

Smarter Infrastructure – Building a Smarter Planet



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The need for a smarter infrastructure is clear

42% / 2025

Buildings consume 42% of all electricity. By 2025 they will be the largest emitters of greenhouse gasses on our planet.

85% / 30%

85% of companies are focusing on sustainability, but only 30% are collecting data frequently enough to impact operations.

2020 / 25%

UK electricity demand will exceed current and planned capacity by 2020, and consumer electricity prices will increase 25%.

The benefits can be substantial

40% energy savings

Smarter buildings can reduce energy usage by 40% and reduce building maintenance costs 10-30%.

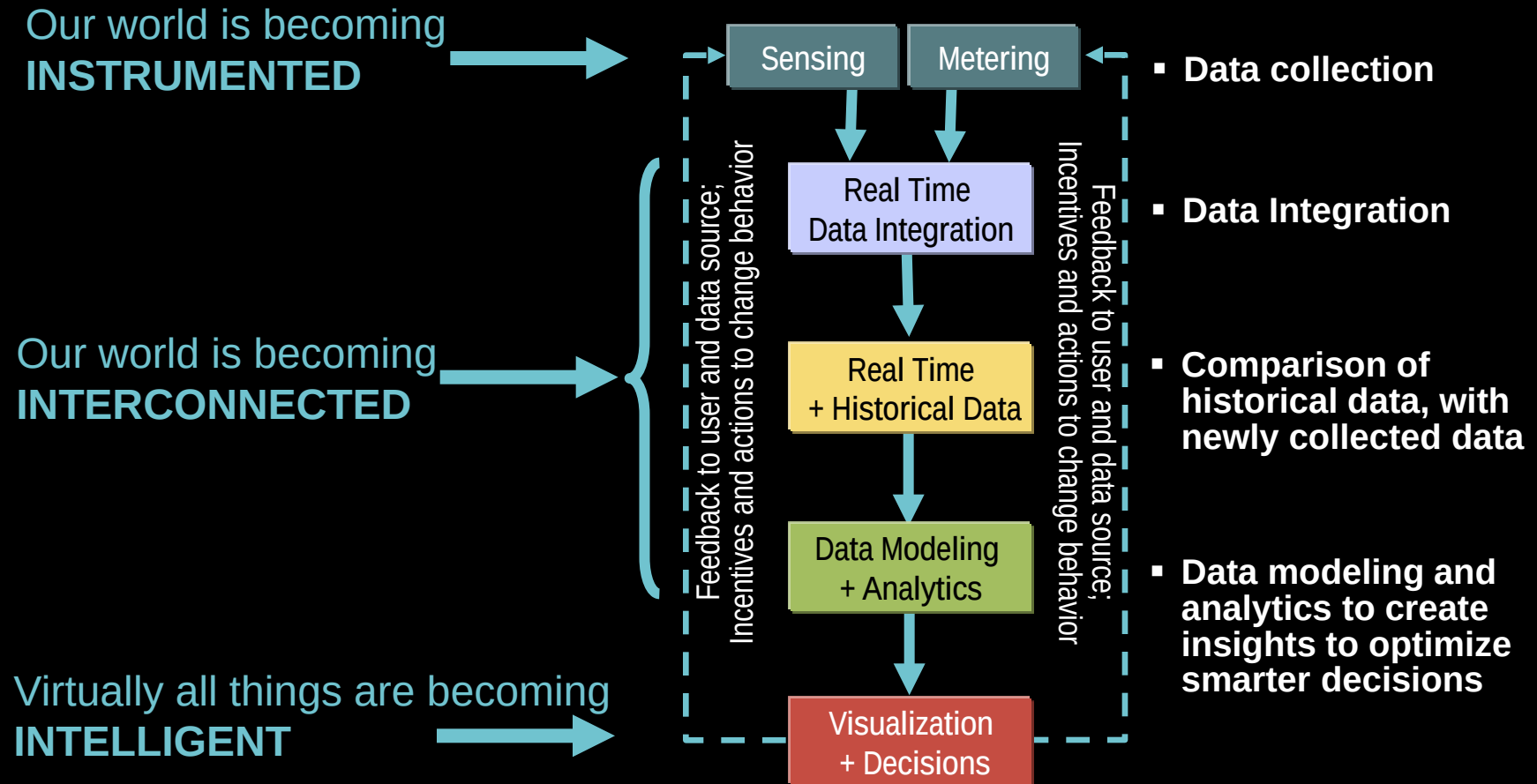
23% / 15%

Global shipping firm Cosco reduced distribution centers from 100 to 40, lowering logistics costs 23% and reducing CO2 emissions 15%.

