rate to 0.6 and lost-time case rate due to injury to 0.15</b></p>	 <p><b>Increase energy efficiency by 25%</b></p>	 <p><b>Reduce absolute greenhouse gas emissions from existing facilities by 25%</b></p>	 <p><b>Use alternative/renewable sources to meet 20% of our energy needs</b></p>
 <p><b>Eliminate waste by reducing waste generation and reusing or recycling all that remains</b></p>	 <p><b>Hold water consumption flat</b></p>	 <p><b>Design all new construction to meet Leadership in Energy and Environmental Design (LEED) or comparable green building criteria</b></p>	

## 2020 GOALS FOR PRODUCTS, SERVICES & SOLUTIONS

 <p><b>Provide leadership in the safety of people in, on and around our products</b></p>	 <p><b>Reduce customer greenhouse gas emissions by 20%</b></p>	 <p><b>Increase customer energy efficiency by 20%</b></p>	 <p><b>Increase customer materials efficiency by 20%</b></p>
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GOALS & PROGRESS



**Health and Safety**

OPERATIONAL GOAL

Reduce recordable workplace injury rate to 0.6 and lost-time case rate due to injury to 0.15.

OVERVIEW

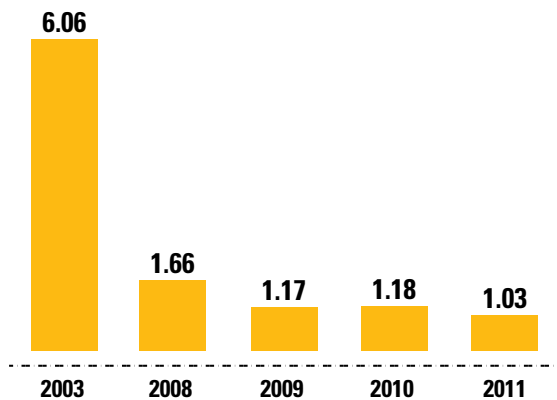
Vision Zero is our commitment to creating a zero-injury workplace. We continue to maintain a strong focus on personal safety and strive for zero injuries.

In 2011, 44 percent of our facilities reached zero recordable injuries and 65 percent of our facilities reached zero lost-time injuries.

It's not about the metrics, but about our people!

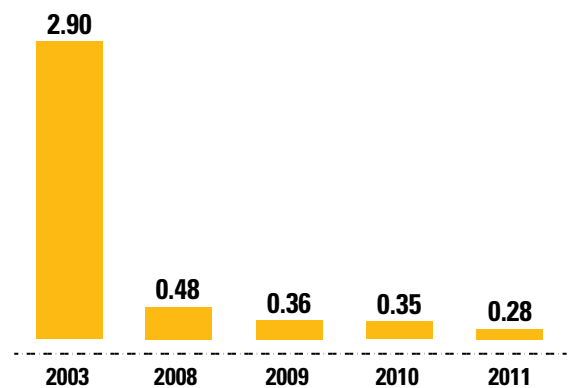
PERFORMANCE SUMMARY

**1.03** Recordable Injury Frequency (RIF)  
*(Recordable injuries per 200,000 hours worked)*



*We have improved our Recordable Injury Frequency rate by 83 percent from our 2003 baseline year and 13 percent from our last reporting period.*

**0.28** Lost-Time Case Frequency (LTCFR)  
*(Lost-time injuries per 200,000 hours worked)*



*We have improved our Lost-Time Case Frequency rate by 91 percent from our 2003 baseline year and 20 percent from our last reporting period.*



In 2008, Caterpillar launched a global risk assessment initiative that has resulted in the reduction of thousands of high-risk work elements to medium or low risk.

In 2011, facilities renewed their focus on safety and ergonomic risk reduction by establishing baselines for new or modified jobs. Our focus on ergonomics has driven continued reduction in ergonomic-related injuries. By year-end 2011, less than one percent of all job elements assessed remained high-risk jobs.

GOALS & PROGRESS



## Health and Safety

EXAMPLES



### AURORA SAFETY PLAN RESULTS IN FEWER INJURIES

The Caterpillar Aurora facility in Illinois reduced its Recordable Injury Frequency rate by more than 60 percent after introducing a new safety plan in January 2011.

The plan was introduced to every employee in an effort to build accountability at all levels and identify potential process problems. Measures included:

- Carrying out weekly shop floor incident reviews with injured employees
- Ensuring one employee is dedicated and trained as a safety champion every month
- Reviewing safety metrics and implementing improvement plans if a target is not being met
- Ensuring five safety observations per week are completed by employees in each section
- Challenging manufacturing engineers to eliminate the five greatest hazards associated with injuries in each area
- Holding all employees accountable for their own safety and the safety of those around them
- Recognizing safety achievements and milestones.

Execution of Aurora’s 2011 Safety Plan has allowed the facility to make a monumental improvement in the culture and performance within the facility, at a time of ramp-up of production levels.



### ENGINEERED SOLUTION IMPROVES SAFETY AT BOONVILLE

A project team at Caterpillar’s High Performance Molded Products facility in Boonville, Mo., implemented an engineered solution with a more technologically advanced system for rubber processing. The facility mixes more than three million pounds (1,360 metric tons) of rubber annually for use in molded components designed for use on Cat® machines.

Previous manual handling of rubber strips is now automatic with the new solution, avoiding potential hazards associated with this process. A new layout also has stopped operators, passers-by, and truck traffic from getting too close to the machinery, further reducing risks for potential injury.

The new process reduced the risks for potential injury to operators as well as to pedestrians in the process areas. The facility’s safety risk assessment score improved by more than 50 percent.

(continued)

GOALS & PROGRESS



## Health and Safety

EXAMPLES



### FULL-TIME SAFETY COACH BOOSTS ENGAGEMENT AT BCP LEICESTER AND STOCKTON

A full-time Safety Coach is helping Caterpillar’s Leicester and Stockton facilities in the UK engage employees in health and safety. The coach’s role is to:

- Deliver formal health and safety training
- Offer one-on-one coaching to the workforce
- Provide an avenue for employees to raise concerns
- Provide support and training for safety improvement projects
- Assist in risk assessments and incident investigation
- Attend safety meetings
- Prepare daily safety briefings for employees.

Since the implementation of the Safety Coach role, the safety awareness of employees has increased and injury rates have decreased. The role of Safety Coach has enabled improvements in the quality and quantity of focused health and safety training in the facilities, dramatically improving competency.



### ELECTRICAL HAZARD SAFETY

Caterpillar’s dealer learning center implemented a project to ensure the safety and well-being of those working with electricity in its laboratories. The goal is to maintain a zero electrical hazard recordable injury rate.

The learning center is responsible for the safety of Caterpillar employees and students attending Caterpillar training classes. The lab environment features fully functional generator sets, uninterruptible power supplies, and other equipment that poses electrical hazards. New safety measures include:

- Changes in circuit breaker settings
- Labeling equipment with electrical hazard stickers
- Additional personal protection equipment for use when interacting near or on a live circuit
- Enhancing instructor training on electrical hazards.



