

IBM Smarter Planet Strategy



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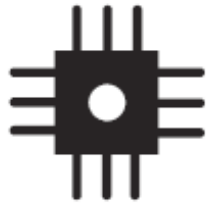


A Smarter Planet

Agenda

- IBM Smarter Planet Solutions
- IBM Energy and Environment Initiatives for a Smarter Planet

Something profound is now happening with the infusion of intelligence into the way the world works



Our world is becoming

INSTRUMENTED



Our world is becoming

INTERCONNECTED



Virtually all things are becoming

INTELLIGENT

... Our planet is becoming smarter



A Smarter Planet: The Next Leadership Agenda

Prime areas to consider for improvement



How much **energy** we waste: 6% to 10% lost because grids are not smart



How gridlocked **transportation** in cities is: \$78B annual loss in U.S. in wasted gas and time



How our **water** supply is drying up: 6 fold increase in demand at twice rate of population growth



How antiquated our **healthcare** is: no linkage from diagnosis to providers to insurers to employers



Inefficiency of our **supply chains**: \$40B annual loss in CPG & Retail industries, 3.5% of sales



Crisis in **financial markets**: inability to track risk has undermined confidence



“The digital and physical infrastructures of the world are converging. We must make the mundane processes of business, government and life sustainable.”

Many of IBM's smarter planet initiatives are interconnected – www.ibm.com/smarterplanet



Water

Whether too much or not enough, the world needs a smarter way to think about water



Buildings

Given their environmental impact, it's time we designed from the earth up



Cities

Safe neighborhoods. Quality schools. Affordable housing. Traffic that flows. It's all possible.



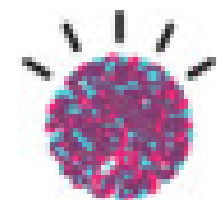
Oil

Get to the "first" oil faster. Increase recovery rates. Sense and solve problems before they start.



