Let’s Build a Smarter Planet: Green & Beyond
The world is smaller, flatter and hotter.
The ecological reality of living in a globally integrated world is upon us.

- Economic downturn requires doing more with the same.
- The effects of climate change are both a societal and business concern.
- Empowered consumers demand more responsible business practices.
- Managing water supplies and sources is a growing challenge.
- Energy use is rising at an unprecedented rate.

Organizations play a major role in shaping this reality, and therefore have a responsibility to manage its impact.
Organizations will manage their environmental impact—or “go green” by addressing three critical resources:

**WATER**
- Water is needed to generate energy and energy is needed to provide water.

**ENERGY**
- Energy production results in CO² emissions.

**CARBON**
- CO² emissions contribute to climate change, which impacts water systems.
Environmental sustainability is an imperative for 21st century business—one that not only encompasses conservation, pollution prevention, and more but also enables the creation of entirely new value and benefits.

- Lower costs while overcoming operational barriers.
- Strengthen reputations while meeting regulations.
- Create products and services that give rise to new markets.
To realize the benefits of sustainability, an organization must take a systemic view of its value chain....
Uncovering unexpected areas of cost...

10,855 liters
Water required over the product lifecycle of a pair of jeans.

6.6 billion
Number of new trees needed to clear CO₂ emitted by data centers each year.

$46 billion
Value of the carbon offset purchases by 20 countries in order to meet emissions reduction targets in 2008.
Uncovering unexpected areas of cost and opportunity.

20 million gallons saved
In water during chip manufacturing process each year by IBM’s Burlington FAB. Resulted in $3 million annual savings.

74% less energy
By implementing a green data center, Care2, a global online community, cut costs, improved performance, and promoted its sustainability to attract new members.

2,400 tons avoided
UK retailer Tesco avoided an estimated 2,400 tons of CO\textsubscript{2} emissions by importing wines in bulk and bottling them in lighter weight glass.
The demand for change is growing.

59 countries and jurisdictions have or are pursuing implementation of mandatory cap and trade systems.

75% of companies have seen an increase in the number of advocacy groups collecting and reporting corporate social responsibility (CSR) related information about their company.

1 in 4 consumers say they would switch brands for a given product or service if provided with a more ethical alternative.
These mandates for change are mandates for smart.
Let's build a smarter planet: Green & Beyond

Something profound is happening....

**INSTRUMENTED**
We now have the ability to measure, sense and see the exact condition of practically everything.

**INTERCONNECTED**
People, systems and objects can communicate and interact with each other in entirely new ways.

**INTELLIGENT**
We can respond to changes quickly and accurately, and get better results by predicting and optimizing for future events.
An opportunity for smarter organizations to find the value in ‘green’.

Lower costs while overcoming operational barriers.

Strengthen reputations while meeting regulations.

Create products and services that give rise to new markets.
To achieve these benefits, organizations must build:

1. **Green infrastructure**
   Instrument, manage and optimize across broad infrastructure – including IT equipment, data centers, property and facility, data and applications.

2. **Sustainable solutions**
   Implement new ways to source, manufacture and distribute goods and services in a more sustainable manner while lowering costs. Deploy platforms for transparent and proactive engagement with employees, consumers and communities.

3. **Intelligent systems**
   Manage resources at the macro level—utilities, traffic and water systems. Provide actionable time-relevant data that inform better decisions.
Green infrastructure is instrumented, interconnected and made intelligent to mitigate the environmental impact of...

- **IT EQUIPMENT**: Lower costs by improving both operational efficiency of data center and the interaction with infrastructure.

- **DATA and APPLICATIONS**: Use intelligent management of business information to lower energy cost of applications.

- **PROPERTY and FACILITIES**: Discover, manage, optimize, and report energy efficiency and compliance for assets and infrastructure.
1 Green infrastructure: Applications and benefits

SMART IS
Building green data centers to support corporate brand objectives

SMART IS
Proactively addressing information growth and environmental regulation.

SMART IS
Holistic view of energy consumption that enhances the efficiency of buildings, fleets and physical assets.

kika\Leiner: Designed and built new energy efficient scalable modular data center – reducing electrical consumption by up to 40%. The new data center extended their environmental strategy to include their data center.

A smart organization: Can build a green infrastructure to anticipate and respond to information growth, measure and verify performance and achieve data compression rates of up to 80%.