### SITE PEDESTRIAN SAFETY

In a period of 12 months and using very limited resources, Caterpillar’s Skinningrove, UK, facility made a major contribution to pedestrian safety around the site. Workshops were held to determine the best facility layout to achieve production in the safest manner possible.

Site managers produced maps for each zone of the facility and worked out ways to keep people and traffic separated. Plans were drawn up to create safe access for forklift trucks. Where pedestrians and forklift trucks come into close proximity, special consideration was given to ensuring line of sight for drivers. Facility layout enhancements include well-marked and well-lit pedestrian walkways and doorways, new locations for tooling racks, relocation of shipping ramps and marking of shipping lanes.

(continued)

## GOALS & PROGRESS



## Health and Safety

EXAMPLES



### INDIA FACILITIES BOOST SAFETY THROUGH ENGINEERING IMPROVEMENTS

Engineers at Caterpillar's machines division in Tamil Nadu and power systems division in Hosur, India, have identified new assembly processes to improve employee safety.

In Tamil Nadu, installing pins into the body of off-highway trucks using hoist cylinders posed potential risk. Assemblers were climbing onto the suspended truck body to install pins. A new assembly process was implemented to allow assemblers to install the pin while standing on the ground outside of the frame rails, reducing the potential for injury.

Also in Tamil Nadu, dollies used to hold and maneuver frames between line assembly stations were improved. Potential risks included the large size of the dolly, potential trip hazards from electric cables and a problematic hydraulic system for lifting purposes. A new dolly design considerably reduced the size of the dolly, eliminated potentially dangerous cables with use of wireless energy transfer and replaced the hydraulic lifters with electrically powered lifters.

In Hosur, manual cylinder head tightening was replaced with automatic tightening. The automatic tightening considerably reduced operator effort and repetitive motion and potentially awkward postures.



### GRIMBERGEN EQUIPMENT INSPECTIONS INCREASE SAFETY

Caterpillar's Grimbergen Distribution Center in Belgium implemented a new rack inspection program in 2011 to ensure that all the racks were installed and maintained correctly to avoid potential safety hazards. Continuous inspection of the racks will be performed to ensure the racks are safe and serviceable.



### GRENOBLE PROACTIVE IN ERGONOMICS AND SAFETY

A project team for the undercarriage production area at the Caterpillar France Grenoble facility defined the best layout adapted to types of activities required for track group assembly. Standard work activities were identified that balanced operators' workloads, reducing walking, waiting and transportation times. A handling device was developed to assist operator handling and positioning, and platforms and tables were placed for best-height processing.

GOALS & PROGRESS

**↑ 25%**

**Energy  
Efficiency**

OPERATIONAL GOAL

Increase energy efficiency by 25 percent.

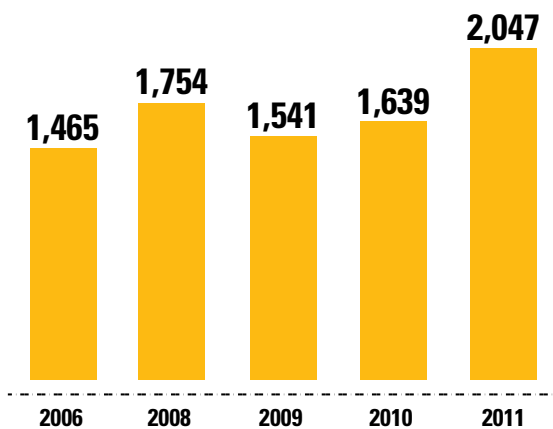
OVERVIEW

Energy efficiency is a continually evolving field, and we will evaluate our metric in the future if standards become available. Individual projects will be launched as identified through research and analysis.

An enterprise-level energy management team was formed in 2011.

PERFORMANCE SUMMARY

**2,047** Dollars of revenue/absolute gigajoules energy use  
*(Baseline: 2006)*



*The 2011 result is 28.3 percent better than our 2011 target, and exceeds our 2020 aspirational goal by 11.8 percent.*

Note: Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers operations.

Previously reported data has been restated due to:

- a) acquisitions,
- b) data updates realized from improved accuracy,
- c) divestitures.



GOALS & PROGRESS

## ↑ 25% Energy Efficiency

EXAMPLES



### 'CUTTING THE LIGHTS' SAVES ENERGY IN FOUNTAIN INN

A simple decision to fit high-efficiency lights with motion sensors throughout Caterpillar's approximately 90,000 square feet (8,361 square meters) Fountain Inn, S.C., facility is reducing energy consumption and providing savings of more than \$11,000 annually. The lights now turn off after 10 minutes of inactivity and have contributed to a nearly 25 percent drop in electricity consumption, proving that the most efficient lights are the ones that are turned on only when needed.

The move was part of the facility's "cut the lights and reduce the water" project, which also has led to the installation of low-flush toilets, saving approximately 900,000 gallons (3.4 million liters) of water over the first year of installation. Replacing the toilets not only cut water use per flush, it also eliminated several leaks that were detected in the old system.



### IMPROVING ENERGY EFFICIENCY IN CORINTH

Reducing energy consumption is a continuous goal at Caterpillar's Cardinal Drive facility in Corinth, Miss.

Through partnerships with the Tennessee Valley Authority and the State of Mississippi, the facility estimated that 97 percent of their greenhouse gas (GHG) emissions at Corinth come from electrical usage at the plant. This allowed the facility to focus on improvements throughout, such as heating, ventilation and air conditioning equipment upgrades and energy control measures.

The facility initiated these projects and was able to cut electricity consumption by nearly a third from 2009 to 2011 – and have reduced GHG emissions by approximately 5,700 metric tons of CO<sub>2</sub>e.

This is also helping to fulfill Caterpillar's goal of reducing absolute GHG emissions.

GOALS & PROGRESS

**↓25%**

**GHG Emissions**

OPERATIONAL GOAL

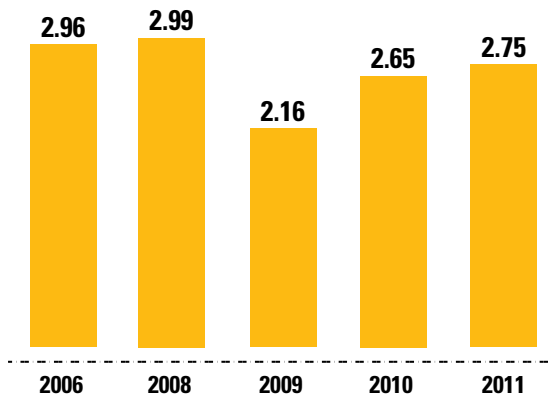
Reduce absolute greenhouse gas emissions from existing facilities by 25 percent.

OVERVIEW

Despite a record increase in production, demand and sales volumes, energy conservation projects contributed to realizing absolute GHG within one percent of the target.