Intelligence

Smart thinking about data analysis



Traffic

How we get from point A today to point B tomorrow



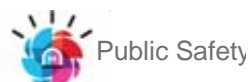
Energy



Work



Products



Public Safety



Oil



Buildings



Banking



Government



Cities



Water



Retail



Traffic



Intelligence



Rail



Healthcare



Food



Infrastructure

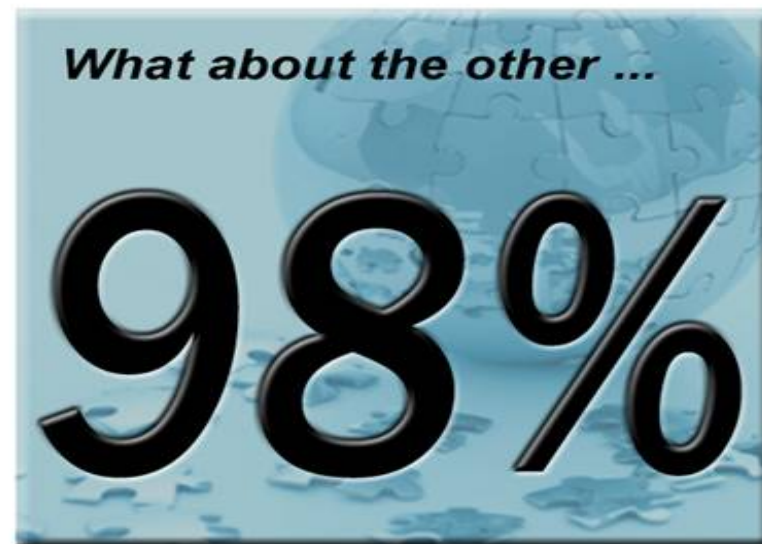


Telecom

Energy & Environment Focus



The Bad News: **IT accounts for 2% of global CO₂ emissions**



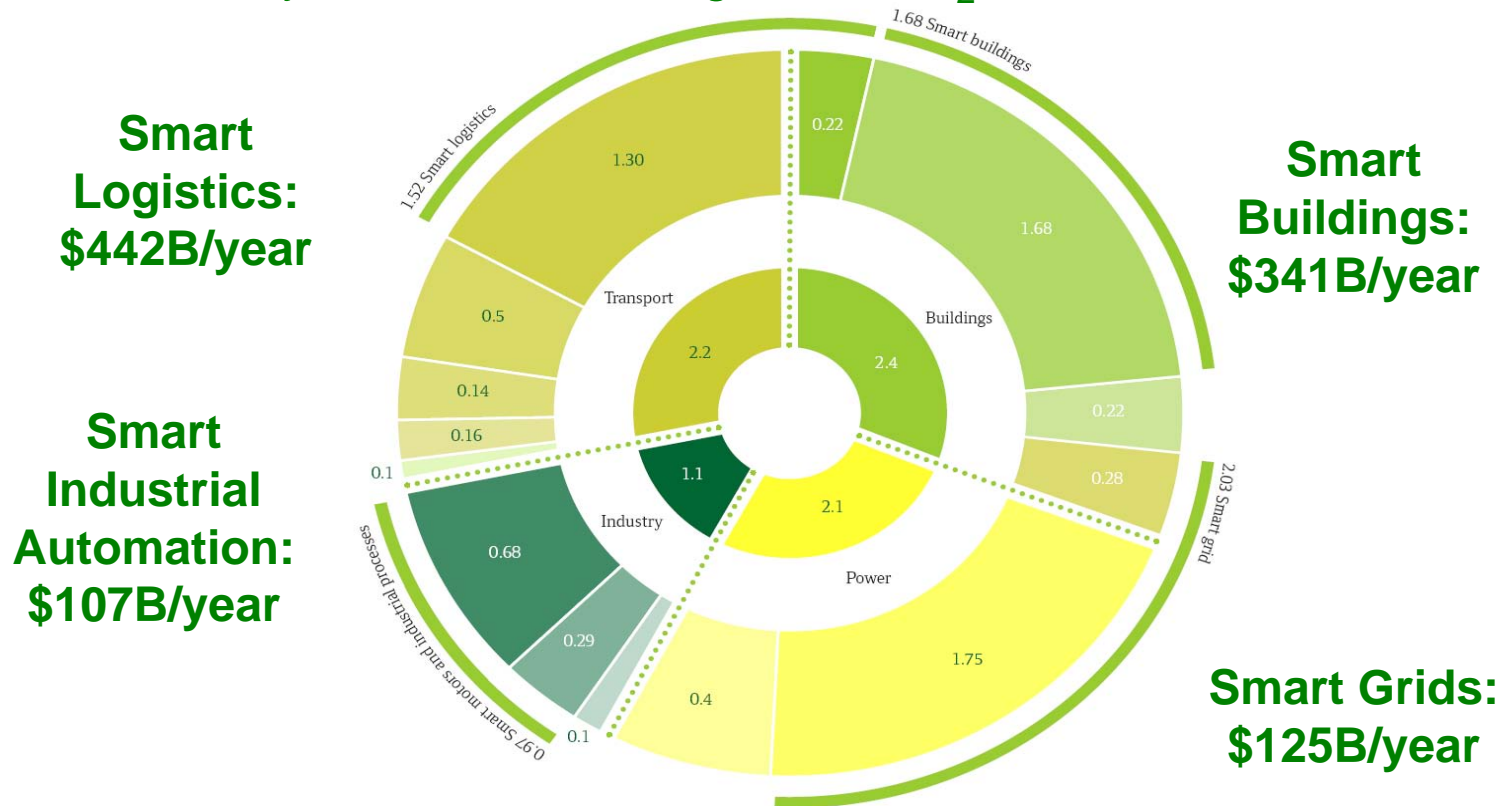
The Good News: **IT can significantly contribute to control and reduce the 98% of CO₂ emissions caused by other activities and industries**

"... you can't make a product greener, whether it's a car, a refrigerator or a traffic system, without making it smarter — smarter materials, smarter software or smarter design." - Thomas L. Friedman

Sources: Gartner, Green IT, October 12, 2007; "The Green Road Less Traveled" by Thomas L. Friedman, The New York Times, July 15, 2007, <http://select.nytimes.com/2007/07/15/opinion/15friedman.html?scp=2&sq=thomas%20friedman%20july%202007%20greener%20smarter&st=cse>

