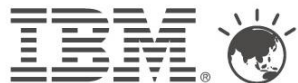




# ReThink

## 企業 突破力

落實創新，再造企業新局！



**ReThink**  
**企業 突破力**

落實創新，再造企業新局！

# IBM TRIRIGA

## Smarter Building Opportunities

Tony Stack,  
Senior Leader of Corporate Real Estate  
WW TRIRIGA Center of Competency  
5 July 2013



VISIBILITY



CONTROL



AUTOMATION



# What really is the driving force?



**I WANT YOU**  
TO BUILD  
SMART BUILDINGS

**ReThink**



# Our Future is Driving the Need for Smarter Buildings

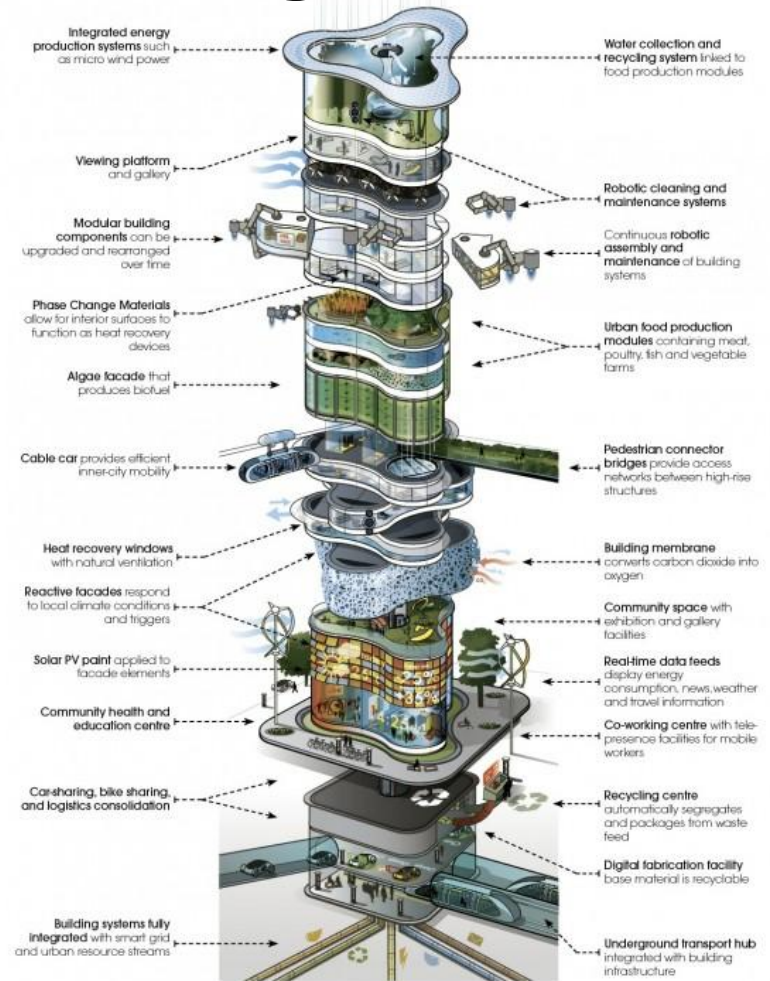
**By 2050**, the world's population will have reached 9 billion, with 75% of inhabitants living in cities.

**By 2030**, South Asia and Africa will add 200 million new workers.

**By 2030**, 93% of the world's middle class will be from emerging markets up from 56% in 2000.

**By 2025**, emerging economies will account for nearly 50% of the world's consumption.

**By 2040**, Korea, Taiwan, and Singapore will be vying with Germany, Italy & Japan for the title of oldest country on earth.



