

## OVERVIEW

# Ecomagination is a business initiative to help meet customers' demand for more energy-efficient products and to drive reliable growth for GE.

It reflects GE's commitment to invest in innovative solutions to environmental challenges, delivering valuable products and services to customers while generating profitable growth for the company.

This document reports on GE's progress on ecomagination, including growing partnerships with customers, governments and non-governmental organizations that are helping address some of the world's biggest challenges.

**EMPLOYEES FEATURED ON THE COVER (LEFT TO RIGHT)**

DANIELLE MERFELD, *leads solar research at GE Global Research in New York*  
WEI CAI, *leads clean water research at GE's Global Research Center in China*  
AJITH KUMAR, *key inventor & developer of GE Transportation's Trip Optimizer*  
PAUL HOLDREDGE, *Design for Environment program manager for GEHC*  
TOMOKO VILLARIN, *is the marketing program manager for GE's GeoSpring water heater*



TO OUR INVESTORS, CUSTOMERS AND OTHER STAKEHOLDERS:

**The world is at a defining moment. The energy infrastructure that transformed the world in the 20<sup>th</sup> century must be transformed once again in the 21<sup>st</sup>. Last century, electricity industrialized and modernized more than half the planet. Hydrocarbon fuels connected people and moved goods around the world by land, sea and air.**

Today, more people around the world live productive and fulfilling lives. It was quite an accomplishment.

But that 20<sup>th</sup> century infrastructure, which we created and built, is last century's solution and is fast becoming obsolete. Today, we have an inspiring responsibility and an enormous opportunity to transform the world's infrastructure to a cleaner, more secure, and more efficient system that will ensure a more sustainable future for generations to come. Companies in the business of innovation and technology that embrace this opportunity will lead and win. At GE, we get this. This is ecomagination.

We launched ecomagination in 2005. We've succeeded by embracing the world's environmental issues as an enormous business opportunity. As with all initiatives at GE, we placed bold business metrics around it. We executed against these metrics

and delivered strong benefits to our customers and value for our shareholders: customer benefits in the form of enhanced profit and competitiveness of their operations, and shareholder value in the form of more competitive GE products and, ultimately, increasing earnings.

To accelerate innovation we committed to double our annual investment in clean tech R&D to \$1.5 billion by 2010. We actually accomplished that in 2009, a year ahead of plan, delivering even through a severe economic downturn. This accelerated R&D investment totaled \$5 billion and produced a fivefold increase in certified products since 2005. Products like our GENx aircraft engine, which has a 15% lower fuelburn during cruise than the platform it replaces. Products like our Evolution™ Series locomotive, which reduces fuelburn by 6 percent. Products like our 2.5-megawatt wind

turbine, which offers reliability and performance improvements and thus more economic value compared to earlier generations. Because we committed to double our investment in innovation and technology, we are more competitive in the markets we serve. This is ecomagination.

Along with our R&D commitment, in 2005 we also committed to a stretch goal of \$20 billion in ecomagination sales in 2010. In 2009, we achieved \$18 billion, up 6 percent in a year when global economies were down, and we are well on the path to our 2010 goal. Overall, in the first 5 years, we invested \$5 billion in clean tech R&D, and we generated \$70 billion in ecomagination revenues. This strong revenue performance is a testament to the competitiveness of our ecomagination products and innovations, the direct result of our R&D commitment. As for our own operations, we committed to reduce our environmental footprint and, in 2009, our greenhouse gas emissions were down 22 percent compared to 2004, well ahead of our goal.

By every metric, by every stretch goal we set, ecomagination has delivered. We have created more efficient and economic solutions for our customers, and a more competitive position and earnings for our shareholders.

#### ECOMAGINATION ADVISORY BOARD

The ecomagination advisory board counsels the company's ecomagination team on critical environmental and business issues. The board also enables thought leaders to learn more about what GE is doing. Current board members are:

**JAMES CAMERON**  
*Climate Change Capital*

**EILEEN CLAUSSEN**  
*Pew Center on Global Climate Change*

**VINOD KHOSLA**  
*Khosla Ventures*

**JONATHAN LASH**  
*World Resources Institute*

**MINDY LUBBER**  
*Ceres*

**RICHARD MCCRORY**  
*University College London*

**ERNEST MONIZ**  
*Massachusetts Institute of Technology*

**DAN REICHER**  
*Google Corp.*

And today, we commit to do more.

With the enormous defining moment facing the world, we are committing, in effect, to double our efforts once again. So while we've already invested \$5 billion in ecomagination R&D in the first 5 years, we now commit to an additional \$10 billion in the next 5 years. While we've grown our ecomagination revenues in the first 5 years, we're now committing to grow them at double the rate of overall company growth. And while we've made terrific progress reducing our own environmental impact, we're now committing to make our company twice as energy efficient by 2015. We are doubling down to drive even faster impact and to deliver our contribution to a 21<sup>st</sup> century energy transformation. This is ecomagination.

We are a global company. We operate in more than 100 countries and we see growing demand for our ecomagination products practically everywhere. But the world needs more engaged stakeholders because scale is critical to making the 21<sup>st</sup> century infrastructure transformation affordable. Countries like China and Korea, which prioritize and execute clean energy plans on a massive scale, encourage us. Countries that embrace this opportunity will lead and win. As a global company, we are positioned to win with them. We also know the United States and other countries can do the same,

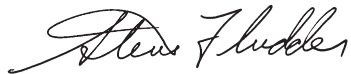
but they must prioritize, decide, and then act. We continue to call for greater and more purposeful actions by leaders and stakeholders around the world to prioritize investment in and foster innovation of cleaner energy solutions for the 21<sup>st</sup> century.

We are at a defining moment. The vision of a cleaner, affordable, secure and globally accessible energy infrastructure inspires and motivates our 300,000 GE colleagues and us every day. Because of this, we are doubling our commitments to accelerate our contributions and to lead. This is ecomagination. Join us.

Sincerely,



**Jeffrey R. Immelt**  
chairman of the board  
& chief executive officer



**Steven M. Fludder**  
vice president,  
ecomagination



## JOB CREATION



## Batteries

GE's new battery plant, located in Schenectady, New York, is expected to create 350 new jobs in the region. The facility has the advantage of being in close proximity to GE Global Research in Niskayuna, where researchers will continue to work on enhancements to battery chemistry and related systems technology. GE is making a \$150 million investment to build upon the Durathon battery technology through the development of new materials, new manufacturing technologies and intelligent controls.



## Wind

GE announced that it will supply 338 2.5 MW wind turbines to the Shepherds Flat project near Arlington, Oregon, developed and owned by Caithness Energy. Caithness Energy estimates that the \$2 billion project will inject \$16 million annually of direct economic benefits into Oregon, and will employ 400 workers during construction and 35 during operation. Construction will begin in 2010 and will be completed in 2012.



## GeoSpring™ Hybrid Water Heater

GE Consumer & Industrial announced plans to manufacture high-end energy-efficient front-load washers and dryers in Louisville, Kentucky, beginning in 2012. Production of the new products, together with plans to in-source manufacture of appliance components and to significantly increase the number of engineers at the facility, will result in the creation of more than 430 new jobs at the Louisville operation. When combined with the Hybrid Water Heater jobs also announced, the total number of new GE Appliance jobs announced in 2009 reached 830.



## GENx

GE Aviation announced the expansion of its operations in Batesville, Mississippi, adding an additional 350 jobs over the next few years. The Batesville plant produces composite components for the GENx jet engine, which will power Boeing's new 787 and 747-8 aircraft. The GENx engine is the world's only jet engine with composite fan blades, composite fan platforms and a composite fan case.

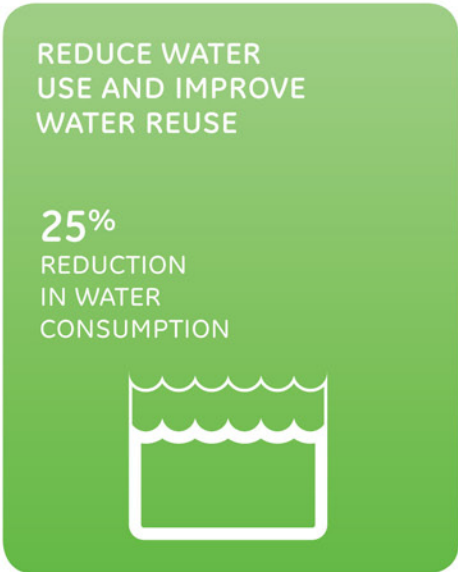
OUR PROGRESS

**In the fifth full year after the launch of ecomagination in May 2005, GE has made significant progress on each of our five main commitments.**

IN 2009, GE:

- Grew revenues from ecomagination products by six percent, to \$18 billion
- Invested \$1.5 billion in cleaner technologies, achieving our 2010 goal one year ahead of schedule
- Reduced greenhouse gas emissions from operations approximately 22 percent from the 2004 baseline
- Reduced water use by 30 percent from the 2006 baseline
- Kept the public informed through this report, its Web site and public engagements

And ecomagination is not stopping there—GE has now established new goals to ensure that ecomagination remains on the leading edge of creating market solutions to the world's biggest challenges. We are now committing to doubling all that we accomplished in the first five years of ecomagination in the next five years.



## COMMITMENT

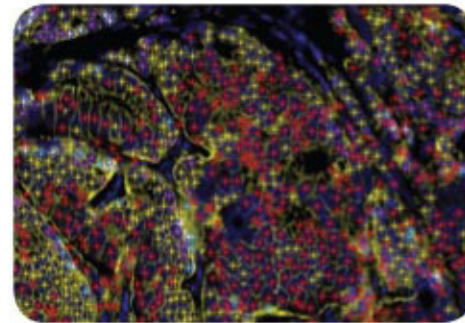
## Doubling our investment in R&D

Today, GE has more than 35,000 technologists located around the world in our businesses and at global research centers in Niskayuna, New York; Shanghai, China; Munich, Germany; and Bangalore, India. They work intensely every day to deliver leading-edge technology and products that drive GE's growth and create a better world.

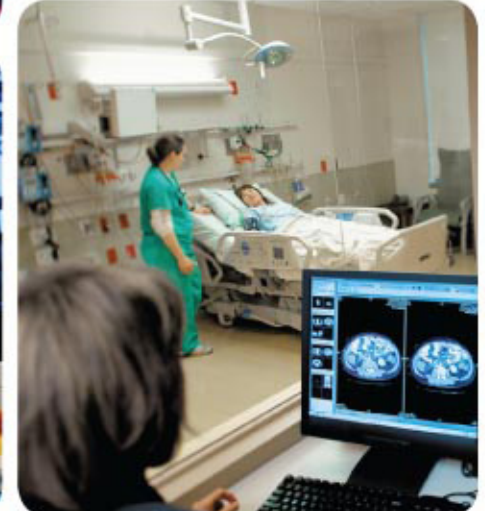
In 2009, GE invested \$1.5 billion on ecomagination R&D, reaching our commitment to double our annual investment by 2010 one year ahead of schedule. GE continues to be committed to unleashing new technology so we are doubling our commitment from \$5 billion to \$10 billion by 2015.