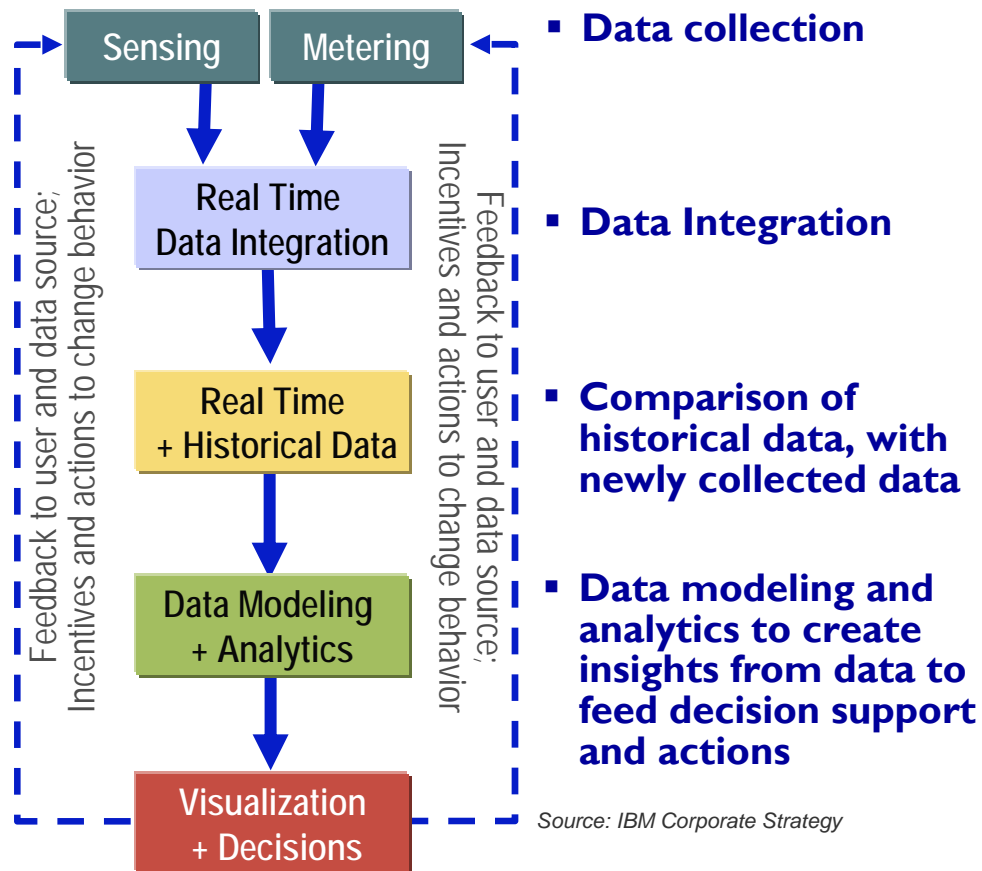
Tackling climate change is good for the climate and economy

Information and Communications Technology (ICT) can significantly improve energy efficiency and reduce GHG emissions, driving potentially \$1 Trillion in energy savings per year by 2020 and 7.8 Gigatons CO₂e abatement



What does it mean to become Smarter?

Measuring, Monitoring, Modeling and Managing



IBM innovations address energy & environment challenges – and wherever you begin, IBM can help – ibm.com/green

Energy Efficient Technologies and Services Green IT and Data Centers



- IT and data center facilities energy efficiency
- Monitoring & verification of efficiency goals
- Energy Efficient, Virtualized, Dynamic IT/DC
- IBM and client case studies: 40% to 80% energy use reduction, up to 85% less floor space

Mobility Services



- Reduce traffic and pollution
- Retain and attract talent
- Cut facility costs/impact

Intelligent Transportation Systems



- Reduce traffic congestion
- Reduce CO₂ emissions
- Increase mass transit usage
- Improve environment
- Stockholm case study: Reduced traffic congestion 25%, Carbon emissions 15%

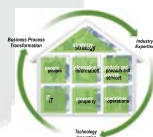
Intelligent Utility Networks



- Reduce energy usage
- Improve grid management, reduce outages
- U.S. case study: 10% energy use reduction, up to 50% reduced load on electric grid

Sustainable Business Solutions & Services

- Strategy
- Corporate Social Responsibility
- Green Sigma TM
- Business Operations/Supply Chain - SNOW
- Smarter Cities
- Smarter Buildings
- Cap and Trade Systems



Advanced Water Management



- Flood avoidance
- Reduce water usage
- IBM case study: 27% reduced water usage, with 30% increase in manufacturing output, saving \$M in energy and water cost

Alternative Energy Research

- IBM know-how in thin films, semiconductors, advanced photovoltaic materials, applying IT cooling technologies to concentrator photovoltaics, IT to ET, nanomembranes for desalination, energy storage; etc.