2000 tons / 30%

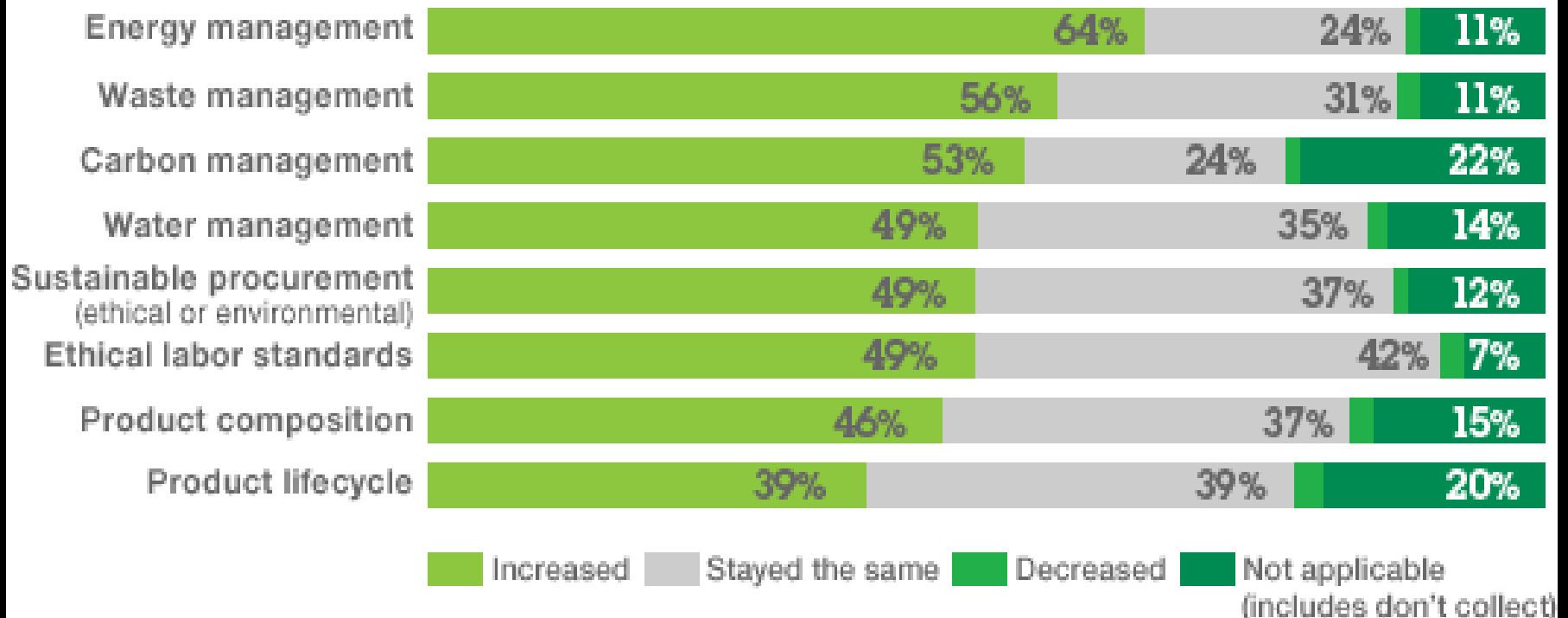
Statistical modeling will allow UK's DEFRA to cut 2,000 metric tons of CO2 emissions per year and cut energy costs by more than 30%.

What does it mean to become Smarter?