*GE Global Research employee  
Christopher Sevinsky*

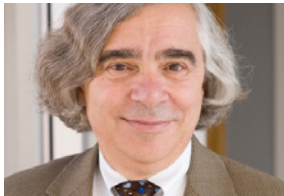


*GE Global Research employees  
Gu Yanfei and Zhang Minglong*



## A VOICE FROM OUR ADVISORY BOARD

## Investing in ecomagination



**Energy technology innovation and business model innovation are two key enablers of the large-scale transformation of energy supply, delivery and end**

**use that is needed to both meet global economic development imperatives and yet minimize climate change risks.**

## ERNEST J. MONIZ

*Cecil and Ida Green Professor of Physics and Engineering Systems, director, MIT Energy Initiative and ecomagination advisory board member*



Public investments in critical research, development and demonstration — such as greatly improved across-the-board energy efficiency, carbon-“free” electricity and clean water — have not been commensurate with the challenge, with the recent exception of the one-time boost provided by the American Recovery and Reinvestment Act of 2009. The private sector is responding with an unprecedented wave of energy technology innovation and entrepreneurial activity.

In particular, ecomagination is a leader in meeting the innovation challenge, scaling up to R&D investments of ten billion dollars over the next five years in its clean technology portfolio, reflecting an enhanced business focus. The ecomagination technologies span multiple sectors — residential and commercial buildings, industry, transportation — and have a pervasive theme of increased efficiency, the surest way to find cost-effective sustainable energy solutions.

However, the greenhouse gas emission goals considered prudent by the international community call for dramatic acceleration in the large-scale deployment of these clean energy technologies in the coming decade, and this in turn calls for policy innovation that builds the public benefit of climate change risk mitigation into private energy decisions. Such policies have proved elusive, but they are likely to come soon, especially if clean energy technology development reduces costs. The aggressive ecomagination R&D program should be an important contributor to this central goal of cost reduction for a carbon-constrained world.



## COMMITMENT

## Increase revenues from ecomagination products

In 2009, ecomagination revenues grew six percent, to \$18 billion, even in a challenging global environment. We are now committing that ecomagination revenue will grow at twice the rate of our total company revenue in the next five years, making ecomagination an even larger proportion of total company sales.



## A PROCESS PERSPECTIVE

## The ecomagination Product Review Process



**GE employs a rigorous review and qualification process to assess which products and services should be included in the ecomagination portfolio.**

**Ecomagination offerings must significantly and measurably improve customers' operating performance or value proposition and their environmental performance.**

ANDREW SHAPIRO  
founder and president,  
GreenOrder



The ecomagination Product Review (EPR) process not only ensures that all ecomagination offerings meet these criteria, but also that all associated marketing claims are clear, compelling and substantiated. The corporate ecomagination team — including corporate legal counsel, environmental health and safety counsel and product marketing teams from the GE business units — runs the process. GreenOrder, a sustainability strategy consulting firm, verifies the product information and advises on the associated marketing claims.

Product characteristics considered during the EPR process include environmental factors such as energy consumption, greenhouse gas emissions and water use, along with the product's ability to deliver financial or

other operating benefits to customers. Once approved, each product is reviewed regularly to ensure that performance claims are based on the latest relevant information and that they reflect any significant changes to the product itself or its market.

The EPR process strengthens GE's awareness of customers' environmental performance needs, informing how GE develops products and ensuring that product marketing is both compelling and accurate.

## ECOMAGINATION PRODUCT PORTFOLIO

**Appliances**

- ENERGY STAR® qualified Dishwashers
- ENERGY STAR® qualified Front-Load Clothes Washers
- ENERGY STAR® qualified Hot and Cold Water Dispensers
- ENERGY STAR® qualified Refrigerators
- ENERGY STAR® qualified Top-Load Clothes Washers
- High Efficiency Water Heaters featuring the GeoSpring™ Hybrid Water Heater
- Homes Inspired by ecomagination

**Aviation**

- CFM56 Tech Insertion
- CFM56-3 Advanced Upgrade
- GE90-115B Aircraft Engine
- GEnx Aircraft Engine
- TrueCourse™ Flight Management System

**Commercial Finance**

- Environmental Performance Services with Telematics

**Consumer Finance**

- Australia eco Mastercard
- Energy-Efficient Home Improvement Loans

**Digital Energy**

- 750 kVA Uninterruptible Power Supply (UPS)

**Energy**

- 7FA Gas Turbine
- AF-6 Series Drives
- Amorphous Transformer
- Coordinated Volt-VAR Control (CVVC) Technology

- DC Data Centers Inspired by ecomagination
  - DLN 1+ Combustion System
  - DLN 2.6+ Combustion System
  - Field Force Automation Software System
  - Distribution System
  - H-Turbine™ Combined Cycle System
  - HEAT™ Steam Turbine
  - High Efficiency Motors
  - Integrated Gasification Combined Cycle (IGCC)
  - Jenbacher™ Associated Petroleum Gas Engine
  - Jenbacher™ Biogas Engine
  - Jenbacher™ Coal Mine Gas Engine
  - Jenbacher™ Combined Heat & Power
  - Jenbacher™ Landfill Gas Engine
  - Kn<sup>3</sup>™ Optimization Software for Power Plants
  - LM6000™ PF Aeroderivative Gas Turbine
  - LMS100™ Simple Cycle Gas Turbine
  - Nuclear Energy
  - OpFlex™ Turndown technology
  - Powerwave+™ Cleaning System
  - PulsePleat™ Filter Elements
  - QL Ultra Efficient Transformer
  - Quadramatic™ Motors
  - Solar Energy
  - Wind Energy
  - Zonal Combustion Tuning for Coal-Fired Boilers
- Energy Financial Services**
- “Greenhouse Gas Services, LLC a GE AES Venture”

**Healthcare**

- +PLUSPAK™ Polymer Bottle
- Centricity™ Enterprise Electronic Medical Records
- Digital Mammography
- Digital X-Ray
- High Efficiency CT (Computed Tomography) Systems
- High Efficiency MR (Magnetic Resonance) Systems™
- Hospitals Inspired by ecomagination
- Voluson™ E Series Ultrasound
- Wave™ Bioreactor for Biotherapeutics Production

**Lighting**

- ENERGY STAR® qualified Compact Fluorescent Lighting
- High Efficiency Evolve™ LED Fixtures for General Lighting
- High Efficiency Halogen Lamps
- High Efficiency Lighting Control Systems
- High Efficiency Linear Fluorescent Lamps & Ballasts
- LED Light Sources

**Oil & Gas**

- BCL 300 Series Centrifugal Compressor for Sour Gas Reinjection
- DLN-1 IBH for FR5-2 gas turbines
- Expanders for Power Recovery Systems
- Integrated Compressor Line (ICL)
- ORegen™ System for Waste Heat Recovery
- PGT25 DLE Products
- UltraScan™ Duo Pipeline Inspection Tool

**Transportation**

- 1033 Locomotive Emission Kits
- China Mainline Evolution Locomotive
- Evolution™ Hybrid Locomotive
- Evolution™ Series Locomotive
- Kazakhstan Evolution ES44ACi Locomotive
- Locotrol™ system
- PowerHaul™ Engine
- Russian-Built Locomotive Modernization Skids
- SmartBurn™ technology
- Trip Optimizer™ Software

**Water**

- ABMet (Advanced Biological Metals Removal)™ system
- Advanced Membrane
- Desalination
- DusTreat™ Control Treatment Programs
- E-Cell® MK-3 Electrodeionization (EDI) System
- Electrodialysis Reversal™ (EDR)
- Entrapped Air Flotation (EAF)
- GenGard™ Cooling Water Solution
- Homespring™ Central Water Purifier
- MetClear™ Metals Removal Chemistry
- PRO/Titan™ Reverse Osmosis System
- SAGD Produced Water Evaporator
- Waste-to-Value solution
- ZeeWeed® Membrane Technology

## COMMITMENT

## Reducing greenhouse gas emissions and improving energy intensity

In 2005 we set three goals around GHG emissions and energy efficiency (with 2004 as our baseline):

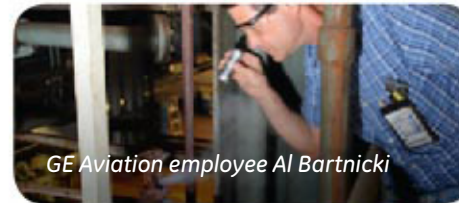
- Reduce absolute GHG emissions by 1% by 2012
- Reduce GHG intensity 30% by 2008 (a goal we met)
- Reduce energy intensity 30% by 2012



GE Healthcare employee  
Gregory Somann



GE Healthcare employee  
Steve Rajnay



GE Aviation employee Al Bartnicki



GE Aviation employee Pat Moore

### OPERATIONAL GHG EMISSIONS

In 2010, we are setting new goals that will continue to drive efficiency into our operations. By 2015, GE will improve the energy intensity of its operations by 50 percent, and will reduce its absolute GHG emissions by 25 percent (both using the 2004 baseline).

In 2009, GE's operational GHG emissions were 5.79 million metric tons of CO<sub>2</sub> equivalents, a reduction of 22 percent from our adjusted 2004 baseline. Each year GE adjusts its 2004 baseline to account for divestments and acquisitions. Our GHG emissions in 2004 were 12.00 million metric tons CO<sub>2</sub> equivalents and our adjusted baseline is 7.46 million metric tons of CO<sub>2</sub> equivalents. Our baseline for energy use has been adjusted from 116 to 62 million MMBtu. We measure our progress towards our commitments against this adjusted baseline.

We continued to implement many GHG and energy reduction projects during 2009, but the bulk of our emission reductions during the past year are attributable to reduced demand due to global economic conditions.

Although we exceeded our 2008 goal of 30 percent GHG emissions intensity (measured as CO<sub>2</sub> equivalent emissions/revenue in millions of U.S. dollars), we continue to track this metric. In 2009, our GHG emissions intensity reduction was 39 percent versus 2004, slightly lower than the 41 percent achieved as of 2008. This is attributable to reductions in GE's 2009 revenue that overshadowed reductions in GE's GHG emissions.

In 2009, GE's energy use was 51.9 million MMBtu, a 16 percent reduction from the 2004 baseline year. This reduction is attributable to our focus on improving our energy efficiency, and to economic conditions throughout 2009. GE's energy intensity (measured as MMBtu/revenue in millions of U.S. dollars) in 2009 has improved 34 percent since 2004, a slight decrease from the 37 percent reported in 2008.

In 2009, GE recognized 50 of its sites as eCO<sub>2</sub> award winners. These sites had at least a five percent reduction in GHG emissions versus the baseline year independent of changes in production levels.