IBM Green Sigma™

Green Sigma™ grew from IBM's deep internal experience in facilities and manufacturing process improvement

- Green Sigma™ is aimed at reducing energy & water, waste generation and CO₂ emissions throughout a company's operations, resulting in:
 - Lower environmental impact
 - Increased efficiency
 - Reduced costs
- The key components are:

1 Metering and Monitoring

2 Management through the Green Sigma™ Dashboard

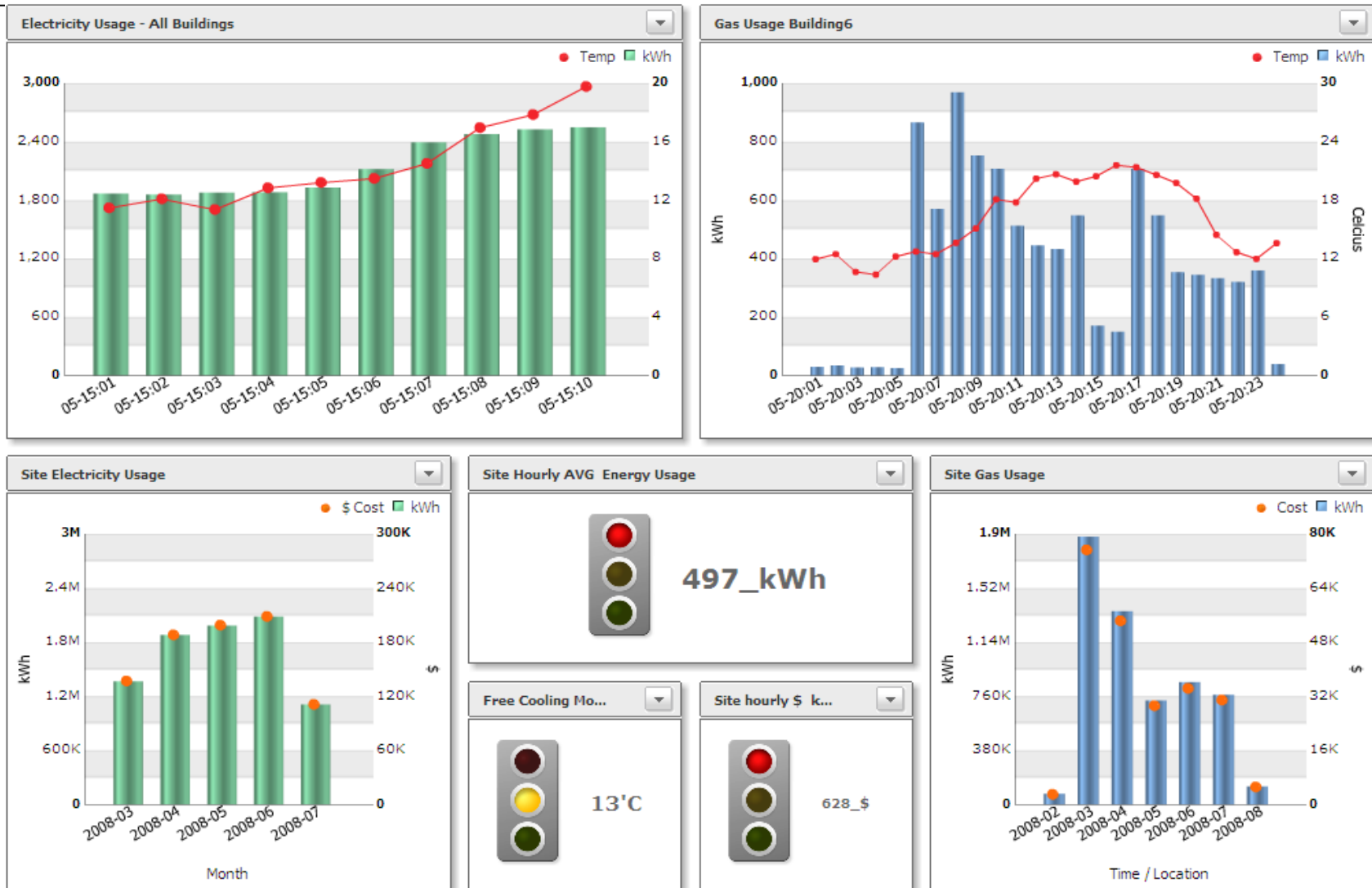
3 Applied Statistical Techniques



“If you can measure it, you can manage it”