Instrumentation is increasingly capturing more data... Now to make it into real intelligence to enable smarter decisions

Change in information collection over the past three years (Percent responses)

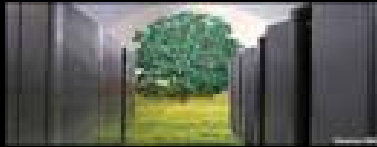


Source: IBM Institute for Business Value 2009 CSR Study

IBM innovations gather and interconnect information, and create intelligence to enable smarter decisions to address energy & environment challenges

Smarter IT Infrastructure

Green IT and Data Centers

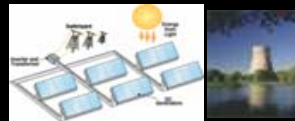


- Energy Efficient, Virtualized, Dynamic IT/Datacenter
- Monitoring & verification of efficiency goals
- Measurement & Management Technology
- Cloud computing
- *IBM and client case studies: 40% to 80% energy use reduction, up to 85% less floor space*

Smarter Transportation Systems



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



Smart Grid

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

Smarter 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*



Sustainable Business Solutions & Services

- Green Sigma TM
- Green SNOW - Supply Chain Network Optimization Workbench
- *Smarter Cities*
- *Smarter Buildings*



Alternative Energy Research

- IT to ET: Applying IT cooling technologies to concentrator PV
- IBM know-how in thin films, advanced photovoltaic materials
- Nanomembranes for desalination
- *Energy storage, modeling and analytics for optimization in energy efficiency and renewable energy, etc.*

What *is* a Smarter Building?

Smarter Buildings are well managed, integrated physical and digital infrastructures that provide optimal occupancy services in a reliable, cost effective, and sustainable manner.