ARUP foresight

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# Our Agenda

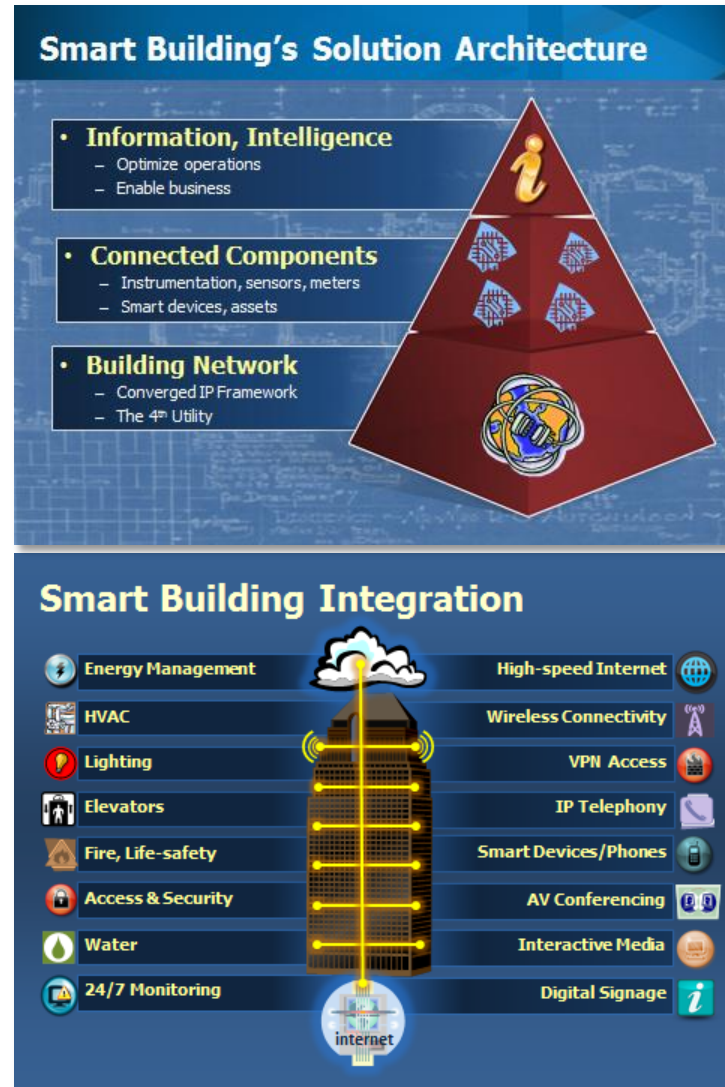
- Smart Buildings – what are they?
- Smart Buildings = Smart Results
- Smart Buildings = connecting to structures to functions
- Why you should care about Smarter Buildings
- Trends to watch of for in the next decade
- Future of buildings
- What really is the driving force?
- A day in the life of.....

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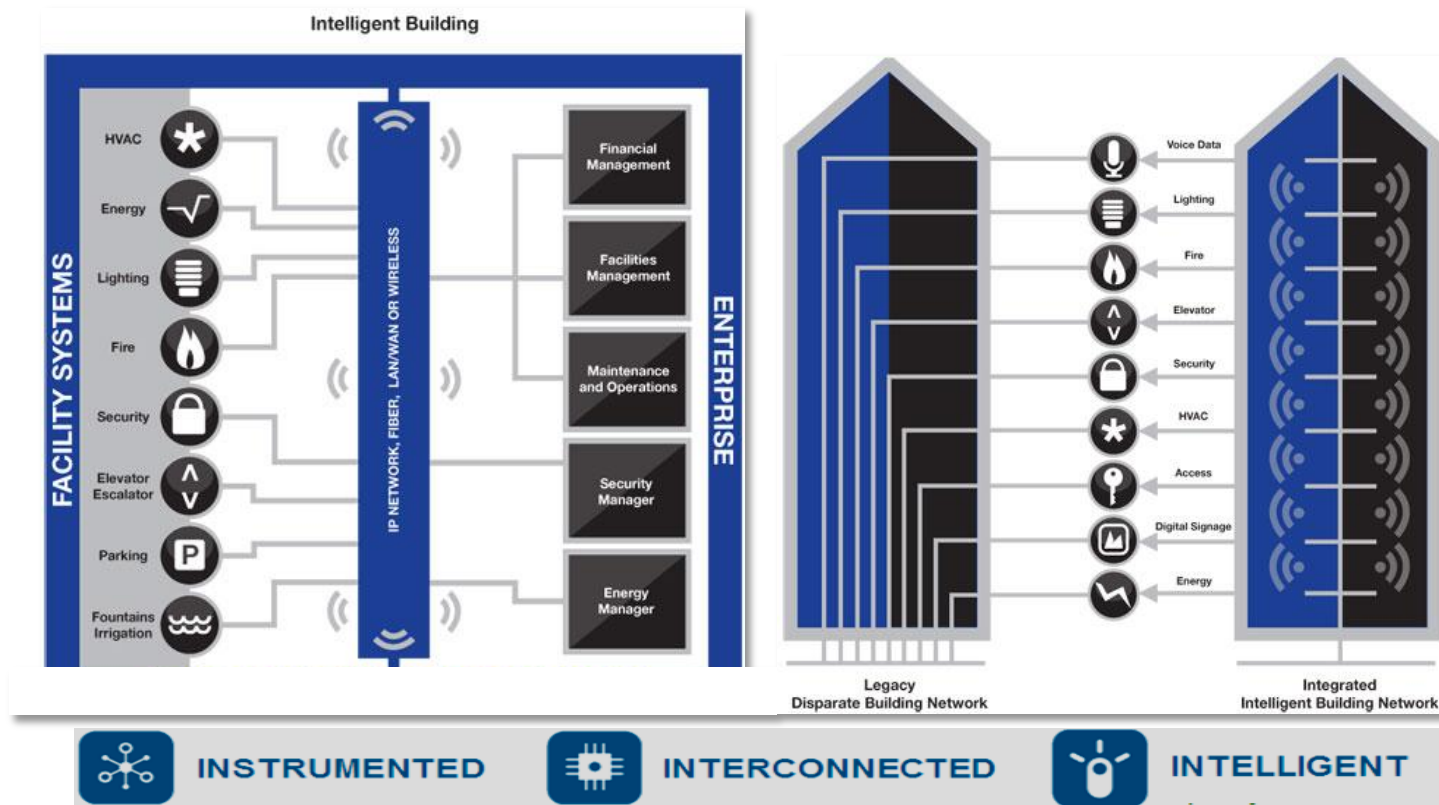
# What is a smart building, really?