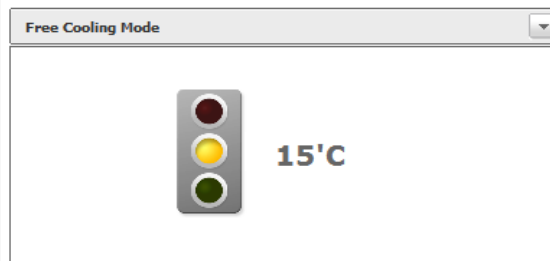
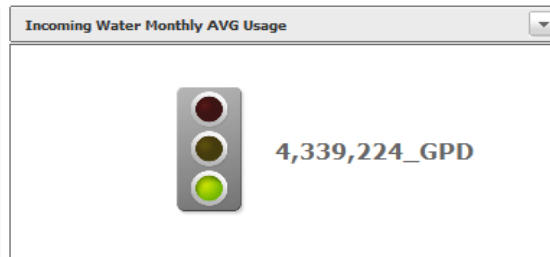
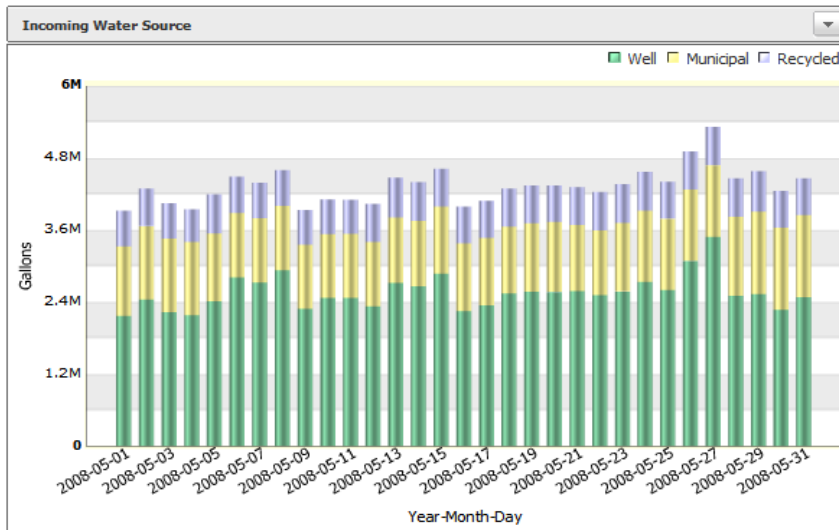
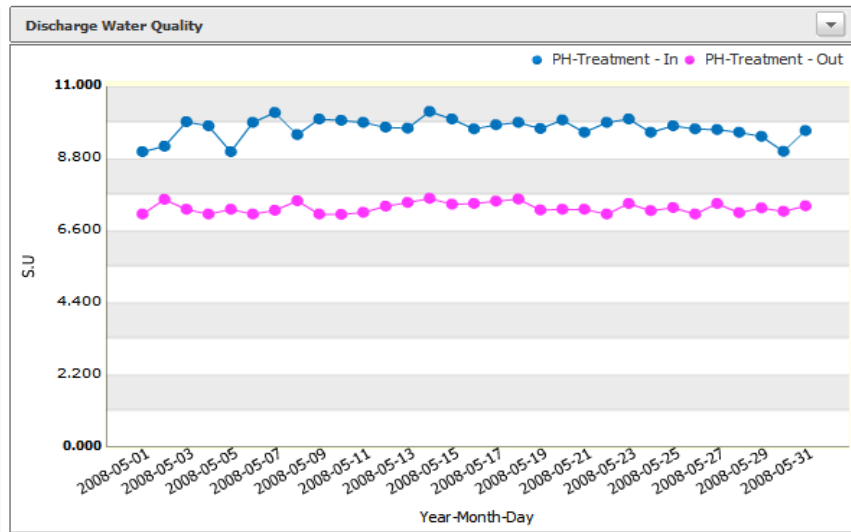
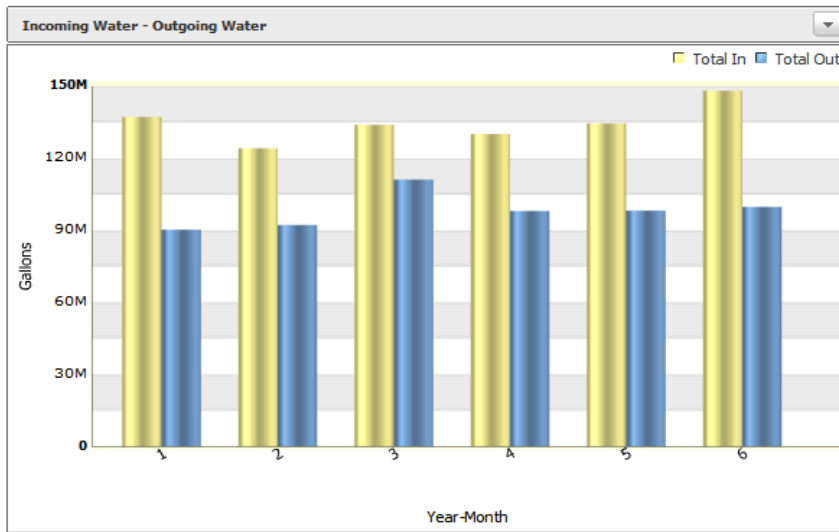
IBM Green Sigma™