For more information, available in the online GE 2009 Citizenship Report to be released July 2010, please visit [www.ge.com/citizenship/ghginventory](http://www.ge.com/citizenship/ghginventory).

#### GE OPERATIONAL GHG EMISSIONS

	2004	2009
(Million metric tons of CO <sub>2</sub> equivalent emissions)	7.46	5.79

#### GE OPERATIONAL ENERGY USE

	2004	2009
(Million MMBtu)	61.92	51.96

#### GE OPERATIONAL GHG INTENSITY

	2004	2009
(Metric tons per \$ million revenue)	60.22	36.95

#### GE OPERATIONAL ENERGY INTENSITY

	2004	2009
(MMBtu per \$ million revenue)	500.09	331.44

### ENERGY TREASURE HUNTS

The Energy Treasure Hunt process, created by Toyota Motor Manufacturing North America, continues to both engage employees and identify projects that drive energy efficiency. Since GE began implementing the process, projects identified during these events have contributed to reductions in excess of 250,000 metric tons CO<sub>2</sub> and saved in excess of \$130 million.

In 2009, in addition to numerous Energy Treasure Hunts performed by the businesses, large events were held at GE Healthcare's U.S. headquarters and Electric Avenue locations in Wisconsin, as well as GE Aviation's flagship manufacturing and testing facility in Lynn, Massachusetts. These resulted in the identification of opportunities to reduce over 57,000 metric tons of CO<sub>2</sub>. Many of the projects had payback periods of less than one year, and the sites continue to implement them.

These events, which involve our service partners and suppliers, continue as a significant part of GE's program. Our outreach efforts continue as well, as we share our approach with suppliers, customers and partners.

The Energy Treasure Hunt process continues to spark the interest of external agencies. In July 2009, representatives of SEMARNAT (the Mexico Environmental Agency) in Saltillo, Mexico, participated in an Energy

Treasure Hunt at the GE office building in Monterrey, Mexico. The representatives were very encouraged about pursuing this approach in their own offices. Likewise, in 2009, GE Energy's Hangzhou site received special commendation for conducting an Energy Treasure Hunt, and was asked to share its findings with over 300 companies that attended the Xiaoshan Development Zone Annual Safety, Environment Protection and Energy Saving meeting.

In addition to identifying opportunities to drive energy efficiency into our existing buildings, GE has pursued LEED or BREEAM certification for commercial interiors and both new and existing buildings. These locations are seeing decreased levels of energy use as a result of certification. GE locations in Stamford, Connecticut; Mississauga, Ontario; Houston, Texas; Shanghai, China; London, England; and Bangalore, India, have been recognized through the LEED or BREEAM processes. GE Healthcare's new manufacturing facility outside of Albany, New York, was recognized as LEED-gold certified at the end of 2009. Overall, GE continues to pursue processes and programs that drive energy efficiency into its operations.

Going forward, we have identified additional projects to further reduce non-CO<sub>2</sub> GHG emissions at several of our operating facilities.



GE Aviation employee Peter Maclsaac

### GE ENERGY FINANCIAL SERVICES' INVESTMENTS

GE also reports GHG emissions from its investments in power projects through GE Energy Financial Services.

GE Energy Financial Services invests in power projects in a number of ways: equity, lease and debt. We are reporting emissions from investments in which GE Energy Financial Services has an equity interest based upon the business unit's percentage of equity ownership.

In 2009, GE Energy Financial Services' greenhouse gas emissions totaled approximately 6.5 million metric tons of CO<sub>2</sub> equivalent from 24 investments. By comparison, GE Energy Financial Services held an equity interest in 24 power projects in 2008, which emitted 9.8 million metric tons of CO<sub>2</sub> equivalent. The decline in emissions between 2008 and 2009 is primarily due to the reduction of our equity interest in certain assets and other assets running less than in prior years. In addition, the renewable energy projects in which GE Energy Financial Services has purchased equity interests avoided 4.9 million metric tons of CO<sub>2</sub> equivalent in 2009, down from 5.0 million metric tons in 2008 due to the variability of wind.

In 2006, GE energy Financial Services demonstrated leadership by becoming one of the first financial services companies to report greenhouse gas

emissions associated with power project equity investments. In 2009, the GE unit continued this leadership through the following actions:

- Establishing a long-term goal to balance investments in coal-fired power plants with renewable energy, clean technology investing and greenhouse gas emissions cuts
- Focusing investments in coal power plants on efficient, super-critical technology and projects with sequestration potential
- Pricing CO<sub>2</sub> for coal and other fossil fuel plants into deal approval processes
- Engaging with non-governmental organizations on policy recommendations to ensure that coal-fired generating units are designed to take into account the future cost of carbon
- Voluntarily reporting emissions
- Exploring increasing focus on investments in energy conservation and efficiency



## COMMITMENT

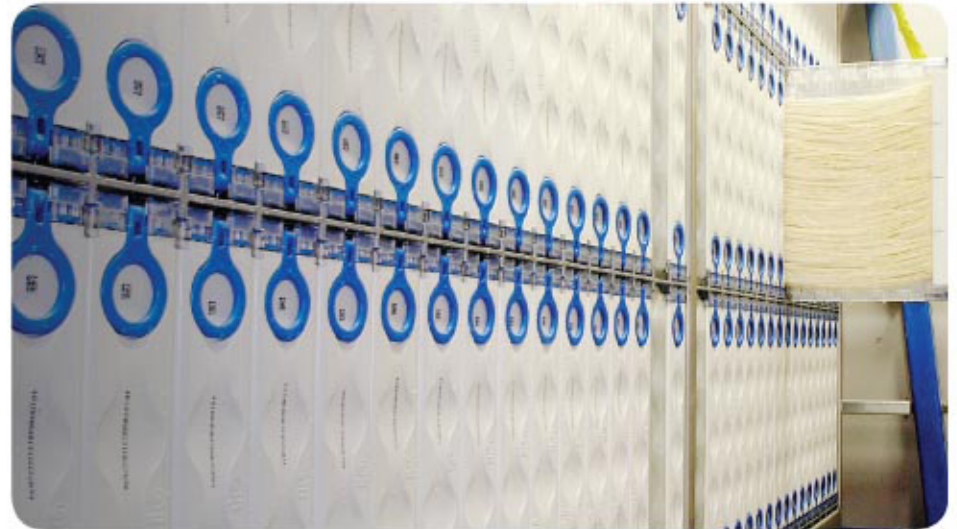
## Reducing water use and improving water reuse

In May 2008, we announced our goal to reduce our freshwater consumption by 20 percent in 2012 from a baseline of 2006. Earlier this year, we modified the goal to a 25 percent reduction by 2015. GE annually collects water data for those sites consuming more than 15 million gallons a year. This includes water used for potable, process and sanitary purposes as well as once-through cooling waters from freshwater sources. We adjust the data each year to reflect acquisitions and divestments.

In 2009, GE's water use was 10.7 billion gallons, a 30 percent reduction from 2006.



GE Aviation employee  
Bryce Chadwell



GE Global Research Center  
employee Rihua Xiong





### THREE FACTORS CONTRIBUTED TO THE LARGE REDUCTION WE ARE REPORTING:

- As discussed in last year's report, at our largest water-consuming site, we identified that water use had been substantially higher in 2008 than originally estimated. We identified this through the use of GE Sensing Ultrasonic flow meters which were installed that year and helped us better quantify actual flow use at the facility. As a result of this discovery, we reevaluated the total flow for this site during the 2006 baseline year and concluded that it was 2.2 billion gallons more than previously estimated. This conclusion was validated through a review by an external, independent engineering firm. In addition to the adjusted 2006 flow data, several significant steps to reduce water consumption were taken, including improved valve operation, opportunities to replace older single-speed pumps with new variable frequency drive pumps, control valves and closed loop cooling opportunities. As a result, testing operations at the site have since been conducted more efficiently using significantly less water than historical practices.

- We conducted Kaizen blitz water reduction events at three of our largest water-consuming sites. The Kaizen approach assembles multi-functional teams who spend a concentrated week monitoring and assessing how water is used at a facility, ultimately developing water reduction projects including associated financial benefits.
- Production decreased at some facilities due to economic conditions.

Due to the enormous success of the Kaizen blitz activities in 2009, we will continue to conduct these events at those sites using the most significant quantities of water across the company, with six events planned for 2010.

Another action under way will potentially reduce GE's global water use by an estimated five percent through a large project at one of our United States plants utilizing GE Water & Process Technology equipment including nanofiltration and ultrafiltration technologies to recycle and reuse water. We anticipate the new system will be operational by 2012.

In addition, because of the substantial readjustment to the 2006 water use baseline, we will reevaluate further modifications to GE's long-term water reduction goal.

For more information, available in the online GE 2009 Citizenship Report to be released July 2010, please visit [www.ge.com/citizenship/waterinventory](http://www.ge.com/citizenship/waterinventory).

## 2006

**Total: 15.3 billion gallons**  
**Once-Through Cooling: 8.9 billion gallons**

## 2009

**Total: 10.7 billion gallons**  
**Once-Through Cooling: 5.4 billion gallons**

## A VOICE FROM OUR ADVISORY BOARD

## Water reuse technologies are vital to addressing growing water scarcity



**Water stress is increasing across much of the world. The number of people facing water scarcity or water-related stress is projected to increase from**

**one billion in 2005 to over five billion by 2050. Increasing freshwater scarcity is being driven by a number of factors, including population growth; urbanization; increasing production of industrial, energy and agricultural goods and services; and climate change.**

**JONATHAN LASH**  
*president, World Resources  
 Institute and ecomagination  
 advisory board member*



In many areas of the world, surface and groundwater sources are already fully developed. Growing populations can expect to see declining supplies as available groundwater resources dwindle and the effects of climate change begin to be felt. This means that decision-makers need to focus their efforts on reducing demand and reusing available supplies.

GE is making a vital contribution to global water reuse efforts through the deployment of its water treatment and reuse technologies. In the U.S. Southwest, for example — an area already characterized by extreme water scarcity — GE has helped the city of Tempe, Arizona, expand its water reclamation program. The project has resulted in the reuse of an additional 2.5 billion gallons of water a year for commercial and industrial applications.

In the U.S. Southeast, which has faced increasingly devastating droughts over the past several decades, GE is helping the power sector implement water reuse technologies. The power sector in the United States is a major water user, accounting for 41 percent of all water withdrawals in 2005. Cogentrix Energy's 120-megawatt power plant in Battleboro, North Carolina,

implemented a GE technology solution to conserve an estimated three million gallons of water annually — the equivalent to approximately 22 percent of its current water usage.

GE is also implementing water reuse technologies in water-intensive industries. In Oakwood, Virginia, for example, GE is providing advanced filtration membranes and thermal water treatment technology to CONSOL Energy to treat mine water in one of the nation's largest coal mines, enabling about 99 percent of the water to be reused in part at the company's preparation plant facility.