PERFORMANCE SUMMARY

**2.75** Absolute million metric tons  
of CO<sub>2</sub>e  
*(Baseline: 2006)*



*The 2011 result is within one percent of our 2011 target. The increase from 2010 is due to a record increase in production, demand and sales volumes in 2011.*

Note: Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers operations.

Previously reported data has been restated due to:

- a) acquisitions,
- b) data updates realized from improved accuracy,
- c) divestitures.

GOALS & PROGRESS

## ↓25% GHG Emissions

EXAMPLES



### TRANSPORTATION PROCESS REDUCES GREENHOUSE GAS EMISSIONS

A Caterpillar European Transportation team implemented a Network Control Center collaborative transportation process, enabling consolidation of parts flow across the supply base, optimal selection of transport companies to haul parts, and dynamic choice of transport mode to final delivery. Carriers handling Cat® equipment will avoid the use of multiple cross-docks necessary to route Cat® parts to plants. Shipping more parts together in larger shipments from each supply location will reduce trailer utilization of trucks delivering parts to plants. Less trucks and less handling results in a reduction of total kilometers traveled.

The Network Control Center is expected to reduce distance traveled by approximately 12 percent, which is a reduction of approximately 1,200 metric tons of CO<sub>2</sub>e annually and a reduction in freight costs of approximately 15 percent annually.



### EFFICIENT LIGHTING SLASHES GREENHOUSE GAS EMISSIONS

Lighting upgrades at Caterpillar's facility in Clayton, N.C., will save an estimated 1,900 MWh of electricity and cut greenhouse gases by approximately 1,000 metric tons CO<sub>2</sub>e per year.

The previous lighting at the Clayton plant was more than 10 years old, inefficient, and was requiring increasing amounts of maintenance. Poor lighting in some areas meant visibility was also affected, potentially affecting work quality and posing a potential safety hazard to employees.

The Clayton facility replaced more than 900 fixtures with higher-efficiency lamps, combined with motion sensors that ensure lights are switched off when there are no personnel in the area.



### ELECTRICITY CONSERVATION PROJECTS REDUCE GREENHOUSE GAS EMISSIONS

Caterpillar's plant in Hosur, India, reduced greenhouse gas emissions in 2011 through a set of energy conservation measures, including:

- Increasing the efficiency of the operation of pumps
- Replacing sodium vapor light fixtures with more energy-efficient fixtures
- Improving the operation of cooling tower fans
- Installing 24 LED light fixtures in place of metal-halide light fixtures
- Using energy created during generator set testing to power cooling blower fans, instead of using power from the facility.

These changes saved approximately 187,000 kWh, equal to more than 5 percent of electricity consumption at the facility.

(continued)

## GOALS & PROGRESS

**↓25%** GHG Emissions  
EXAMPLES



### REPLACING PRODUCTION LINE CUTS EMISSIONS AND BOOSTS SAFETY IN BOONVILLE

The Clean and Coat Adhesive Line at Caterpillar's High Performance Molded Products facility in Boonville, Mo., is an important production facility that manufactures highly engineered rubber and plastic component parts. Replacing and redesigning this 17-year-old production line has reduced reliance on natural gas by approximately 16 percent, cutting greenhouse gas emissions by approximately 13 percent and saving approximately \$50,000 a year in energy costs.

Generation of hazardous waste has also been reduced nearly 60 percent; and the use of cleaning chemicals, solvents and adhesives has been cut significantly.

GOALS & PROGRESS

**20%**  
Alternative/  
Renewable  
Energy

OPERATIONAL GOAL

Use alternative/renewable sources to meet 20% of our energy needs.

OVERVIEW

An enterprise-level energy management team was formed in 2011.

Individual projects will be launched as identified through research and analysis.

PERFORMANCE SUMMARY

**14.8** Percent renewable energy  
*(Renewable electrical energy use/total electrical energy use) x 100*



*The 2011 result indicates good progress toward achieving our 2020 aspirational goal.*

*Alternative Energy: Caterpillar is defining alternative energy sources and the calculation methodology.*

*Renewable Energy: Energy resources that are naturally replenishing over a short period of time and virtually inexhaustible such as wind power, solar power, hydro power, geothermal power, tidal power, wave power, biomass power and anaerobic digestion.*

Note: Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers Operations.

## GOALS & PROGRESS

# 20% Alternative/Renewable Energy

EXAMPLES

### EXAMPLES



#### INTRODUCING A BIOGAS GENERATION FACILITY IN INDIA

Managers at Caterpillar's facility in Thiruvallur, India, installed a system that turns waste into biogas. This system converts canteen food waste into energy. This renewable resource is then used directly in electrical and heating applications back in the company's canteen.

Thiruvallur has reduced the canteen's use of electricity and liquefied petroleum gas. The onsite biogas solution recycles up to 1,000 kg (1 ton) of food waste daily, and eliminates the use of vehicles that were previously used when disposing of food waste off site.



#### SOLAR ENERGY SAVES WATER AND CUTS COSTS

Installing solar panels has allowed Caterpillar's plant in Hosur, India, to recycle the water used to test engines, significantly reducing the use of resources – and saving approximately \$150,000 a year.

Plant managers realized it was wasteful not to reuse the hot water which, after testing, contains diesel fuel and a chemical that prevents rusting. By installing solar panels that can keep the water at the required temperature, it can be stored for reuse in testing rather than being allowed to cool down, after which it is of no use.

The move has cut back on the use of approximately 330 liters (87 gallons) of diesel fuel a day, saved approximately 6,440 liters (1,700 gallons) per day of water, and approximately 1,500 liters (395 gallons) of rust preventive each month.

GOALS & PROGRESS



Waste

OPERATIONAL GOAL

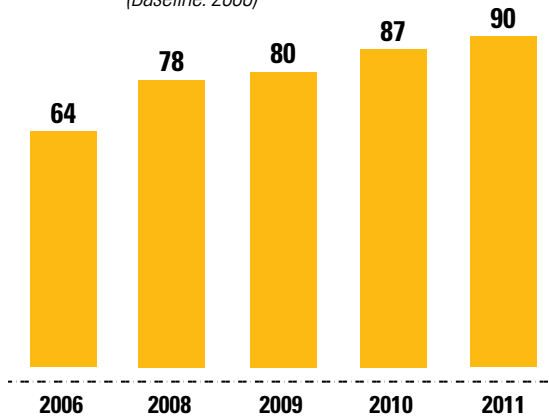
Eliminate waste by reducing waste generation and reusing or recycling all that remains.

OVERVIEW

We continue to make gains in this effort due to the general population at Caterpillar embracing recycling efforts on a global basis. We reduce the generation of waste as much as possible and, for the remainder, find types of beneficial reuse (such as waste to energy) or recycle. 111 facilities are recycling at 90 percent or greater. If metals are included, 173 facilities are recycling at 90 percent or greater.