- Historically focussed on the use of Building Automation Systems that control building heating, air-conditioning and security systems.
- Now more focussed on “interconnected, instrumented and intelligent” systems upon which building services can be delivered: data, networking, telephony, environment controls, security systems, etc
- History
  - First coined in early 1980s
  - Model is still evolving
    - Automated buildings (1981- 1985)
    - Responsive buildings (1986- 1991)
    - Effective buildings (1992-





# Smart Buildings = Smart Results



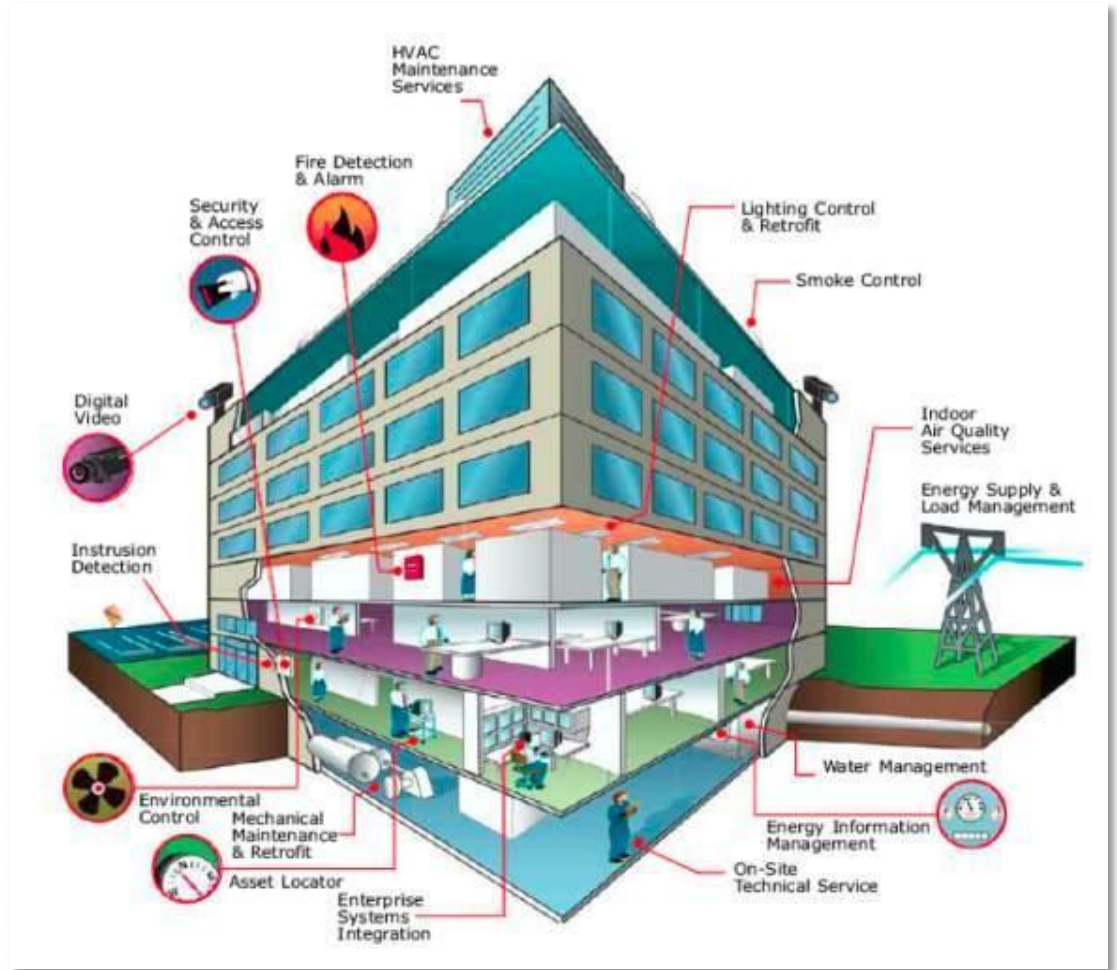
- Whether new or old facility, the power of interconnection, instrumentation and intelligence delivers a smarter building package through building automation that equals substantial savings!