Water reuse technologies can help public and private sector decision-makers in water-scarce regions throughout the world successfully tackle the growing problem of water scarcity. However, these technologies cannot be deployed in sufficient quantities as long as withdrawing water from a river or a well is less expensive than conserving or reusing it. So the next big challenge lies in identifying and implementing institutional, legal and regulatory reforms that boost the price and marketability of water supplies while providing adequate social and environmental safeguards.

## COMMITMENT

## Keep the public informed

GE is continuing ongoing discussions, dialogues and communications to engage with the public on our ecomagination efforts. This year, the company is launching an updated Web site at [www.ecomagination.com](http://www.ecomagination.com) where the public can learn more and engage in a dialogue about GE, ecomagination, our customers and our diverse stakeholders.

As part of GE's overall corporate effort to improve transparency, the company issues this annual ecomagination report to track environmental goals as well as a separate citizenship report to highlight social responsibility initiatives. Throughout the year, GE also provides updates on ecomagination through shareholder and analyst meetings.



*President and CEO GE Japan Yoshiaki Fujimori, Steve Fludder and Senior Vice President and Director GE Global Research Mark Little on a panel at ecomagination day in Tokyo.*



*GE 2009 ecomagination television commercial*



*Steve Fludder with U.S. Ambassador to Denmark Laurie Fulton and U.S. Secretary of Commerce Gary Locke at ecomagination press briefing in Copenhagen.*

A VOICE FROM OUR ADVISORY BOARD

## Stakeholder engagement



**Sustainability is a must for business success in the 21<sup>st</sup> century economy. The combined reality of climate change, water scarcity and billions of people**

**still working and living in poverty are profound challenges for the global economy. Leading companies are focused on developing solutions, collaborating with stakeholders and other businesses and pressing to ensure that governments provide the right drivers and incentives to encourage innovation and jobs.**

MINDY LUBBER  
*president, Ceres and  
 ecomagination advisory  
 board member*



GE's commitment — to double its R&D investment in clean technology products by 2015; set a target to realize twice the revenue growth from ecomagination products compared to overall growth; and reduce energy use, GHG emissions and water consumption — is exactly the direction we need to go. All companies should be reexamining their business strategies and making these types of commitments.

GE and other companies need to expand their reach and examine the complete sustainability impacts of their businesses — from their operations, through their vast supply chains and their employees, and to the use and disposal of products. It is through this depth of analysis that both companies and investors can understand risks and opportunities for achieving competitive advantage.

In order to reset our economy to be sustainable, we also need strong policy signals, including energy and climate legislation that puts a price on carbon. We need to create certainty for companies and investors so that more capital will be invested in the development of energy-efficient, low-carbon sustainability solutions. GE is actively calling on governments to act now, and we need more companies, investors and other stakeholders to come together on this critical economic issue. Policy certainty will help investors to reward the companies that are taking action now on sustainability and positioning themselves for long-term financial prosperity.

PRODUCT STORIES

**Beyond numbers alone,  
ecomagination comes to life in  
an even more important way —  
the successes of our customers.**

Across borders and industries, organizations are improving their environmental performance in dramatic ways using ecomagination products. From solar energy and biogas to smart grid technology and lighting solutions, their stories are as varied as the ecomagination portfolio itself.



## THE RIGHT MIX FOR A CLEANER, MORE SECURE ENERGY FUTURE

Global energy use continues to grow, while interest in renewable energy is at an all-time high. World demand for electricity is expected to double by 2030, driven in part by the increased needs of developing nations.

Ensuring a cleaner, more secure energy future in the face of this growing demand will require a diverse mix of power generation technologies.

Achieving this mix won't be easy. Stronger policies to bring more renewable technologies to market; a smarter grid designed to accept high penetrations of wind and solar power; deriving power from conventional fuels in cleaner, more efficient ways; and new global emissions standards all will be needed to make this possible.

Renewable energy growth has exploded this past decade, but we're not even close to realizing its full potential. And while wind and solar can't meet all of our future energy needs, both could account for 20 percent of the world's

power capacity in the next 20 years as new advancements bring costs in line with fossil fuels.

As we increase renewable energy capacity, we cannot ignore traditional sources like coal, natural gas and nuclear that comprise the bulk of power generation today and will for decades to come. With coming innovations, we will reduce emissions from these sources while increasing their efficiency and safety. We will likely see, for example, coal gasification with carbon capture capability; the development of cleaner solutions utilizing gases from existing coal mines, biomass plants and landfills; and nuclear power with fuel recycling that handles waste in safer, more effective ways.



MARK LITTLE  
*senior vice president and  
 director, GE Global Research*

With a balanced, diversified approach, we can deliver a cleaner, more secure energy future. The good news is that GE and others are investing and driving advancements on several technology fronts to create the right mix.

## PLAYING THE SUN AT MANY ANGLES

**From project investing to platform expansions and venture capital, GE is supporting solar power from many angles.**

**Since 2005, GE has financed and invested in 247 megawatts of solar projects, including what was once the world's largest, the 11-megawatt Serpa solar plant in Portugal. But the company is not focused only on individual projects — it's also putting capital into other companies that are building out solar power around the world.**

Partnering with one of Spain's largest and most successful solar project developers, Fotowatio Renewable Ventures (FRV), GE Energy Financial Services has expanded its solar platform in Europe and the United States. Within one year of receiving equity investments from GE and others, FRV acquired one of the largest solar photovoltaic (PV) parks in operation in the U.S. — the 14-megawatt project at Nellis Air Force base in Nevada — and agreed to finance and develop a 10-megawatt photovoltaic power plant in Fiumicino, Rome, which will be one of the largest solar plants in Rome province and one of the largest in Italy.

GE is also investing in the future of solar: GE Energy Financial Services has invested in California-based Soliant Energy, the leading provider of concentrated solar energy systems for commercial rooftops, and Israel-based SolarEdge, whose technology maximizes the power generation of residential and large-scale PV systems. In conjunction with PrimeStar Solar Inc., GE Energy invested in the research and development of thin film PV panels. GE Global Research Centers around the world are working on all facets of panel development. This includes the GE Research Center in Munich, which is utilizing indoor and outdoor solar system test facilities to study finished module performance.



*The 14-megawatt project at Nellis Air Force base, Nevada, is one of the largest solar photovoltaic parks in operation in the U.S.*

## ECOMAGINATION INNOVATION: BEST OF BOTH WORLDS

While GE's in-house research, development and commercial deployment of innovative technologies is the driver of ecomagination, it's not the whole story. Through its venture capital investing,

GE is gaining a window into — and helping bring to market — innovations conceived outside the company. Through GE Energy Financial Services and GE Equity, we have made venture and growth capital investments totaling \$175 million in 21 companies, ranging from a battery maker for electric cars to a developer of small wind turbines. The benefits to GE include the ability to see a broad universe of technology developed outside the company, and the establishment of relationships with other VC firms and entrepreneurs, spawning more high-quality deals. What do the companies we invest in gain? The depth of GE's technological expertise, financial strength and the commercialization

skills to bring so many new technologies to market. We bring to bear all the firepower of GE, including GE Global Research, GE Energy Financial Services, GE Energy and other commercial businesses. And we engage in high-impact collaborations on technical and commercial issues. In short, we bring "more than money" to help companies succeed.





## THE TIME FOR SMART GRID

The smart grid is, in essence, an “energy Internet,” delivering real-time energy information and knowledge—and empowering smarter energy choices for consumers.

Specifically, a smarter grid will help integrate cleaner energy resources; empower consumers to better manage their energy usage and save money; increase productivity and efficiency in how our power is delivered; and improve overall power reliability. In the past two years, we have seen clear progress toward smart grid adoption when it comes to the commitment and engagement of governments, utilities and the business community.

However, to make the smart grid a reality, we need to do more around consumer education and engagement. Without consumer buy-in, the full promise of smart grid benefits will not be realized. Many of the utility smart

grid programs will be “opt-in,” which means consumers will need to understand the benefits a smarter grid can deliver for them before they will decide to join.

Multiple studies, such as ones by PNNL and Faruqi, show that when people have access to direct feedback on their power use, they can achieve an average savings of up to 10 percent on their electricity costs through simple behavioral changes. Providing customers with access to real-time electricity price information and energy management systems can lead to additional cost savings for consumers on their electric bills.



DANIEL C. HEINTZELMAN  
*president and CEO,  
 GE Energy Services*

There are also real benefits to the utility and the environment. According to a U.S. Department of Energy study, if utilities were to use demand response programs to achieve a 10 percent reduction in their peak loads, they would reduce emissions by an average of 900,000 metric tons of CO<sub>2</sub> annually—equivalent to the annual CO<sub>2</sub> emissions of 200,000 cars on U.S. roads.


Clearly, this smarter future is one key way to meet our environmental targets and further economic vitality going forward.

**BIOGAS PROJECT IMPROVING AIR AND WATER QUALITY**

**By using Jenbacher engines to power China's largest poultry waste biogas-energy plant, the Minhe Animal Husbandry Facility supports the country's national economic and environmental goals to increase local energy reliability and improve air and water quality.**

The facility's poultry waste biogas power generation project uses three Jenbacher engines to combust methane generated by 300 tons of manure and 500 tons of wastewater daily. This process generates electricity for the 19,000-square-meter complex, as well as the local grid. In addition, any residual material in the digester is later used as fertilizer.

Jenbacher engines can help farm customers improve the operational and environmental impacts of their operations. By consuming the waste in the digester to create biogas electricity, GE's technology can greatly reduce the site's greenhouse gas emissions and dust created by the poultry waste, reducing impact on regional air and water quality.



*The Minhe Animal Husbandry Facility in China uses three Jenbacher engines to process the electricity for this 19,000-square-meter complex.*

## SAVING UP TO 185,000 TONS OF CO<sub>2</sub> PER YEAR IN MACEDONIA

**Steel factories in the Macedonian industrial park Zelezara Skopje are being powered by the country's first natural gas-cogeneration plant certified for international carbon credit financing. GE supplied 10 Jenbacher engines with LEANOX<sup>®</sup> lean-mixture combustion and engine control systems, as well as five steam generators for the plant.**

By installing GE's cogeneration technology instead of separate electrical and thermal power equipment, the operators of this facility have received significant primary energy savings through reduced fossil fuel consumption.

In addition to reducing Macedonia's dependence on imported energy by increasing local energy efficiency and

reliability, the plant will help mitigate the local environmental impacts of energy and steel production, thus earning about 185,000 Certified Emission Reduction (CER) credits a year. This corresponds to a projected reduction of the equivalent of 185,000 metric tons of CO<sub>2</sub>. Selling the carbon credits will help the operator ensure the financial viability of the project.