The Green Sigma™ Dashboard for Energy proactively monitors KPI data, alerts and trends, and enables drill-down analysis...



IBM Green Sigma™

Similarly, the Green Sigma™ Dashboard for Water monitors KPI data, alerts and trends to drive Water related benefits



Why Smarter Cities? Why now?

Technological

- Convergence of pervasive digital networks, cheap sensors, cheap analytics
- There are over 4 billion mobile cellular subscribers in the world today (60% penetration)
- Location-based services and social networking continue to grow in capability and popularity
- IT has made it possible for global enterprises to operate anywhere in the world

Social/Demographic

- At the end of 2008, 50% of the world population lived in a city
- Urban population will almost double between 2010-50 (to 6.4B!)
- 18 countries in the world with contracting populations (in 2050, 44)
- Asia will become 50% urban in next 15 years
- Rapid urbanization is creating high stresses for many Asian cities, in turn driving the construction of hundreds of new cities

Economic

- The top 100 urban agglomerations currently account for 25% of worldwide GDP
- Developed world has underinvested in its cities; the developing world needs new urban infrastructure (\$41T needed by 2030)
- Rise of “new” cities (MASDAR, New Songho City, GIFT, KAEC, etc.)
- Global financial crisis is spurring government stimulus, creating new jobs

Environmental

- Drive for cities to cut carbon emissions and increase the energy they get from renewable sources
- There will be 1.2 billion cars on the road by 2015 (~1 car/6 people)
- 95% of the world's cities still dump raw sewage into their waters



Smarter Cities Bring it All Together – with intensive use of information technologies for sustainable development

Intelligent Transportation Systems

- Road Usage Charging/Congestion Pricing
- Integrated Fare Management
- Traffic Information Management

Energy Management

- Smarter Building Management
- Automated Meter Management
- Smart Grid – Demand Management
- Energy Network Monitoring & Stability
- Proactive management of the alternative energy mix

Water Management

- Water purity monitoring
- Water use optimization
- Waste water treatment optimization

Public Safety

- Smarter Surveillance Systems
- Emergency Management Integration
- Micro-Weather Forecasting
- Cyber-security