PERFORMANCE SUMMARY

**90** Percent recycled  
*Absolute pounds recycled waste/absolute pounds total waste x 100*  
*(Baseline: 2006)*



*The 2011 result is 8 percent above our 2011 target. Sustained improvement was made from 2009 to 2011. If metals are included, our recycling rate in 2011 was 95 percent. This metric does include energy recovery from waste to energy incineration. Achieving such a high percentage on this metric will allow us to look at unique opportunities to further increase our material efficiency.*

Note: Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers operations.

Previously reported data has been restated due to:

- a) acquisitions,
- b) data updates realized from improved accuracy,
- c) divestitures.

GOALS & PROGRESS

 **Waste**  
EXAMPLES



**NEW PAINT TECHNOLOGY DRASTICALLY CUTS HAZARDOUS WASTE**

Converting paint from liquid to powder coat form has reduced hazardous waste by approximately 99 percent at Caterpillar’s Building Construction Products Sanford facility in North Carolina.

Under the liquid paint regime, it was necessary to clean the paint pistols and the lines that feed them with a solvent. The solvent then had to be disposed of as hazardous waste, averaging 0.69 gallons/unit (2.6 liters/unit). Converting to powder coating has eliminated this waste stream. Liquid paint is still used for touch ups but generates only approximately 0.01 gallons (0.04 liters) of hazardous waste/unit.

Emissions of volatile organic compounds and hazardous air pollutants have also been cut by approximately 98 percent as a result.



**RECYCLING OIL SAVES RESOURCES AND MONEY**

Caterpillar’s East Peoria, Ill., manufacturing site has been recycling nearly 53,000 gallons (200,600 liters) of oil at a cost avoidance of approximately \$358,000 since the project’s inception in 2010.

The tractor assembly process was wasting hydraulic engine and transmission oil each year because the different oils being used on the assembly line were drained into catch pans where they were commingled with other oils generated in the building and then shipped off site for recycling.

The new system catches the oil at the point of generation and immediately pumps it into oil reclamation units. This has also reduced the need to buy approximately 23,800 gallons (87,500 liters) of new oil, cutting carbon emissions associated with processing and delivery.



**REDUCING OIL WASTE IN INDIA**

Caterpillar’s machines division in Thiruvallur, India, has been looking carefully at how oil waste can be reduced when assembling off-highway trucks on its production line.

Improvements to date include carrying out oil-level checks in more efficient ways that allow oil to be recycled, filtering used oil during operations and implementing safe storage and handling procedures. Such innovations have reduced the amount of waste oil by approximately 70 percent so far.



GOALS & PROGRESS



**Water  
Consumption**

OPERATIONAL GOAL

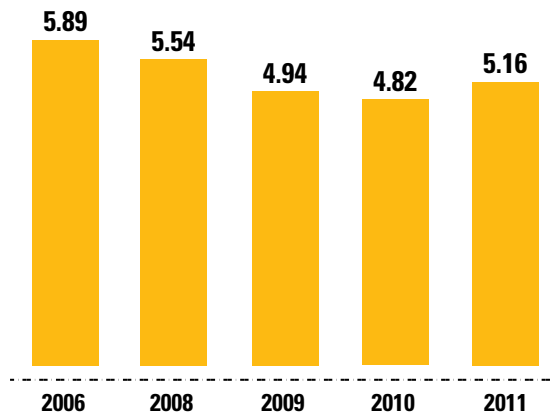
Hold water consumption flat.

OVERVIEW

In 2011, we continued to execute the water plan and tools developed in 2008. Mapping the true cost of water use is in progress for our two largest water use facilities. We continue to look for replication opportunities at other sites.

PERFORMANCE SUMMARY

**5.16** Absolute billion gallons used  
*(Baseline: 2006)*



*The 2011 result is 12.4 percent better than our 2011 target.*

Note: Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers operations.

Previously reported data has been restated due to:

- a) acquisitions,
- b) data updates realized from improved accuracy,
- c) divestitures.

## GOALS & PROGRESS



### Water Consumption

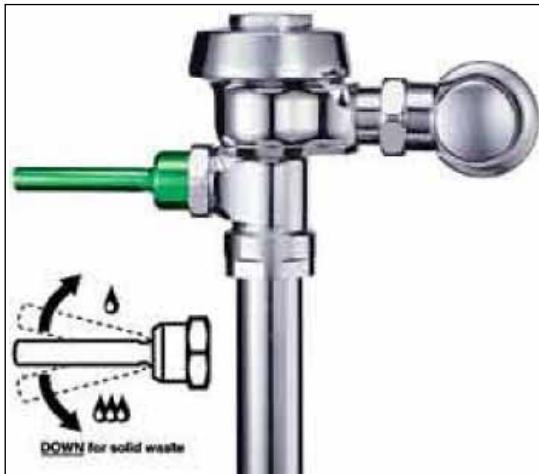
EXAMPLES



#### NATURAL LANDSCAPING IS HEALTHIER FOR LOCAL WATER

Our manufacturing site in East Peoria, Ill., has replaced its traditionally managed turf grass with a natural landscape regime eliminating the need to use toxic substances such as fertilizers, herbicides and pesticides. This is better for the environment as nutrient run-off from fertilizers can have a detrimental effect on local surface water. Producing and transporting the fertilizer also consumed significant amounts of energy.

The natural landscaping has the additional benefit of cutting CO<sub>2</sub> emissions from mowing machines by an estimated 70 percent per year [up to 76 lbs. (0.04 metric tons) CO<sub>2</sub>e], as well as approximately \$60,000 in maintenance cost savings.



#### SIMPLE SOLUTIONS SAVE WATER IN MEXICO

Our Remanufacturing site in Nuevo Laredo, Mexico, saved a total of approximately 385,000 gallons (1.5 million liters) of water in 2011 by implementing some simple savings measures.

The site replaced electric flushing systems for the toilets with a manual, dual-flush toilet, saving up to half a gallon per flush. Water flushing urinals were also replaced with dry urinals, which saved approximately 53,000 gallons (200,000 liters) of water per urinal per year.



#### IMPROVED WASTEWATER TREATMENT REDUCES DEMAND ON LOCAL SUPPLY

Until recently, Caterpillar's joint venture AsiaTrak in Tianjin, China, which makes undercarriages for various vehicles, could treat only up to 70 m<sup>3</sup> of the wastewater it generated each day.

The hurdle that they faced was that the current quality of treatment system provided was not high enough to allow the water to be recycled within the plant. Rebuilding the water treatment plant brought about a major change. The new wastewater treatment facility doubled treatment capacity to approximately 150 m<sup>3</sup> per day, and was able to meet higher wastewater treatment standards.

As a result of meeting these standards, wastewater at AsiaTrak Tianjin can now be fully recycled within the facility. Caterpillar is saving approximately \$22,000 a year in water bills and has reduced its demand on the local water supply.