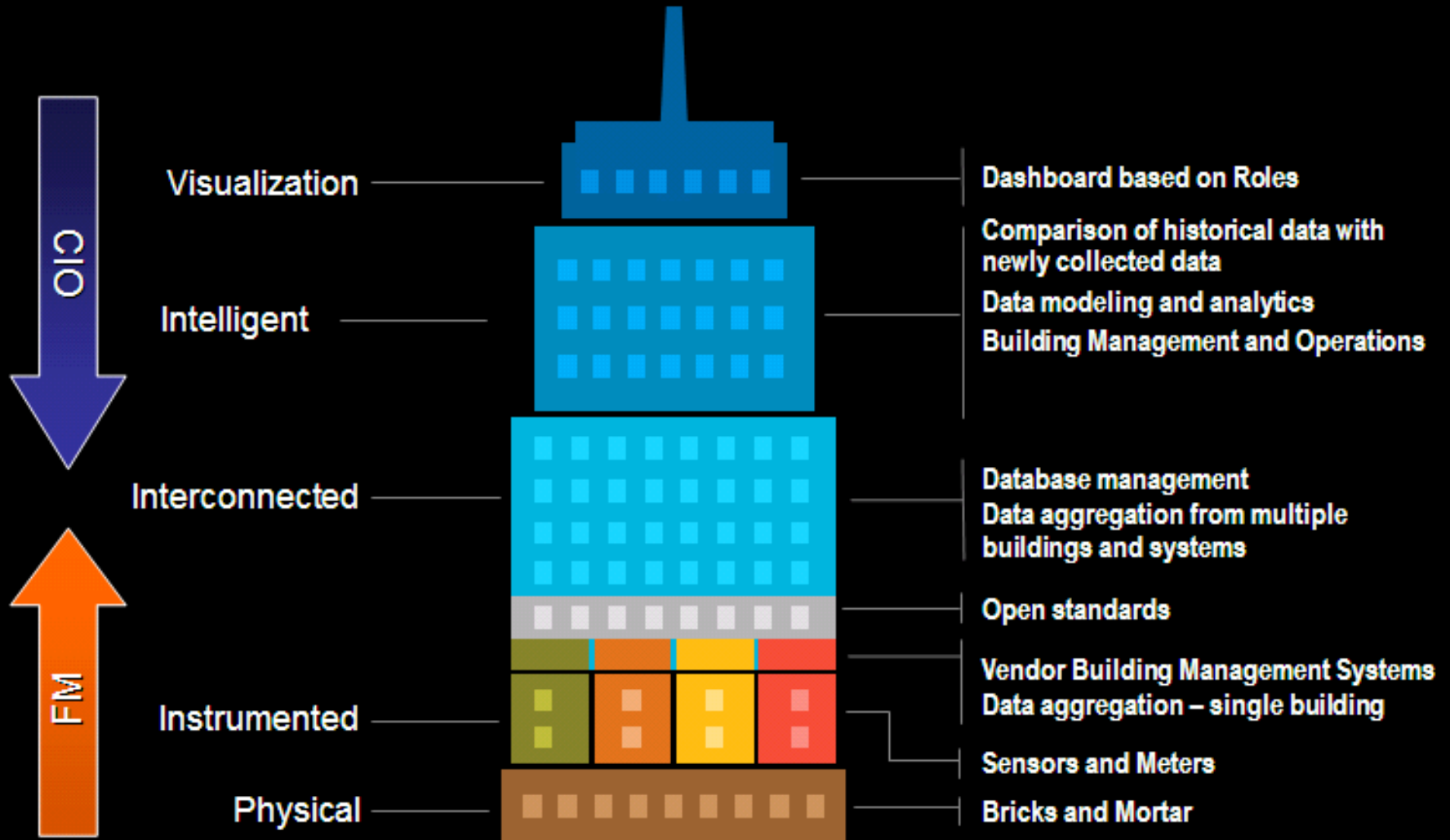


■ Smarter Buildings...

- Are more cost effective by reducing energy and operating costs.
- Use active and designed-in techniques to achieve efficiency and environmental responsibility.
- Have the ability to interact with occupants inside them as well as the environment around them.
- Maintain a safer and more secure workplace.
- Communicate in real-time to supporting infrastructure (i.e. smart grid, broadband, etc.).

Convergence Creates a Smarter Building

The technology and architecture of a smarter building



Energy Efficiency & Operational Benefits are Real

Dragon Hotel

World-class, personalized experience



Automatically register the arrival of visitors, direct them to their rooms, customize temperature settings based on weather and preferences, electronic peephole provides outside room view to room TV, and even record attendance at conference events.

Ave Maria University

Maintained control across facility portfolio



IBM teamed with Johnson Controls to converge 23 systems onto single IP network, and integrated Johnson Control Metasys with IBM Maximo. Saved the client \$1M in building costs and \$350K/yr in combined operating costs.

DC Water & Sewer

Predictive analytics to manage service & delivery



By implementing a smarter water solution, DC Water can better schedule crews, prevent pipes from breaking, prevent pollution during storms, predict & manage demand, and make smarter capital investments.

Teaming to deliver client benefits

Johnson Controls & IBM: IBM HQ & Rochester

Teaming to bring energy and operational efficiency to IBM facilities



- ❖ Expect additional 5+% energy cost reduction
- ❖ Data correlation anticipates events, identifies faulty equipment and points to operational energy savings

Eaton Corp. and NC State University Collaboration with IBM on Smarter Building Initiative (SBI)



- ❖ Defining a Smarter Building from facility owners/manager point of view
- ❖ Developing technologies for “last mile” of smart grid
- ❖ FREEDM Center demo of Smarter Buildings vision

Schneider and Bryant University Extended innovation already in use in the data center across the campus



- ❖ Disparate data in a common repository for use across the facilities, IT and administrative functions
- ❖ Usage trending and analysis help university reduce carbon footprint

IBM's sustainability leadership and experience is leveraged to build smarter infrastructures around the world



IBM's Internal Sustainability Results are Strong

- Avoided CO2 emissions by an amount equal to 50% of our 1990 emissions by 2008
- Saved \$370 million in energy expense in the tens of millions of square feet we manage
- Grew our renewable energy purchases from 11MkWh in 2001 to 560M kWh in 2009
- Exceeded our water conservation goal
- Earned over \$20M (US) in efficiency related rebates in the past year.

Our strategy forward is simple, use our own sustainability efforts and lessons learned to help others.