Telecommunications

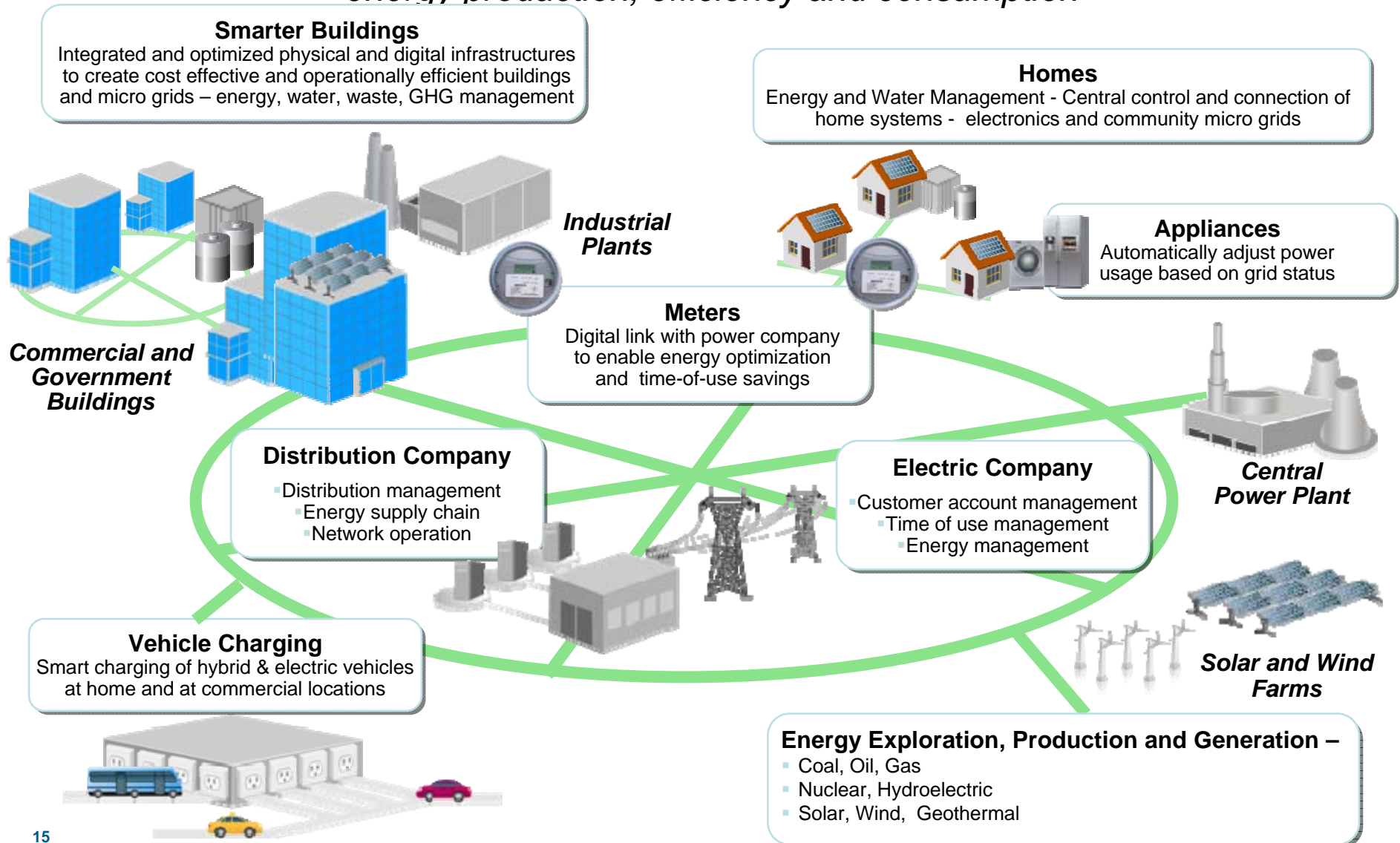
- Fixed and mobile operators
- Media Broadcasters

Environmental Management

- City-wide Measurements
- Key Performance Indicators (KPI's)
- Energy, Water, Waste, CO₂ Management
- Scorecards
- Reporting