GOALS & PROGRESS

## LEED

### Leadership in Energy and Environmental Design

#### OPERATIONAL GOAL

Design all new construction to meet Leadership in Energy and Environmental Design (LEED) or comparable green building criteria.

#### OVERVIEW

The collection of buildings or projects represents varying degrees of certification or certifiable status attained or sought, or that are targeted, in accordance with either the U.S. Green Building Council’s New Construction, Existing Buildings, or Commercial Interiors certification processes, or comparable green building criteria.

The total of 33 buildings/projects consists of 31 new construction and two existing buildings.

#### PERFORMANCE SUMMARY

**33** Buildings/projects designed to LEED or comparable criteria

#### EXAMPLES



#### CATERPILLAR 2011 LEED STATUS

The following facilities received certification in accordance with the U.S. Green Building Council’s LEED-NC (Leadership in Energy and Environmental Design – New Construction) certification process or comparable criteria:

- SILVER – Seguin, Texas, Engine Facility

The following new facilities are seeking certification in accordance with the U.S. Green Building Council’s LEED-NC (Leadership in Energy and Environmental Design – New Construction) certification process:

- Target GOLD – Peoria, Ill., Caterpillar Visitors Center
- Target SILVER or Certified – Clayton, Ohio, Cat Logistics Distribution Center
- Target Certified – Rayong, Thailand, Underground Mining Facility
- Target Certified – Rayong, Thailand, Medium Tractors Facility
- Target Certified – Winston-Salem, N.C., Axle Manufacturing Facility
- Target Certifiable – Wuxi, China, Upper & Lower Power Train Facility
- Target Certifiable – Wuxi, China, Hydraulic Cylinder Manufacturing Facility

GOALS & PROGRESS



**Health and Safety**

PRODUCTS, SERVICES AND SOLUTIONS GOAL

Provide leadership in the safety of people in, on and around our products.

OVERVIEW

Caterpillar offers a suite of safety services to customers either individually or as part of a Fleet Management Services agreement and remains committed to expanding the availability of safety information and materials.

PERFORMANCE SUMMARY

Operator and jobsite health and safety is promoted at SAFETY.CAT.COM™ to help our customers use our products safely and improve their safety performance. This dedicated website includes safety culture solutions that offer assessments, coaching and training to develop a stronger safety culture.

EXAMPLES



**REFINED DESIGN DELIVERS SAFETY FEATURES**

The refined design for the Cat® D11T and D11T Carrydozer includes a new operator-presence system that locks out the power train and hydraulic system to avoid unintentional machine movement when the operator is entering or exiting the cab. Entering and exiting can also be done via an optional hydraulically actuated access ladder that deploys and stores in seconds. An optional sound-suppression package reduces average spectator sound power levels, a benefit to both the operator and the surrounding environment. Operator comfort features include ergonomic joystick steering, automatic climate control and precision blade control and positioning.



**WHEEL LOADER OPERATOR COMFORT**

Improved production and efficiency can be achieved if the operator is comfortable and does not become fatigued. The operator sound level on the new Cat® 980K Wheel Loader has been reduced by approximately 50 percent. New cab mounts decrease noise and vibration for the operator. The result is a comfortable work environment, helping the operator remain efficient and productive. A joystick steering system combines operator comfort and precision control to provide a sustainable work environment for the operator. The system automatically adjusts the effort needed to tilt the ergonomic joystick based on ground speed, resulting in superior control in all applications and climates.

(continued)

GOALS/PROGRESS

## ✓ Health and Safety

EXAMPLES



### OBJECT DETECTION

The more equipment operators know about the working environment around them, the more safely they will be able to operate their equipment. Object Detection enhances visibility of the near vicinity surrounding large machines by providing visual indications of objects in close proximity. A combination of cameras, radars and in-cab display automatically detect hazards such as other equipment or vehicles within critical zones around the machine – in front, at the rear or within the turning radius on each side, depending on machine type.



### STAIRWAY & HOOD LIFT ASSIST RETROFITS

Caterpillar is committed to providing customers with safe and reliable products and services. One key area of focus is preventing slips, trips and falls when mounting or dismounting a piece of equipment. The new diagonal stairway retrofit for Cat® 777C and 777D off-highway trucks provides improved access to and from the bumper walkway and cab. Diagonal stairway retrofits are also available for Cat 785 and 789 off-highway trucks. Powered access systems for select large mining trucks and track-type tractors further improve ingress and egress.

The hood lift assist retrofit for select large mining trucks reduces the effort required to open and close the front and rear engine hoods. Maintenance-free mechanical spring struts reduce lifting forces and provide controlled motion for closing the hoods.



## GOALS & PROGRESS

↓ 20%

### Customer GHG Emissions

#### PRODUCTS, SERVICES AND SOLUTIONS GOAL

Reduce customer greenhouse gas emissions by 20 percent.

#### OVERVIEW

We want to help our customers achieve their emission reduction goals, too. Their needs provide potentially valuable business opportunities for us.

#### PERFORMANCE SUMMARY

Customers are demanding greater fuel efficiency and using our technology to help them reduce GHG emissions.



#### NEW EXCAVATOR DOES MORE WORK WITH LESS FUEL

The new Cat® 349E hydraulic excavator delivers more engine and hydraulic horsepower than its predecessor, and averages five percent improved fuel efficiency in typical applications. Decreases in fuel consumption result in a decrease of combustion of carbon, reducing greenhouse gases.

The 349E operates on either ultra-low-sulfur diesel fuel (ULSD), or a blend of ULSD and 20 percent biodiesel, and meets stringent U.S. Environmental Protection Agency Tier 4 Interim emissions standards.

Fuel-saving features include:

- An engine idle shutdown setting – which allows selection for how long the machine is permitted to idle before shutting down
- Isochronous speed control – a system that maintains constant engine speed, regardless of load
- An economy power mode used during less demanding applications
- A hydraulic system that recycles hydraulic energy and hydraulic oil.



#### REFINED DESIGN DELIVERS FUEL-EFFICIENT PRODUCTIVITY

The refined design for the Cat® D11T and D11T Carrydozer delivers fuel-efficient productivity. New for the D11T and D11T CD is the Enhanced Auto Shift (EAS) system, designed to conserve fuel by automatically selecting the optimal reverse gear and engine speed, based on load and desired ground speed. When the EAS mode is not activated, an Auto Downshift feature automatically changes gears down to most efficiently handle loads. Decreases in fuel consumption result in a decrease of combustion of carbon, reducing greenhouse gases.

(continued)

## GOALS & PROGRESS

# ↓20% Customer GHG Emissions

EXAMPLES



### WHEEL LOADER FUEL ECONOMY IMPROVEMENTS

A primary advantage of the new Cat® 980K Wheel Loader is fuel economy improvement in typical loader applications. Furthermore, the fuel that is burned produces 90 percent less particulate matter (PM) and 50 percent fewer oxides of nitrogen (NO<sub>x</sub>) than its predecessor, the 980H. The 980K was designed to be almost fully reused, with a 96 percent recyclability rate, and provides the foundation by which resources can be conserved for years to come.