*GE supplied ten J620 gas engines for combined heat and power production at Macedonia's first CHP Plant.*

*Inset photo (from left): Walter Neuhauser, CFO of GE Energy's Jenbacher gas engine business, Neven Pecotic, GE Energy Country Executive for Macedonia, George Kachurkov, Energetski Institut and Nikola Gruevski, Prime Minister of Macedonia.*



## WASTEWATER TREATMENT WITHOUT DISCHARGE

Imagine a wastewater treatment process that reuses virtually 100 percent of your wastewater stream and leaves not a single drop to discharge. The technology exists today, but its high capital costs and high energy usage are preventing widespread market adoption. However, scientists and engineers at GE Global Research in Shanghai along with the teams from GE Water and Process Technologies are developing new technology to address these challenges and make Zero Liquid Discharge (ZLD) available to thousands of businesses.

As part of the project, the team is developing a unique electrochemical process that can electrically separate impurities from a wastewater stream. Compared to thermal approaches, where water is recovered at high temperatures (i.e., at its boiling point), this new approach would enable water recovery at room temperature. As a result, it would be much less energy intensive and less costly.

GE's new ZLD process would transform a regulatory burden into an economic incentive for thousands of businesses that must deal with wastewater treatment in their manufacturing operations. Most of all, it will help preserve a precious resource and protect the environment.



*Rihua Xiong, Lead Engineer in the GE China Technology Center's Electrochemical Processes Lab, is developing new technology to make Zero Liquid Discharge available to thousands of businesses.*

A NEW SYSTEM SAVES WATER AND IS BETTER FOR THE ENVIRONMENT AND EMPLOYEES

**In Green Bay, Wisconsin, OMNOVA Solutions' Performance Chemicals and GE implemented a water solution to save 3.6 million gallons of water per year, lessening the stress on freshwater sources and thus reducing environmental impact.**

The project involved installing GE's reverse osmosis (RO) system combined with a cooling water treatment featuring GE's Continuum AEC Alkaline chemistry program to reuse water by sending it into the cooling tower system instead of the sewer. This technology change substantially

reduced freshwater usage—and yielded a yearly net savings of \$120,000.



*With decades of engineering and manufacturing experience worldwide, GE's PRO Series modular reverse osmosis system provides a state-of-the-art water system running at customers' facilities in the shortest amount of time.*

## GE'S WIND TECHNOLOGY: THE EVOLUTION OF POWER

### In September, GE announced the acquisition of ScanWind, a developer of advanced drive-train and control wind turbine technologies aimed at offshore deployment.

ScanWind has designed and developed 11 turbines, which are currently operating on the Norwegian coast. GE's Renewable Energy business will expand the offshore wind program, enhancing the proven technology by leveraging its existing wind turbine expertise, supply chain and global research capabilities.

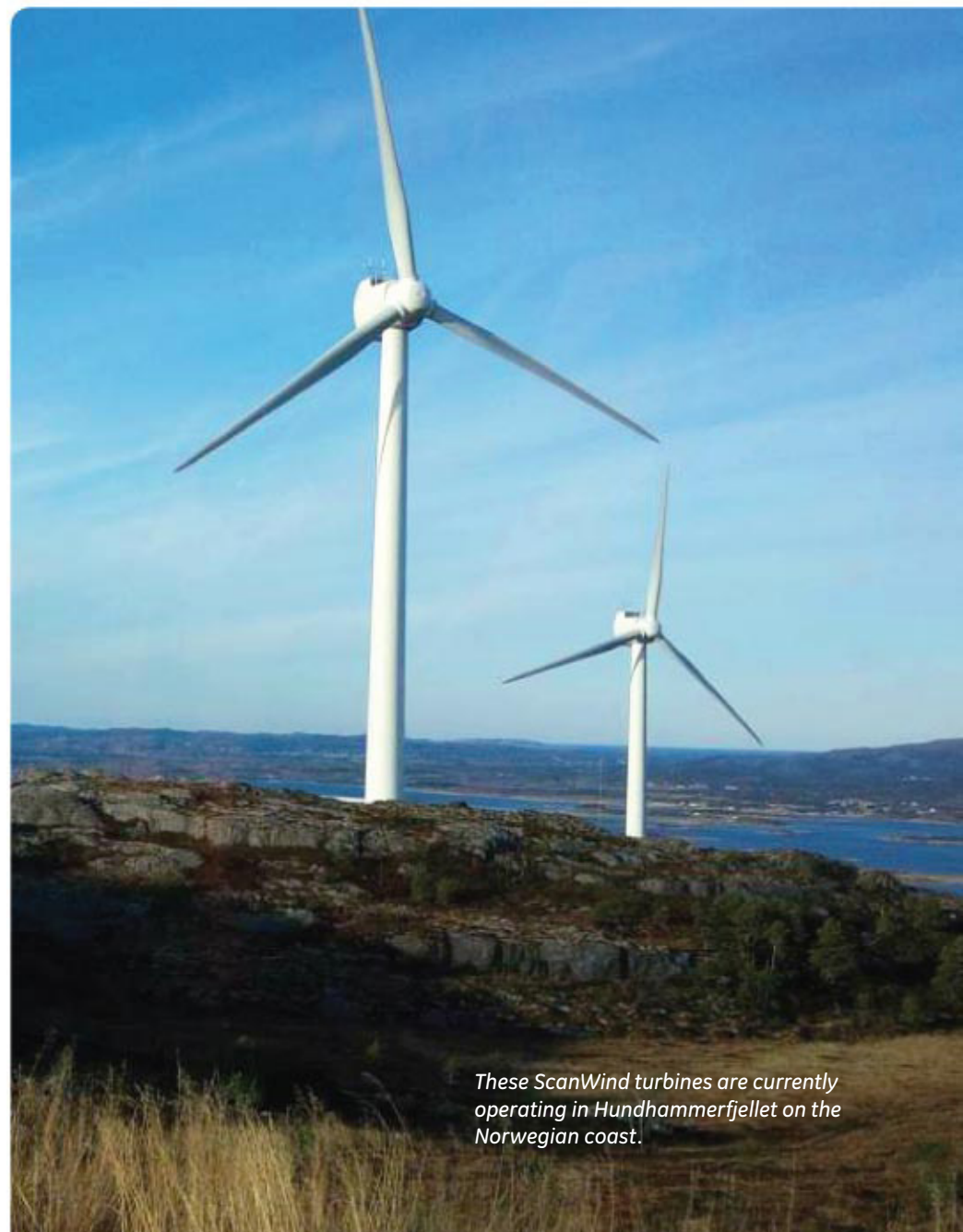
When the largest utility in Central Europe began building Europe's largest onshore wind farm, GE was there to supply 139 of its giant 2.5xl wind turbines. Now, with construction of the first phase well under way, GE Energy inked a new deal to provide up to 101 additional turbines. When completed, the site will produce enough wind-generated electricity to meet the needs of more than 400,000 E.U. homes.

The European Union currently has a goal of cutting greenhouse gas emissions 20 percent while increasing renewable energy capacity 20 percent by the year 2020. To reach this objective, the EU has set national targets for each EU member state, based on the per capita GDP of each country. In contrast, in the United States, current proposals

before Congress call for just three to six percent of total U.S. electricity generation to be produced by renewable energy by 2012 — which is essentially equal to or below the business-as-usual case.

The first phase of the project, Fantanele, and the second phase, Cogealac, are both located in Romania, which at the end of 2008 had only 10 megawatts of wind generation equipment installed, according to the European Wind Energy Association. But the new wind farm will increase that figure dramatically — when phase two is completed in 2011, the country will have a total capacity of 600 megawatts of wind power.

A key reason for the new wind farm's location is Romania's new pro-renewables legislation. The Romanian government has created legislation that is favorable to the development of renewable energy resources, granting significant incentives for wind farms and other renewable energy projects through 2015. This has encouraged investors and developers to pursue projects in the country.



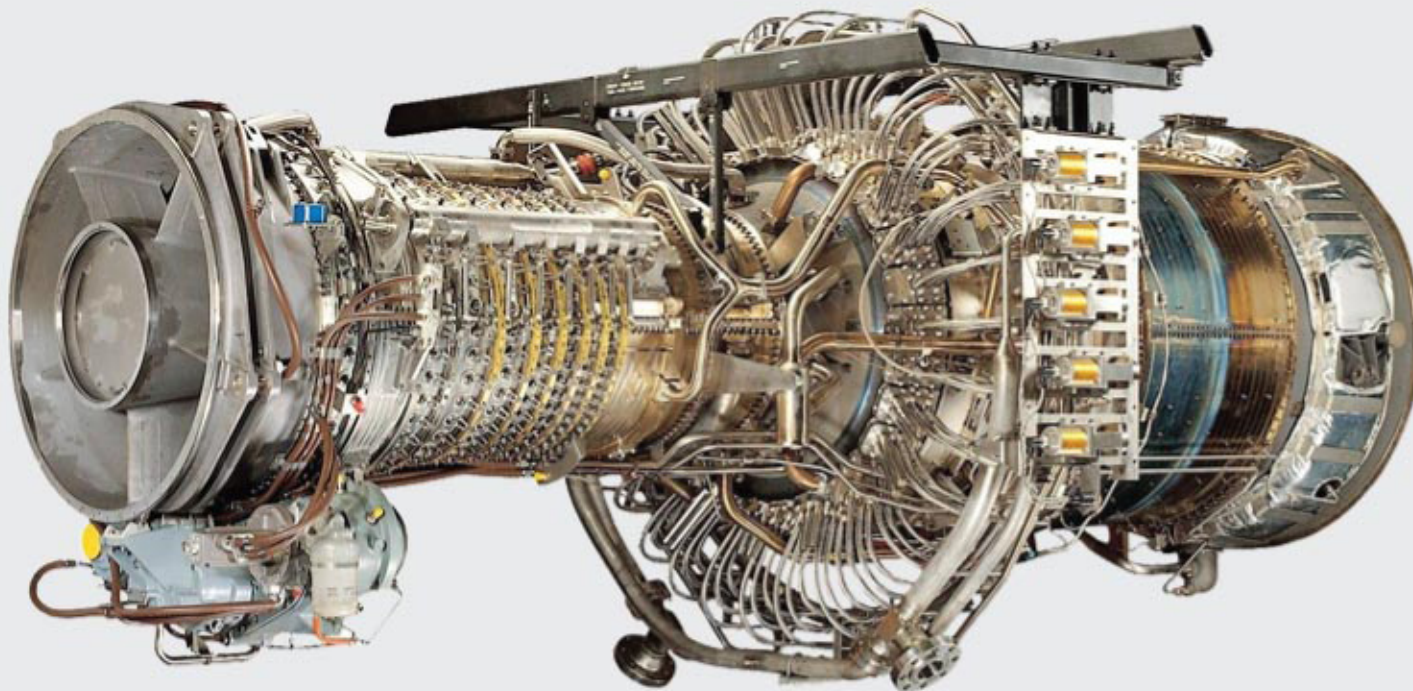
*These ScanWind turbines are currently operating in Hundhammerfjellet on the Norwegian coast.*

## ASIA'S NATURAL GAS PIPELINE INFRASTRUCTURE

**GE Oil & Gas ecomagination technology is playing a major role in the development of Asia's natural gas pipeline infrastructure. It is specifically impacting the Asia Gas Pipeline, which will deliver gas from Uzbekistan and Kazakhstan to China. The inflow of gas from these two countries will significantly help China meet its rising energy demands.**

The pipeline will feature PGT25+DLE aeroderivative gas turbines, which operate on natural gas. At base load conditions, these turbines have an efficiency of 41 percent, the highest in the 29–32 megawatt power range, producing lower CO<sub>2</sub> emissions per megawatt of power output than competing technologies. A total of seven units will be in operation across two pipeline stations of the Asia Gas Pipeline.