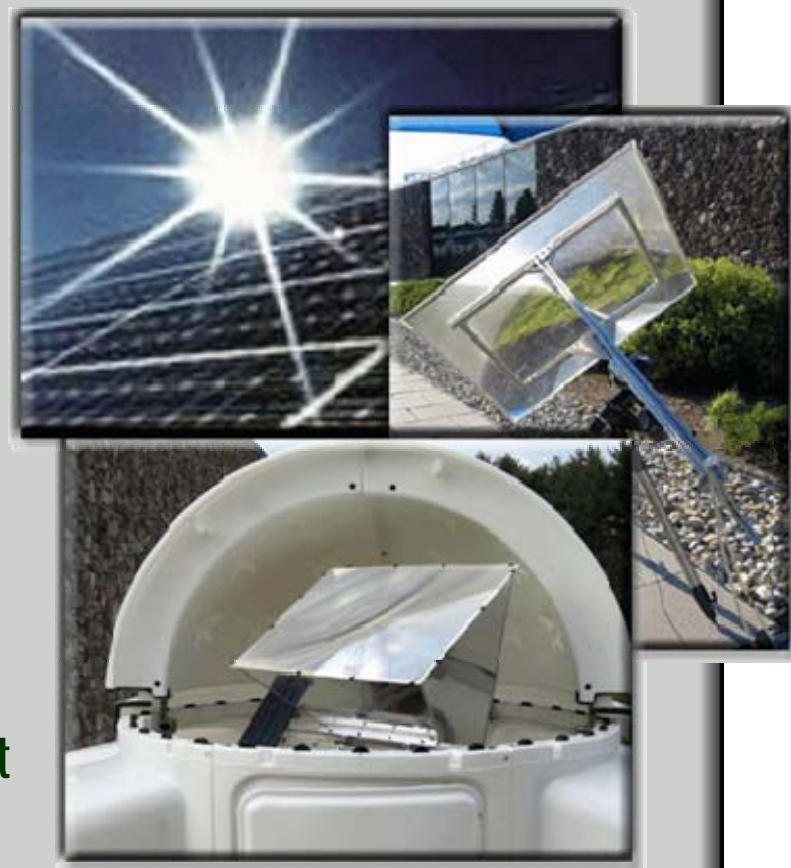
Energy Management in a Smarter Planet

The interconnection of physical assets and information technology can optimize energy production, efficiency and consumption



IBM Energy and Environment Research

- Leverage know-how in thin films, semiconductors, silicon, materials science, cooling for photovoltaics including concentrator photovoltaics
- Energy Storage Research – Lithium/Air
- Nanomembranes for Reverse Osmosis filtration of salts and other toxins from water for desalination
- Modeling analytics for optimization in energy efficiency and renewable energy
- Cyber-security research and development
- IBM Center of Excellence for Nuclear Power in LaGaude, France



The Green Sigma™ Coalition

Working together to co-create a Smarter Planet, Smarter Cities, Smarter Buildings

- **Accelerating** the move toward **sustainable enterprises**
- Collaborating on showcase projects to **drive quick ROI & continuous improvement**
- Enabling public & private enterprises to **reduce energy, water, waste and GHG Emissions... across the value chain. Saving money, time and resources.**



IBM has a long history of environmental tradition and leadership.



1976: Think!, the company magazine, devoted an entire issue to IBM's energy conservation and environmental programs

1990: Think! Devoted an entire issue to IBM's environmental programs – beginning IBM's annual Corporate Environmental Reporting

1991: Established IBM's Product Stewardship Program



1997: IBM becomes the first major multi-national to earn a single global registration to the ISO 14001 environmental management system standard

96%

2006: Amount of IT product and product waste processed by IBM's product End-of-Life Management operations that was reused or recycled

2006: IBMers "Jam" on innovation for a better planet, and IBM invests in Big Green Innovations

44%

1990 - 2006: Between 1990 and 2006, IBM's global energy conservation actions reduced or avoided CO₂ emissions equal to 44% of its 1990 emissions



1971: T. J. Watson Jr. issued IBM's first corporate policy on environmental protection

1989: IBM offers its first product take-back program

95%

1987 - 2006: Reduction in hazardous waste generation since the 1987 base year of this pollution prevention metric

1992: IBM becomes charter member of Energy Star Program



1994: Established Global Materials Recovery Center Network for product re-use and recycling

2007: Invested in Intelligent Utility Networks, Intelligent Transportation Systems, Project Big Green



Collaborating to develop solutions ...



WORLD RESOURCES INSTITUTE

CLIMATE LEADERS
U.S. Environmental Protection Agency



The Nature Conservancy
Protecting nature. Preserving life.™



blade.org



the green grid™



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