### ULTRA LEAN BURN UPGRADE

Retrofits can provide the latest lean burn gas engine technology for Cat® G3500 petroleum engines in existing gas compression applications. The upgrade for G3508, G3512, and G3516 engines utilizes state-of-the-art electronic controls and sensor technology to improve fuel efficiencies, and reduces oxides of nitrogen (NO<sub>x</sub>) emissions.

GOALS & PROGRESS

**↑20%**

**Customer  
Energy Efficiency**

PRODUCTS, SERVICES AND SOLUTIONS GOAL

Increase customer energy efficiency by 20%.

OVERVIEW

Efficiency gains will vary by product, application and segment. We continue to work with our product groups and customers to define applicable metrics.

PERFORMANCE SUMMARY

We collaborate with our dealers to deliver highly customized and site-specific solutions that result in optimized use of our equipment and an improved bottom line for our customers. We offer training to our customer operators on how to use our products more efficiently.

EXAMPLES



**TECHNOLOGIES FOR EFFICIENCY**

Caterpillar is constantly developing and refining advanced technologies to make equipment more productive and efficient, and to effectively manage equipment fleets and operations.

Cat® products for earthmoving solutions, including AccuGrade™ Grade Control System and Computer Aided Earthmoving System, combine the latest global positioning system technology with sophisticated electronic control modules and database tools to help customers increase productivity, lower costs, improve accuracy and sustain natural resources by increasing fuel efficiency.

Cat® mining technologies, including Cat® MineStar™ System and Product Link, improve productivity and enhance safety and are building blocks for autonomous mine sites of the future.

Cat® products apply advanced technologies and state-of-the-art information systems to provide updated minute-by-minute fleet and ongoing operations information – including machine location and status, equipment health and more – to assist in the most efficient operations.

Cat® engines meet tough emissions standards while delivering performance and efficiency.

(continued)



GOALS & PROGRESS

## ↑ 20% Customer Energy Efficiency

EXAMPLES



### 988H WHEEL LOADER EXEMPLIFIES ENERGY EFFICIENCY

The Cat® 988H Performance Plus Wheel Loader update exemplifies energy efficiency.

Fuel/Energy Efficiency:

- The 988H Performance Plus with the new Performance Series Bucket offers the benefit of up to 10 percent increase in productivity
- The new Positive Flow Control hydraulics has demonstrated fuel savings of up to 5 percent
- Factoring in the combination of productivity and fuel savings, improvements of up to 10 percent can be realized
- At a minimal sacrifice to productivity (5-10 percent loss), customers may realize an additional 15-20 percent in fuel savings with the Fuel Management System (FMS).

New with the 988H Performance Plus are two additional fuel-saving modes of operation available that allow the operator to choose the level of fuel savings to be achieved. The operator can easily accommodate changing production demands by moving between three modes of operation: Full Power (FMS not engaged), Balanced Power and Maximum Fuel Savings. Additionally, the 988H Performance Plus introduced Auto Idle Kickdown and Idle Shutdown features to minimize fuel burn, and reduce gaseous emissions.



### GENERATOR HYBRID POWER SOLUTION

Telecommunications operators are rapidly moving to employ generator hybrid power solutions that blend energy storage, solar photovoltaic (PV) panels and small wind turbines into a solution that could save hundreds of millions of liters of diesel fuel annually and avoid millions of tons of CO<sub>2</sub> emissions. Caterpillar recently piloted a hybrid system consisting of a Cat® generator set, PV solar panels and small wind turbines integrated into a complete solution. The solution is expected to reduce fuel consumption by more than 95 percent, also resulting in reduced emissions and owning and operating costs.

The Caterpillar hybrid power solution has the potential to increase operating efficiencies, as well as meet or exceed stringent environmental requirements. Hybrids are particularly well suited for applications in remote areas, where electric utility service does not exist or would be too costly to extend. In comparison with the costs of grid extension or the high costs of fuel delivery to remote locations, hybrids can offer several benefits to off-grid customers:

- Decreased fuel consumption by 30-100 percent
- Extended maintenance and replacement intervals
- Payback periods of three years or less in many instances
- Configurability to provide the optimal solution for quickest payback, or minimum (or zero) fuel consumption.

Global customer interest in hybrid power solutions has grown significantly in the last few years, not only in telecommunications, but also in other segments such as off-grid village power and military applications. It is expected that hybrid solutions will continue to grow into many applications where Cat® generator sets are used today, from telecommunications to mine sites.

## GOALS & PROGRESS

↑ 20%

### Customer Materials Efficiency

#### PRODUCTS, SERVICES AND SOLUTIONS GOAL

Increase customer materials efficiency by 20 percent.

#### OVERVIEW

Remanufactured, rebuilt and certified used parts provide cost savings to our customers and help us achieve our goal of using materials more efficiently. Retrofits and upgrades provide significant customer benefits through the avoidance of obsolescence of older generation parts.

#### PERFORMANCE SUMMARY

We work to enable our customers to conserve and reuse resources.

#### EXAMPLES



#### CAT® CERTIFIED REBUILD

Cat® machines are so durable that instead of scrapping older models, rebuilding them to excellent reliability, performance and durability is possible, providing a second lease on life. Rebuilding customer equipment requires 50 to 60 percent less energy by reusing 85 to 95 percent by weight of the materials from the original product. By restoring used equipment, Cat® dealers minimize waste while offering high-quality, cost-effective solutions to our customers. It's good for business and for the environment.

Cat Certified Rebuilds are also available for power trains, hydraulics and machine components.



#### REMANUFACTURING

Caterpillar restores near end-of-life parts to original engineering specifications through remanufacturing, an advanced form of recycling. This makes both economic and environmental sense because it reduces waste and consumption of raw materials, and provides a lower cost to the customer. Through remanufacturing, Caterpillar makes one of its greatest contributions to sustainable development – keeping nonrenewable resources in circulation for multiple lifetimes.

To support the fast-growing Asia-Pacific remanufacturing business, in 2011, Caterpillar opened remanufacturing facilities in Shanghai, China, and Singapore. The new facility in Shanghai remanufactures pumps, motors and engine components. The new facility in Singapore remanufactures major components for large off-highway trucks and other mining equipment, including engines, transmissions, final drives and torque converters.

(continued)

GOALS & PROGRESS

## ↑ 20% Customer Materials Efficiency

EXAMPLES



### SUSTAINABILITY IN LARGE MINING TRUCKS

A variety of features in large Cat® mining trucks improve sustainability in areas of decreasing waste and extending component life, as well as lowering emissions levels. Longer-lasting components feature state-of-the-art technologies and enhanced electronics. The trucks are now more serviceable – so less time is spent on maintenance and more time on hauling. Cat® mining trucks are designed to be rebuilt multiple times with service lives regularly reaching beyond 100,000 hours. Major parts are reusable, and extensive salvage guidelines have been developed for our dealers to maximize value to customers. Fewer new parts means fewer resources used. Components are designed for remanufacture to provide multiple service lives.