The Asia Gas Pipeline project further expands GE's overall technology presence in Kazakhstan. More than 50 GE gas turbines and centrifugal compressors are installed for a variety of gas transportation and sour gas reinjection projects across the country.



*PGT25+DLE aeroderivative gas turbines operate on natural gas. At base load conditions, these turbines have an efficiency of 41 percent, the highest in the 29–32 megawatt power range.*

## MORE ENERGY EFFICIENCY, LESS ENERGY CONSUMPTION

Engineers from GE Oil & Gas and scientists from GE's European Research Center in Munich have teamed up to develop a breakthrough technology that helps customers address the challenges of rising fuel costs and demand for more efficient power systems. The result was ORegen™, a system that converts the exhaust heat of gas turbines and the waste heat from industrial processes into usable electricity.

When coupled with a simple-cycle GE gas turbine, the ORegen system can generate up to 12.4 megawatts from waste heat while consuming no additional fuel or water — and avoiding associated CO<sub>2</sub> emissions. A simple-cycle gas turbine equipped with the ORegen system operating more than 8,500 hours a year — compared to the same turbine operating in a combined-cycle system — generates additional electricity while avoiding the consumption of more than 11,000 cubic meters of water per year. This is equivalent to more than four Olympic-sized swimming pools.

The ORegen system is ideal for use in locations where water is scarce or cannot be exploited. It does not require on-site manned supervision and can operate at very low ambient temperatures. It is also an attractive alternative to traditional steam cycle technology.

*ORegen™ is a trademark of Nuovo Pignone SpA and is available in select markets.*



*The ORegen converts the exhaust heat of gas turbines and the waste heat from industrial processes into usable electricity.*



## RE-IMAGINING TECHNOLOGY FOR A CLEANER ENERGY FUTURE

Today's power plant operators face increasing pressure to find cleaner and more efficient ways of producing electricity while also keeping costs in check. Responding to these requirements, GE has launched an upgraded version of one of the company's most popular gas turbines, the Frame 7FA gas turbine. The new advanced gas turbine delivers higher performance, more flexibility and fewer emissions, with estimated fuel savings of \$2 million per year.\*

Marking the latest evolution of GE's well-established gas turbine technology, the 7FA gas turbine can help power plant owners reduce their environmental impact and total cost of ownership by allowing them to use less fuel to generate power.

A typical customer operating a new 7FA gas turbine instead of an earlier version of the 7FA gas turbine for an equivalent net plant output of 627 MW could avoid the emission of more than 19,000 metric tons of CO<sub>2</sub> per

year. This improvement is equivalent to the CO<sub>2</sub> emissions of approximately 3,800 cars on U.S. roads.

Since its introduction, GE's F-class gas turbine technology has consistently set industry standards for reliability and fuel efficiency. The 7FA gas turbine upgrade underscores GE's commitment to continuously refine technology to meet the evolving energy and environmental needs of today's customers.

\*Assumes \$6 per MMBtu natural gas price.



*GE Energy gathered product improvements from across the company's portfolio of turbine technologies for the new 7FA — which is made in GE's Greenville, South Carolina, plant.*

## YM KRISHNA SSK TRANSFORMS BIOMASS INTO A RENEWABLE ENERGY SOURCE

**In a remote area of Western Maharashtra, India, the YM Krishna SSK 16-megawatt cogeneration plant will soon take bagasse from a sugar mill and provide energy back to the total plant while using mill waste and carbon credits to provide surplus power back to the market.**

The sugar mill is at the center of development here, providing for the construction of irrigation and roads while bringing education and healthcare to the area. Last year it adopted GE Intelligent Platforms' Proficy Process Systems to control and automate the captive power plant.

GE is a major automation supplier for biomass-fueled captive power plants globally. The flexibility and robust nature of Proficy Process Systems\*,

a comprehensive system for process automation and control that leverages GE Intelligent Platforms' broad hardware and software platforms, provides YM Krishna with the ability to measure and analyze various operations within the plant. These operations include steam, power and water consumption; production efficiency; molasses output; steam generation; fuel quantity; and water quality and quantity.

*\*Undergoing ecomagination product qualification in 2010.*



*GE's Proficy Process Systems provides YM Krishna with a control system to reduce startup time and production downtime, as well as improvement in energy efficiency and less dependence on human factors.*

## FLORIDA'S MAJOR MOVE TO MAKE ITS GRID SMARTER

**Energy Smart Florida, a joint effort among GE, Florida Power & Light, Cisco Systems and Silver Spring Networks, has the potential to be one of the first holistic smart grid state implementations in the United States. The goal is for “smart” energy infrastructure to reach every resident, uniting consumer, business, utility and government around a common energy vision.**

*From left, Miami Dade College President Eduardo Padron, Cisco Systems Chairman & CEO John T. Chambers, FPL Group Chairman & CEO Lewis Hay III, GE Chairman & CEO Jeffrey R. Immelt and Silver Spring Networks Chairman and CEO Scott Lang, each hold a Smart Meter during the announcement of the Energy Smart Florida initiative at the Wolfson Campus of Miami Dade College in Miami, Florida, on Monday, April 20, 2009.*



This groundbreaking initiative aims to be a model electricity system for American cities and the cornerstone of a broader \$800 million statewide investment. It is using federal economic stimulus funds to help spur a \$200 million investment in smart grid technology and renewable energy over two years, including:

- **Smart grid automation and communications**— More like the Internet than an electric network, the new system will connect smart meters, high-efficiency transformers, digitized substations, power generation and other equipment through a centralized information and control system.
- **Smart meters**— Smart meters will be installed in more than four million homes and businesses.
- **Renewable energy integration**— Several local universities and schools will receive solar power installations to help meet energy needs with renewable energy technologies.
- **Plug-in hybrid electric vehicles**— 300 plug-in hybrid electric vehicles will be added to the Florida Power & Light fleet.
- **Consumer Technology Trials**— Through trial programs, Florida Power & Light customers will be empowered with information and knowledge via smart meters and in-home energy panels, allowing them to make smarter energy choices, manage their energy usage and save money.



## TRANSFORMING A U.S. MILITARY BASE INTO A SMART GRID SHOWCASE

According to the 2009 Defense Appropriations Act, United States military installations consumed 3.8 billion kilowatt-hours of electricity last year — enough electricity to power nearly 350,000 households in the U.S. for a year. Energy costs for these installations are high, and critical defense facilities must operate seamlessly through a power outage or other infrastructure disturbance. These are two key challenges that a smarter, more intelligent grid management system have the potential to address.

So the U.S. Department of Defense engaged GE researchers in a \$2 million smart grid demonstration project at the Twentynine Palms Base in California, the premier training facility for Marine operations.

Microgrids are localized energy networks that can provide power to self-contained areas like a military base or college campus. In the case of military bases, power is typically managed in two ways — local power is generated on-site for critical facility needs and noncritical needs are provided by the larger U.S. electrical grid network.

As part of this project, GE will provide an enhanced suite of microgrid control system technologies that will help military bases reduce their energy costs and further enhance the energy security of their power system network. Additionally, GE's system will provide enhanced capabilities for installations to integrate more renewable resources, such as solar energy and fuel cells, to help meet their electricity needs and reduce their carbon footprints.



To develop the new demonstration project at the Twentynine Palms Base in California, researchers at GE Global Research will develop and incorporate advanced algorithms and computational decision engines into a microgrid controller, which is built by GE Digital Energy.

## MAKE WAY FOR SMART APPLIANCES

The time for smart appliances has come. Smart grid enabled appliances — along with smart meters and other in-home measures for consumers to track and control their energy usage — can have a major impact when implemented nationwide.

GE's first available smart appliance — the Energy Star® GeoSpring™ Hybrid Water Heater — works on two fronts, saving consumers money on water heating costs and lowering a home's carbon dioxide emissions from water heating on the United States grid by 62 percent\* compared to a standard 50-gallon electric water heater. If 25 percent of U.S. households purchasing a new electric water heater were to choose GE's GeoSpring over a standard 50-gallon electric water heater, we would avoid more than four billion pounds of CO<sub>2</sub> emissions annually on the U.S. grid — equivalent to the annual CO<sub>2</sub> emissions of approximately 360,000 cars on U.S. roads.

Other smart appliances are in development at GE, including a refrigerator, double-oven range, microwave oven, dishwasher and front-load washer and dryer. These appliances are designed to lower wattage or defer operation in peak or high-energy usage and pricing times to save consumers money and help utilities shed load. Consumers will still have the ability to override these energy-saving or deferral features as needed. This design approach — the smarts seek out the best time to operate and save money and the override feature preserves consumer control — separates GE's in-home solutions from other offerings in the past.



CHARLENE BEGLEY  
 senior vice president and  
 president and CEO, GE Home  
 & Business Solutions

But steps are still needed to put energy savings control into the hands of consumers. As outlined in a letter to President Obama signed by GE and 46 other stakeholders, what is required beyond the government's committed \$4 billion nationwide smart grid investment are "clear rules on consumer access to information, incentives to promote the deployment of technologies... and encouragement of diverse technologies."

Once the national smart grid is in place, smart appliances must be ready simultaneously, and companies should enjoy incentives for their manufacture and purchase to get there.

*\*Based on DOE test procedure and comparison of a 50-gallon standard electric tank water heater using 4881 kWh per year vs. the GE GeoSpring Hybrid water heater using 1856 kWh per year, and national average residential electricity price of 10.65 cents per kWh.*

## INTRODUCING THE GEOSPRING HYBRID ELECTRIC WATER HEATER

After air heating and cooling, water heating is typically the largest energy use in a home. As homes are designed to be more energy efficient, the percentage of energy used to heat water has been growing — until now. The new GE GeoSpring™ hybrid electric water heater can cut residential water heater energy costs by more than half.

By utilizing heat pump technology in combination with traditional electric elements, the GeoSpring pulls heat from surrounding air and transfers it to the water tank. This innovative process creates the same amount of hot water as a traditional electric water heater, but can reduce energy expenses up to 62 percent.\* Such a reduction can have a dramatic impact on both utility bills and the environment.