Star Technology Services: Can manage both power and cooling capacity and begin to include non-IT resources into its event management. They use the same infrastructure monitoring IT to monitor and measure non-IT devices and view overall power use.
1 Green infrastructure:
IBM is helping clients as they focus across the infrastructure…

**Data Center**
- Thermal and energy assessments
- Rationalize and consolidate
- Energy efficient data center design
- Modular approach
- Innovative cooling techniques

**Energy Management**
- Measure, collect, benchmark
- Monitor, trend, manage
- Policy based optimization
- Track, verify, report for compliance
- Earn energy efficiency certificates

**IT Equipment**
- Energy efficient product designs
- Workload optimized systems
- Active energy management
- Virtualization of server, storage, network, application, & desktop
- Tiered storage
- Environmentally responsible disposal of assets
- Energy efficiency IT assessments

**Property and Facilities**
- Instrumentation of assets for power, temperature, layout, and problem identification
- Intelligent lifecycle management solutions
- Sustainable facilities analysis for emissions, waste generation, water recycling

**Data and Applications**
- De-duplication and compression
- Lifecycle management, retention and archiving
- Application server optimization
- Application monitoring
- Chargeback and usage accounting
Sustainable solutions account for environmental and social impacts of activities to better equip organizations for smarter growth...

<table>
<thead>
<tr>
<th>Supply chain and distribution</th>
<th>From the supplier, to the manufacturer, to transporter, warehouse operator and beyond.</th>
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| Manufacturing and business operations | Use fewer resources in the creation of products.  
                                         | Improve environmental attributes of products.  
                                         | Reduce waste creation and associated disposal costs. |
| Governance and strategy | Understand customers’ sustainability expectations.  
                          | Develop sustainability strategies aligned with overall business strategy. |
| Workforce | Reduce environmental impact of employees while enhancing productivity.  
            | Attract and retain employees through socially responsible practices. |
2 Sustainable solutions: Applications and benefits

SMART IS
Consolidating distribution centers to reduce emissions by 15% and fuel costs by 25%.

SMART IS
Reinventing manufacturing processes to use less water, energy and other chemicals.

SMART IS
Reducing travel, real-estate and office costs while appealing to top talent.

COSCO: Performed an analysis of its operations across product development, sourcing, production, warehousing and distribution. The company ultimately consolidated its distribution centers from 100 to 40 to prevent 100,000 tons of emissions each year.

IBM Burlington FAB: Retooled its chip-making process to cut annual water use by 20 million gallons, chemical use by 15,000 gallons and electricity use by more than 1.5 million kWh.

A smart organization: Can reduce paper consumption by 80%, cut annual real-estate costs by tens of millions of dollars and eliminate 20% of programming (or software) code —and associated energy costs —by re-engineering its workforce operations.
2 Sustainable solutions: IBM is helping organizations enhance their...

**Product and Supplier Management**
- Using lean and six sigma principles to drive reduction in energy and water inefficiencies, CO² emissions and waste generation
- Supply chain optimization of trade-offs considering service levels, quality, cost, and CO2 emissions
- Public sector analysis of energy and water use, CO² emissions, procurement practices, facilities and equipment, waste management and workforce programs
- Environmental product lifecycle management services
- Regulatory compliance for products and processes

**Governance and Business Strategy**
- Global benchmarking for sustainability and corporate social responsibility (CSR)
- Development of CSR and sustainability strategies
- Development of strategies to reduce energy and CO2 emissions
- Executive dashboards for monitoring and reporting
- Collaboration and engagement strategies with key stakeholders

**Distribution and Logistics**
- Optimization strategies to balance environmental performance with cost, quality and service levels
- RFID tagging and tracking systems
- Networked sensors and meters for environmental data collection
- Environmental dashboard management for monitoring and reporting
- Business process redesign for inclusion of environmental impact assessment and reduction

**Workforce Management**
- Enablement of remote working
- Remote Employee collaboration
- Paper reduction strategies
- Travel foot-printing and reduction strategies
- Online collaboration ‘Jams’
Intelligent systems gather, synthesize and apply information to change the way entire industries operate.

**Smart water**
Apply monitoring and management technologies to help reduce the use of water, as well as related energy and chemicals.

**Smart traffic**
Use real-time traffic prediction and dynamic tolling to reduce congestion and its byproducts while positively influencing related systems.

**Smart energy**
Analyze customer usage and provide customized products and services that help to boost efficiency from the source through the grid to the end user.
3 Intelligent systems: Applications and benefits

**SMART IS**
Lowering congestion and carbon emissions by influencing traffic patterns on a city scale.

**SMART IS**
Knowing exactly where a power outage occurs and instantly dispatching a crew to fix the problem.

**SMART IS**
Using real-time information to help reduce the energy required to desalinate and deliver water.

**Stockholm, Sweden:** Implemented an intelligent toll system that uses cameras, sensors and central servers to identify vehicles and charge drivers based on when and where they drive—cutting traffic by 20% and emissions by 12%.