Sustainability features of the new Cat® 793F include continuous rear axle filtration, extended life filters and extended maintenance intervals that aid in decreasing the amount of waste oil generated. Engines with advanced technology maintain fuel efficiency while contributing fewer emissions to the environment. Advanced Surface Technology replaces hard chrome coatings on some steel parts. This technology improves wear resistance and reduces repair time. Elimination of chrome reduces environmental impact.



### REBUILDING GENERATOR SETS

Available excess engine cores and market need from Cat® dealers for rebuilt/used generator sets led to a program to rebuild Cat® generator sets. The rebuilding began early in 2011, and demand grew throughout the year.

The program enables Caterpillar and Cat® dealers to reduce scrap material, take back used core from the market and leverage remanufacturing salvage technology to provide additional engine and component life. Demand for power continues to increase worldwide, and offering a low-cost solution to the market provides an additional avenue for customers to purchase a reliable Cat® generator set.



### BRAKE WEAR INDICATORS

Cat® Brake Wear Indicators for current and legacy off-highway trucks eliminate the risk of brake fluid loss and reduce service time. Retrofit of the brake wear indicator enables a noninvasive service procedure to quickly check brake disc wear. With the brake wear indicator, service technicians no longer need to bleed the brakes for routine wear checks, eliminating the opportunity for fluid loss and significantly reducing service time.

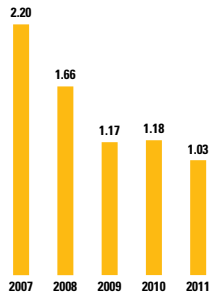
## GOALS/PROGRESS

# PERFORMANCE AT A GLANCE

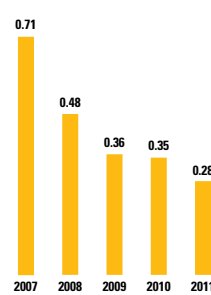
These graphs provide a snapshot of performance for certain safety and sustainability indicators.

### WORKPLACE SAFETY

**Recordable Injury Frequency (RIF)**  
(Recordable injuries per 200,000 hours worked)



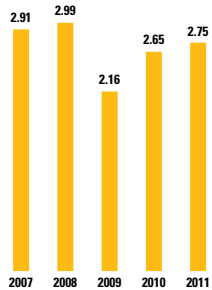
**Lost-Time Case Frequency (LTCFR)**  
(Lost-time injuries per 200,000 hours worked)



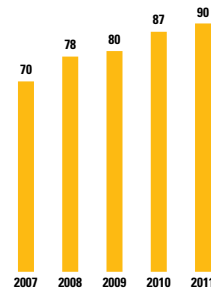
1. Data does not include facilities acquired after June 1, 2010, or Caterpillar Japan Ltd – Direct Dealers operations.
2. Data prior to 2011 has been restated due to: a) acquisitions, b) data updates realized from improved accuracy, c) divestitures.
3. Percent recycled waste excludes the weight of metal, which is 100 percent recycled. Including metal raises the level to 95 percent in 2011.
4. Based only on renewable energy. Alternative energy will be included in the future.
5. Data does not include Progress Rail operations.

### ENVIRONMENTAL IMPACT<sup>1,2</sup>

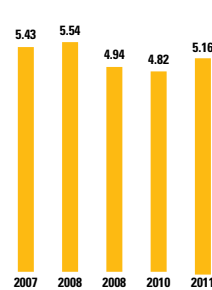
**Absolute GHG**  
(Absolute million metric tons of CO<sub>2</sub>e)  
(Baseline: 2006)



**Percent Recycled<sup>3</sup>**  
(Absolute pounds recycled waste/  
absolute pounds total waste) x 100



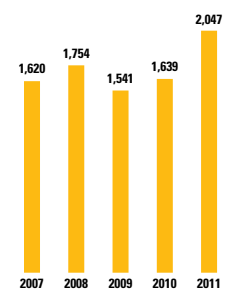
**Water Use**  
(Absolute billion gallons used)  
(Baseline: 2006)



**Percent Alternate/  
Renewable Sources<sup>4</sup>**  
(Renewable electrical energy use/total  
electrical energy use) x 100

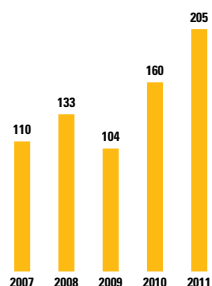


**Energy Efficiency**  
(Dollars of revenue/absolute  
gigajoules energy use)  
(Baseline: 2006)

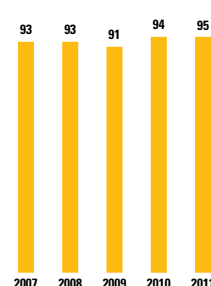


### REMANUFACTURING (REMAN)<sup>5</sup>

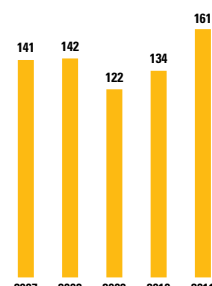
**Reman Business Growth**  
(Percent revenue increase over 2001 base)



**Reman End-of-Life  
"Take Back" Percent**  
(Actual end-of-life returns/eligible returns)  
x 100

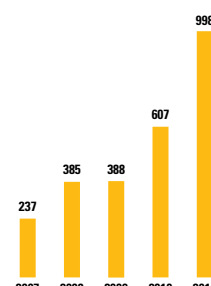


**Reman End-of-Life  
"Take Back" by Weight**  
(Millions of pounds of end-of-life  
material received)



### CAT® CERTIFIED REBUILD<sup>2,5</sup>

**Cat® Certified Rebuild  
Business Growth**  
(Percent revenue increase over 2001 base)



CONNECTIONS



## ADVISORS, COMMENTS & AFFILIATIONS

Caterpillar works with a wide range of individuals and organizations to promote sustainability globally.

Our advisory council of eminent sustainability experts provides us with independent advice and challenges us to continue improving.

CONNECTIONS



## EXTERNAL ADVISORS & COMMENTS

Our thanks to the advisory council of experts who provided their comments on Caterpillar’s sustainability progress. Inclusion below indicates they provided feedback; it does not indicate they endorse the contents of the report. Comments below are advisory in nature and do not necessarily reflect corporate policy.

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**LUKE DANIELSON**  
*Sustainable Development Strategies Group*

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**GEORGE C. EADS**  
*Senior Consultant, Charles River Associates*

Manufacturers tend to concentrate mostly on the efficiency of their equipment in terms of emissions or energy used over time. Caterpillar is noticeable for its dual focus on the efficiency of the equipment (per unit time operating) AND the amount of time it takes for the equipment to complete the job. This is not only good business but represents a “win-win” in terms of sustainability.