The GeoSpring features a user-friendly electronic control system that offers both simplicity and flexibility. It gives

consumers as much or as little control of operating modes as they like, letting them set the thermostat and forget it or easily change the desired water temperature or operating mode to maximize energy efficiency.

*\*Based on DOE test procedure and comparison of a 50-gallon standard electric tank water heater using 4881 kWh per year vs. the GE GeoSpring Hybrid water heater using 1856 kWh per year, and national average residential electricity price of 10.65 cents per kWh.*



*The new GE GeoSpring hybrid electric water heater can cut residential water heater energy costs by more than half.*

## ENERGY-EFFICIENT HOMES OF THE FUTURE

The energy-efficient home of the future will generate as much energy as it typically uses over the course of a year. This energy will be generated through renewable sources such as wind and solar power, and used for functions such as lighting, appliances, heating and cooling. These homes will be highly insulated and energy efficient, even before taking into account their renewable energy sources.

GE has invested over several years to develop products that can assist builders and homeowners in the development of these homes. These products include:

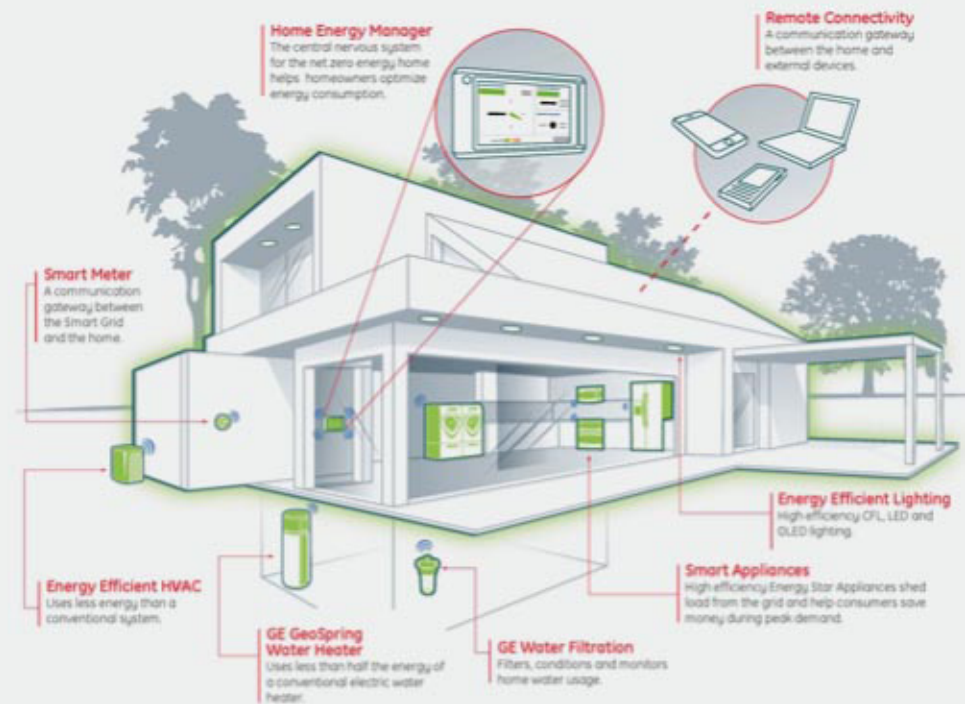
- **High-efficiency water heaters.** GE's gas tankless water heater and GeoSpring hybrid electric water heater each deliver significant energy savings versus standard tank varieties.
- **Smart appliances.** Currently under development, GE's new smart appliances are designed to communicate with smart meters, which are being

deployed by local utilities across the country to work as part of time-of-use pricing structures for consumers.

- **Energy management.** GE is currently developing home energy management tools to enable consumers to understand and manage their daily household energy usage, including usage trends over time.

These products are an important step toward the widespread deployment of technology for tomorrow's energy-efficient homes.

## GE Home Efficiency and Optimization



*The GE energy-efficient home of the future will generate as much energy as it typically uses over the course of a year, through renewable sources such as wind and solar power, and it will be used for functions such as lighting, appliances, heating and cooling.*

## GE LED SOLUTIONS FOR STARBUCKS

**Next time you visit your local Starbucks, take a closer look at the lighting. GE developed a new LED lighting solution that has helped Starbucks reduce energy consumption as part of its commitment to environmental stewardship.**

In 2008, Starbucks explored the substitution of incandescent and halogen lighting with LED lighting, but found no commercially available LED product that met its aesthetic and functional requirements. As a result, Starbucks reached out to GE to identify a solution. With input from Starbucks about its specific needs, GE developed a highly energy-efficient LED product that complements the Starbucks store design approach and fits existing fixtures.

Starbucks began implementing its LED lighting conversion program in 2009, and had completed installation in more than 1,000 stores in the U.S. as of September, resulting in an annual savings of more than 13.5 million kWh

of electricity. This avoids the emissions of more than 8,100 metric tons of CO<sub>2</sub> per year on the U.S. grid, equivalent to the CO<sub>2</sub> emissions of approximately 1,600 cars on U.S. roads.

Starbucks plans to expand the program to international locations, aiming to complete installation in more than 8,000 company-owned stores around the world by the end of 2010. Following global implementation, Starbucks projects a 7 percent per store reduction in electricity use. This improvement will contribute toward the company's goal of reducing energy consumption by 25 percent in company-owned stores by the end of 2010.



*Since implementing its LED lighting conversion program, Starbucks has seen more than 13.5 million in total annual kWh savings.*



## SOFTWARE IS THE KEY TO CLEANER TRANSPORTATION

Moving people and freight around quickly and efficiently is as much a matter of brainpower as horsepower. Our aircraft and locomotive engines are among the most fuel efficient in the world. But how do you make all trains and planes more efficient? That's a job for applied intelligence.

Each year, airlines burn nearly three-quarters of a billion gallons of jet fuel just waiting for their turn to take off and land. That's nearly seven million metric tons of CO<sub>2</sub> released into the atmosphere because of delays on the ground.<sup>(1)</sup> GE is using software developed in-house to get all that hardware back into the air.

GE Aviation TrueCourse™ can get more planes in and out of airports faster by sorting incoming and outgoing flights with greater precision and by plotting flight paths that maximize fuel economy and minimize noise pollution. Our NextGen flight management systems are one way we're helping the U.S. Federal Aviation Administration

achieve its ambitious goal of reducing greenhouse gas emissions from aircraft by 12 percent by 2025.

While railroads have made remarkable improvements in fuel efficiency, the next frontier of clean rail transportation is logistics management. GE Transportation's RailEdge™ movement planner<sup>(2)</sup> is a breakthrough technology designed to improve railroad capacity and efficiency, ultimately saving time and money. The GE technology can predict expected track usage patterns based on historical data to produce the most efficient plan, giving dispatchers the real-time information they need to make optimal decisions in a matter of seconds.



JOHN RICE  
vice chairman and CEO,  
GE Technology Infrastructure

RailEdge is demonstrating that if fully implemented across an entire rail system, it can achieve two-to-four mile-per-hour increases in velocity. One mile per hour in velocity improvement has the potential to save approximately \$200 million in capital and expense annually.

The promise of ecomagination is that GE and its customers can grow and be profitable while solving the world's most challenging environmental problems. We're realizing that promise a little more each day through our clean transportation initiatives, where the key to cleaner transportation is the powerful combination of hardware and software.

(1) <http://cleantech.com/news/2880/air-traffic-delays-wasting-money-and-fuel>

(2) Undergoing ecomagination product qualification in 2010.

## REALIZING SAVINGS THROUGH AN IMPROVED FLEET PLAN

**AmeriPride, a leading service provider of uniform rentals and commercial laundry, recognized that a carefully developed and executed fleet plan could offer double-digit improvements in overtime costs, workforce productivity, carbon emissions and fuel cost savings. So they brought in GE Capital Fleet Services to assist in analyzing, designing and executing a fleet plan — including services such as vehicle replacement, telematics and fleet administration.**

“Our goal in working with GE was to save money, increase efficiency and slash emissions,” said AmeriPride CEO Bill Evans. “We are very conscious of our impact on the environment, but we also saw this as a smart business decision.”

The results have exceeded the expectations of Evans and other top management. During a pilot conducted in 2009, the company realized a 40 percent reduction in fuel costs and CO<sub>2</sub> emissions related to idling and inefficiencies of older vehicles. Once extended across the entire fleet, this could represent a potential fuel savings of \$640,000 and a reduction of over 6,800 metric tons of CO<sub>2</sub>.

Currently, the company is in the process of replacing 1,800 vehicles in the U.S. and Canada with newer, more fuel-efficient vehicles. They are right-sizing their fleet so vehicle size and power match — but do not unnecessarily exceed — business needs. This effort also includes the addition of hybrid vehicles. So far, AmeriPride has replaced 700 vans and is testing 10 hybrid vehicles in a pilot program that could eventually grow to a fleet of 50.

“We are on track to meet our goals,” says Evans. “By 2020, we expect savings to exceed \$3 million and carbon dioxide emissions to drop by 33,000 tons.”



*GE Capital Fleet Services is assisting AmeriPride in analyzing, designing and executing a fleet plan — including services such as vehicle replacement, telematics and fleet administration.*

## THERE'S NO BETTER WAY TO FLY

**When passengers fly Southwest Airlines, they expect the friendly faces and comfortable atmosphere for which the company has become renowned. But what they may not know is that behind the smiles and brightly colored aircraft is a revolutionary technology that helps their flight arrive on time – and with a lower environmental impact.**

As the first customer to adopt a fleet-wide integrated flight deck solution from GE Aviation Systems, Southwest has positioned itself as a leader in air traffic management. Southwest's fleet of Boeing 737s feature GE's advanced flight management system, TrueCourse™, which enables aircraft to use less fuel and reduce emissions and noise. GE technology also helps to keep the aircraft on track to within 100 meters. It can precisely calculate the time of arrival to within 10 seconds at any point on the flight plan, helping passengers get where they need to go, when they need to go.

"GE's flight management system is a key part of our plans to conduct Required Navigation Performance (RNP) operations," commented Mike Van de Ven, executive vice president and chief of operations for Southwest Airlines. "It allows us to realize significant cost savings with lowered fuel consumption while simultaneously lowering our impact on the environment through reduced emissions. GE's technology is key to the success of Southwest Airlines' implementation of RNP and our partnership with the FAA to advance NextGen airspace."