**DONG Energy:** Installed remote monitoring and control devices to gain an unprecedented level of information about the current state of the grid, lessening outage times by a potential 25-50%.

**Malta:** Is building an integrated water and energy system that will rely on 250,000 smart meters to monitor energy usage, identify water leaks and electricity losses, set variable rates and reward customers for using less.
Intelligent systems:
IBM is partnering with governments and organizations to deliver…

**Intelligent Transportation Systems**
- Road user charging and tolling practices
- Integrated fare management systems
- Transport information management systems
- Innovations in telematics, GPS, etc

**Advanced Water Management**
- Strategic water information management of natural, utility, and enterprise water systems
- Smart water infrastructure solutions (e.g. smart levees, smart storm water management)
- Smart water meter management and asset management solutions
- Micro weather forecasting solutions and impact analyses
- Innovations in advanced modeling, visualization techniques, predictive analytics

**Intelligent Utility Networks**
- Advanced electric meter management systems
- Network automation and analytics best practices
- Power generation optimization
- Utility company networked revitalization services
- Customer operations transformation assistance

**Intelligent Energy Exploration Solutions**
- High performance computing and seismic data processing, simulation, and visualization
- Event early warning - analysis and detection services
- RFID technologies optimized for supply chain

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IBM’s capabilities and offerings are aligned with the needs of smarter organizations.

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<tr>
<th>ORGANIZATIONS ARE FOCUSED ON…</th>
<th>IBM IS DELIVERING…</th>
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| **1 Green infrastructures**   | • Data Center Assessment and Services  
• IBM Data Center Family™  
• Consolidation, Virtualization and Optimization Services  
• IBM Energy Efficient Servers and Storage Systems  
• IBM Tivoli Monitoring for Energy Management  
• Tivoli Usage and Accounting Manager  
• IBM Maximo Spatial  
• WebSphere Software  
• Rational Portfolio |
| **2 Sustainable solutions**   | • Strategic Carbon Management , IBM Green Sigma™  
• Carbon Intelligence  
• Sustainable Logistics Design, Asset Mgt. and Procurement  
• Environmental PLM  
• Tivoli Process Automation  
• Lotus Portfolio |
| **3 Intelligent systems**     | • Intelligent Utility Network and Advanced Meters  
• Intelligent Transportation  
• Intelligent Oilfields  
• Strategic Water Information Management (SWIM)  
• Industry Solutions for Business Intelligence Performance Management |
We’ve only just begun to uncover what is possible on a smarter planet.

The world will continue to become smaller, flatter and smarter. We are moving into the age of the globally integrated and intelligent economy, society and planet.

By systemically managing water and energy use, as well as carbon emissions, smart organizations will realize true sustainability while achieving real business benefits—driving growth at the individual, organizational and population levels.

Let’s work together to drive real progress in our world.
IBM’s legacy of leadership

- IBM’s comprehensive global environmental management system in place since 1970s
- 1990-2007, IBM reduced or avoided CO² emissions by an amount equivalent to 45% of its 1990 emissions through the company’s global energy conservation program
- 42% of IBM’s employees do not regularly come into an office saving $100M annually in real estate costs
- Last year IBM saved $97M in travel costs by using online collaboration instead
- Process improvements in chip making process in Burlington, VT saving 20M gallons of water, 15K gallons of chemicals and over 1.5M kilowatts of electricity annually… achieving $3M in annual savings while increasing production over 30%
- IBM’s purchase of renewable energy grew from 11M kWh in 2001 to 455M kWh in 2007
- IBM is a charter member of Chicago Climate Exchange, Green Grid, EPA Climate Leaders, WWF Climate Savers, WRI’s Green Power Market Group, and many other organizations
Environmental leadership: IBM case study results.

- **1990-2007 Early Results**
  - IBM reduced or avoided CO2 emissions by an amount equivalent to 45% of its 1990 emissions through the company's global energy conservation program.

- **Earned Leadership Status**
  - 2009 #1 Green IT Vendor Computerworld
  - 2007 #1 Vendor “Green 500” Supercomputing
  - 2008 CNET UK Business Technology “Green IT Initiative of the Year”
  - 2008 One of top 15 Green IT companies, InfoWorld
  - 2008, CERES ranked IBM #1 among 63 different companies across 11 different industry sectors for corporate climate change governance practices.
  - 2008, Gartner and WWF-UK ranked IBM #1 among fourteen I/T companies for Basic Environmental Management of Climate Change.
  - 2008, Climate Counts ranked IBM #1 among electronics companies for Climate Friendliness.

http://www.ibm.com/ibm/responsibility/