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**BRUCE M. EVERETT**  
*Professor, The Fletcher School, Tufts University*

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**MARGARET FLAHERTY**  
*Chief Operating Officer, World Business Council for Sustainable Development*

In less than 20 years there will be three billion middle class consumers needing products and services. This will boost demand for energy and infrastructure. In a resource-constrained world, those companies that can meet market needs sustainably (low pollution and sustainable use of resources, including energy) will secure a powerful competitive advantage. Caterpillar stands to be a winner if it continues on its path to sustainability by leveraging its two main assets: technology and talented people.

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(continued)

CONNECTIONS



## EXTERNAL ADVISORS & COMMENTS (CONT.)

**BRADLEY GOOGINS**

*Professor, Carroll School of Management;  
Former Director, Center for Corporate Citizenship, Boston College*

The social, political and sustainability issues bubbling up and over global corporations will only continue to redefine the boundaries, roles and responsibilities of business in society. The blurring of democracy and capitalism, the competition between emerging economies and the scarcity of natural resources and the emergence of a growing awareness and activism around wealth and income inequality, all present an amazing set of challenges and paradoxes for companies trying to balance growth and sustainable development. Never has business leadership from companies such as Caterpillar been more critical, and the challenges and opportunities to step up into these new roles will require the flexibility of a ballet dancer and the firmness of a disciplined athlete.

**STEPHANIE HANFORD-HASS**

*President, Connectivity Consulting, LLC*

I congratulate Caterpillar on its efforts to reduce its GHG emissions as well as those of its customers. I am excited that the company has decided to have a strategic focus on energy this year. I would like to see the company ramp up sales around renewable energy generation, particularly through methane capture sources – both big and small. As methane is a fast-acting climate forcer, reducing methane emissions is of particular importance to help the world achieve near-term gains in climate protection. Caterpillar should be actively pursuing a wider range of customers for methane capture in the waste management, mining and agricultural industries.

**STUART L. HART**

*S.C. Johnson Chair in Sustainable Global Enterprise,  
Johnson Graduate School of Management, Cornell University*

**THOMAS LOVEJOY**

*Biodiversity Chair, Heinz Center for Science, Economics and the Environment*

(continued)

CONNECTIONS



## EXTERNAL ADVISORS & COMMENTS (CONT.)

MARK B. MILSTEIN

*Professor and Director, Center for Sustainable Global Enterprise, Cornell University*

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WILLIAM R. MOOMAW

*Professor and Director, Center for International Environment and Resource Policy,  
The Fletcher School, Tufts University*

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KEVIN SWEENEY

*Writer and Consultant on Climate Change and Sustainability Issues*

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WILLIAM A. WALLACE

*Past President and Member of the Governing Board, Engineers Without Borders – USA*

Society has only recently begun to understand that the world's resources and ecological carrying capacity are not only finite, but are being used up faster than they can be replaced, replenished or restored. This situation makes life especially difficult for the developing nations, which may not have sufficient economic means nor the technological wherewithal to meet basic needs. If done well, Caterpillar's global reach, combined with cost-efficient product and service offerings, can help developing nations make substantial progress in improving the quality of life of their citizens.

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DURWOOD ZAEKE

*President, Institute for Governance & Sustainable Development;  
Director, International Network for Environmental Compliance and Enforcement*

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CONNECTIONS



## OUR AFFILIATIONS

### Dow Jones Sustainability Indexes

Included since 2000; sector leader 2006-2007-2008-2010

[sustainability-index.com](http://sustainability-index.com)

### Ethisphere

World's Most Ethical Companies 2007-2008-2009-2010-2011

[ethisphere.com](http://ethisphere.com)

### Asia-Pacific Partnership on Clean Development and Climate

Solar Turbines is a task force member for the Asia-Pacific Partnership on Clean Development and Climate, an innovative effort to accelerate the development and deployment of clean energy technologies.

[asiapacificpartnership.org](http://asiapacificpartnership.org)

### Business Council for Sustainable Energy

Solar Turbines is a member of the Board of Directors of the Business Council for Sustainable Energy, which promotes clean energy technologies as solutions to economic, environmental and national security challenges.

[bcse.org](http://bcse.org)

### Business Roundtable

Caterpillar is a member of the Business Roundtable, which supports sustainable development through its task force on environment, technology and the economy that sponsors the S.E.E. Change initiative (Society, Environment, Economy) and through Climate RESOLVE (Responsible Environmental Steps, Opportunities to Lead by Voluntary Efforts).

[businessroundtable.org](http://businessroundtable.org)

### Diesel Technology Forum

Caterpillar is a member of the Diesel Technology Forum, a leading resource and educator on the importance and unique value of diesel engines, fuels, equipment and emissions control technology.

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

### Energy Technologies Institute

Caterpillar is a member of the Energy Technologies Institute, a U.K.-based public-private organization focused on projects that create affordable, reliable, clean energy for heat, power and transport.

[energytechnologies.co.uk](http://energytechnologies.co.uk)

### The Nature Conservancy

Caterpillar has an active role on the International Leadership Council and became the lead corporate donor in the Great Rivers Partnership Project in 2005.

[nature.org](http://nature.org)

(continued)

CONNECTIONS



## OUR AFFILIATIONS (CONT.)

### Opportunity International

Through the Caterpillar Foundation, Caterpillar collaborates with Opportunity International to provide microfinance loans, savings, insurance and training to over two million people working their way out of poverty in the developing world.

[opportunity.org](http://opportunity.org)

### Tropical Forest Foundation

Caterpillar became a founding member of the Tropical Forest Foundation in 1990. The Tropical Forest Foundation works to advance environmental stewardship, economic prosperity and social responsibility through sustainable forest management.

[tropicalforestfoundation.org](http://tropicalforestfoundation.org)

### U.S. Green Building Council

In the U.S., Caterpillar is a member of the U.S. Green Building Council, a nonprofit community of leaders working to make cost-efficient and energy-saving buildings available to everyone within a generation.

[usgbc.org](http://usgbc.org)

### Woody Biomass Coalition

Caterpillar is a member of the Woody Biomass Coalition which provides advocacy, education, information and outreach to public and private entities to promote research, development and funding for sustainable woody biomass utilization and markets in the U.S.

[woodybiomass.net](http://woodybiomass.net)

### World Business Council for Sustainable Development (WBCSD)

Caterpillar is a member of the World Business Council for Sustainable Development, a CEO-led, global association of some 200 companies dealing exclusively with business and sustainable development.

[wbcsd.org](http://wbcsd.org)

### World Food Programme

Through the Caterpillar Foundation, Caterpillar collaborates with the World Food Programme, the world's largest humanitarian agency, to fight hunger worldwide, delivering food wherever and whenever it is needed most.

[wfp.org](http://wfp.org)

### World Resources Institute

Caterpillar's Chairman and CEO is a member of the Board of Directors of the World Resources Institute, an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives.

[wri.org](http://wri.org)