*GE's advanced flight management system, TrueCourse™, enables Southwest aircraft to use less fuel and reduce emissions and noise.*

## INTRODUCING POWERHAUL LOCOMOTIVES TO THE UNITED KINGDOM

**In November 2009, Freightliner Group Ltd. and GE Transportation announced the launch of the first PowerHaul locomotives to the United Kingdom's rail freight market. This launch represented GE Transportation's first locomotive customer in the United Kingdom and Europe.**

One of GE's most technologically advanced locomotives, the PowerHaul is designed to provide significant fuel savings compared to other heavy haul, lightweight engines in use today. Its traction control technology also allows it to carry heavier loads by significantly reducing slippage on start-ups, inclines and poor track conditions.



*One of the new locomotives arrives via ship in South Wales, U.K.*

## “GREEN” HOSPITALS

With the right design and environmental consciousness, hospitals can reach their full potential as places best suited to healing. A “green” hospital is one that will strive to reduce energy costs, greenhouse gas emissions and waste.

It will also be a place where patients—responding to improved air, natural elements and streamlined staff responses—can be happier, healthier and recovering faster.

The United States Green Building Council (USGBC) outlined standards for hospitals to improve their operations and environmental impact as well as how to measure successful implementation. Hospitals can use three times the energy of a commercial building, and commercial buildings account for 30 percent of U.S. energy usage, according to the USGBC.

A conservation-minded hospital is capable of making a real impact when replicated worldwide. A 200-bed hospital that reduces its energy consumption by 16 percent reduces greenhouse gas emissions equivalent to the annual CO<sub>2</sub> emissions of approximately 300 cars on U.S. roads. Beyond these emissions reductions are a host of other benefits, including significant water savings, improved air quality and reduced paper use. “Green” hospitals also report that better air quality and use of technology can lead to improvements in both patient and staff satisfaction and overall workflow.



JOHN DINEEN  
 president and CEO,  
 GE Healthcare



*In July 2009, GE announced a “green hospital” partnership with Asklepios Hospital Group focusing on designing energy efficient healthcare facilities. The aim is to develop and deploy technology to reduce energy usage, conserve water, generate renewable energy on-site, maintain air quality, reduce waste and increase staff productivity of hospitals.*

*From left to right: Jeff Immelt; Dr. Rolf Lucas, President & CEO, GE Healthcare in Germany; background, a bit covered: Dr. Wolfgang Sittel, Head of Architecture & Construction, Asklepios Group; Dr. Tobias Kaltenbach, CEO, Asklepios Group; Dr. Carlos Härtel, Head of GE Global Research Europe.*

## HIGH-EFFICIENCY MR SCANNERS

**With demand for quality healthcare on the rise, hospital systems in China are looking for innovative and cost-effective solutions to help them provide high-quality care to a large population. For Dr. Jin Zhengyu, Director of Peking Union Medical College Hospital (PUMC), GE Healthcare's 1.5T Signa HDe MR scanner was an excellent fit, reducing power consumption and lowering environmental impact without compromising image quality.**

The Signa HDe was the first healthcare product to join ecomagination's product portfolio and is now part of GE Healthcare's family of high-efficiency MR scanners. Compared with previous generation systems, these scanners can, under normal operating conditions, reduce power consumption by a third, saving 60,000 kWh of electricity per year — equivalent to the annual electricity consumption of about 13 urban Chinese households. Along with savings, high-efficiency MR scanners have a significantly lower need for helium refills, which potentially could further reduce operating costs and lessen their impact on the environment.

"We have more than 150 patients per day receiving MR examinations, which can be quite a challenge," said Dr. Jin Zhengyu. "The Signa HDe provides good image quality and allows us to scan more patients, as well as cut the operating time for each patient. It also consumes much less power and has relatively no helium loss compared to our other MR systems. These benefits add up to significant cost savings each year."



*Patient prepares for a scan in the Signa HDe.*

## DIGITAL X-RAY MACHINES REDUCE CONSUMPTION WHILE LOWERING COSTS

**Today's healthcare facilities face mounting pressure to conserve financial resources and reduce their environmental footprint without compromising high-quality patient care.**

GE Healthcare has developed a family of digital X-ray machines that, compared with traditional film-based X-ray equipment, can reduce the consumption of resources such as energy, water, film and chemicals, increasing productivity while lowering operating costs. GE's newest digital X-ray offering is the Brivo™ DR-F, launched in 2009\* to answer environmental and economic concerns without compromising quality of patient care.

For facilities evolving from analog to digital technology, Brivo DR-F provides a compact, affordable solution that delivers outstanding clinical capability and helps eliminate the cost and

waste associated with film processing. Replacing two GE analog X-ray rooms and a film processor with one Brivo DR-F room could reduce energy consumption by over 70 percent, also reducing physical space requirements by more than 40 percent — all while maintaining imaging volume. The use of digital X-ray also eliminates the need to store 50,000 films per year, and can save customers 156,000 gallons of water and 1,900 gallons of fixer and developer used with analog film processing.

*\*Brivo DR-F is available in China, India, EAGM, Latin America and some countries in Eastern Europe and the Asia Pacific region.*



*GE's newest digital X-ray offering is the Brivo™ DR-F, launched in 2009 to answer environmental and economic concerns without compromising quality of patient care.*

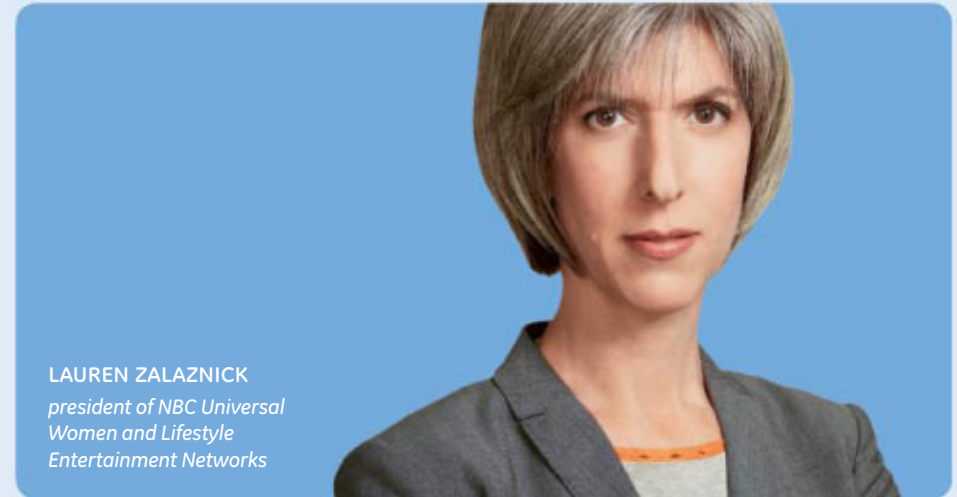
## GREENING THE ENTERTAINMENT INDUSTRY

**NBC Universal's portfolio of news and entertainment has broad reach — from television and online content to theme parks and the movie studio. Using the power of our portfolio, we launched our environmental initiative, Green is Universal, in 2007.**

The mission is to raise green awareness, activate consumers and help “green” the company's own operations.

To “green” the entertainment industry requires a strategic but detailed approach. Over the last few years, we've worked to identify and address our productions' environmental footprints — including the materials and energy used and waste output when producing a TV series or film. We have then implemented changes that help reduce those loads at every level: from offering reusable water bottles and recycling bins to constructing sets with sustainable wood and fueling vehicles with biodiesel. Collectively, these measures can add up to a substantial reduction in our environmental impact.

By taking a holistic view, the entertainment industry can make environmental responsibility part of its behind-the-scenes culture, not merely a case-by-case consideration — and the industry is moving in that direction. NBC Universal has taken a leadership role in this commitment and facilitated the transition for production studios looking to “go green” by developing comprehensive, step-by-step instruction guides that detail the most effective ways to operate productions in an environmentally sensitive fashion. From scouting locations and set design to energy efficiencies and wrapping sets, we have been streamlining the process for others in the industry. Four more guides are under way and will be released this summer, detailing best practices for



LAUREN ZALAZNICK  
*president of NBC Universal  
 Women and Lifestyle  
 Entertainment Networks*

television news, independent/cable production, award programs and special events and sourcing.

In front of the camera, NBC Universal talent have also shown us that this issue is important to them, willingly lending their voices and support to our green efforts, especially via their participation in our Emmy-award winning “The More You Know” public service announcement campaign. Our TV and film studios, too, are influential in the industry, weaving “behavior placement” into shows across our network and cable television platforms, as characters reinforce positive messages by practicing green actions — from composting to carrying reusable shopping bags to using water coolers instead of plastic bottles — within popular shows and films.

NBCU also encourages its employees to adopt environmentally conscientious behavior. In addition to practicing more environmentally sensitive habits within the office — such as powering down idle computers, eliminating water bottles and recycling — the company hosts local volunteer events in the United States and internationally throughout the year. Thousands of employees participate in tree plantings, park restoration projects and trash cleanups in local communities. We are constantly striving to propel the company, and the industry, toward a greener existence.



## GREEN IS UNIVERSAL: BRINGING “GREEN” TO THE TV SCREEN

Launched in May 2007, “Green is Universal” is NBC Universal’s ongoing initiative dedicated to raising environmental awareness, effecting positive change and greening its own operations. This commitment is especially visible during NBC Universal’s Green Week (November) and Earth Week (April), which tap the business’ broad on-air networks and online platforms to incorporate environmentally themed content and help raise environmental awareness. With a massive reach of about 100 million viewers per month, NBC Universal seeks to engage and activate its audience around environmental sustainability on an ongoing basis.

In November 2009, NBC Universal’s “Make Green Count” campaign encouraged audiences to make one small “green” change to their daily lives — from turning the lights off to walking to work. The effort rallied more than 40,000 pledges through a text message and online click-to-pledge campaign across all NBC Universal online properties. In addition, through a partnership with the FEED Foundation — a nonprofit that works to bring healthy food solutions to all children

worldwide — NBC Universal donated one dollar for each pledge made.

NBC Universal is not just “going green” in front of the camera — it is taking a close look at its behind-the-scenes impact as well. NBC Universal has launched an initiative to deliver a combination of environmental tools and comprehensive resources to its crews and staff to facilitate more sustainable production.



*Characters on NBC's “The Office” fill up their new water bottles.*

Green is Universal partnered with NBC Universal’s television production arms, Universal Media Studios (UMS) and Universal Cable Productions (UCP), to develop a series of best practices and educational materials for all production projects to use. The Green Production guides offer step-by-step environmental suggestions specific to film and TV production — and largely focus on and measure five areas of production that tend to have the greatest environmental impact:

travel/transportation, set design/construction, energy, waste/recycling, on-set water/catering. Applying business strategy and metrics to the use of natural resources and building materials not only affects our environmental impact, but also saves money and creates new and efficient approaches to production.

To learn more about ecomagination and get updates on progress as it relates to products, services, and our overall commitment, please visit [www.ecomagination.com](http://www.ecomagination.com). If you'd like to share this with colleagues, refer them to [www.ecomagination.com/report](http://www.ecomagination.com/report), where they can download the full report.



imagination at work