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# Connecting Structures to Functions

- Smart-building technology now exists to interconnect all the various operational systems of a building into one network that can optimize resource utilization based on real-time fluctuations in environmental and occupancy conditions.



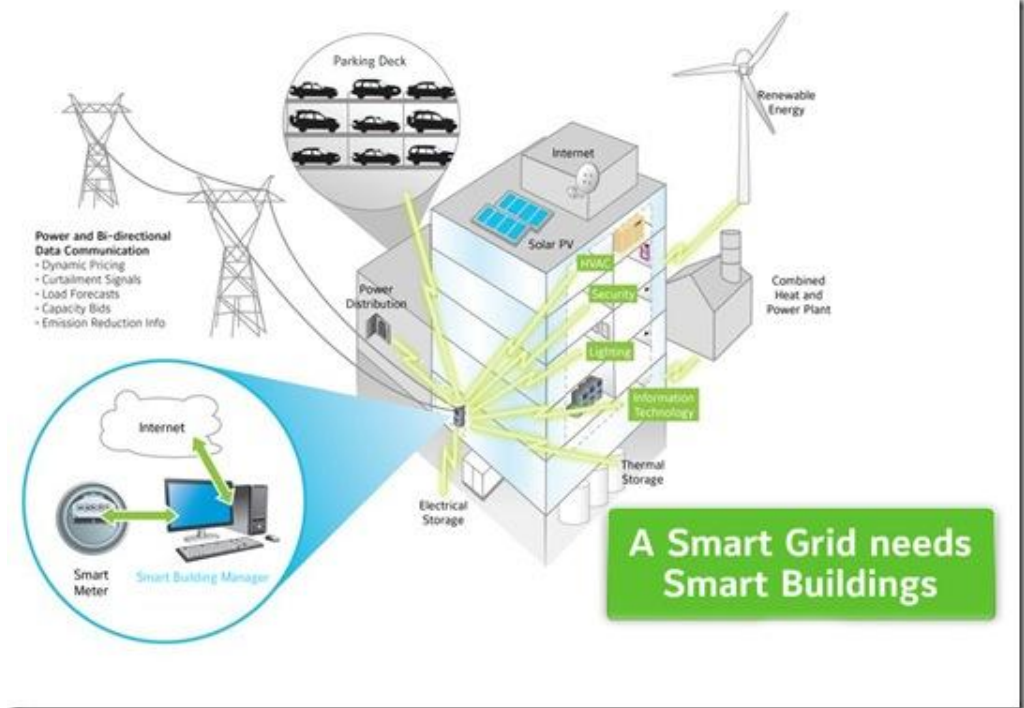
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# Connecting Structures to Functions

- Connecting building systems
- Connecting people and technology
- Connecting to the bottom line
- Connecting to the global environment
- Connecting to the smart power grid
- Connecting to an intelligent future.





**Why you should care.....**

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# The need for Smarter Buildings is clear

2

Real estate is the second largest expense on the income statement for most companies.

2025

By 2025, buildings worldwide will become the top energy consumers.

3

In most organizations the real estate portfolio is on the balance sheet as the third most valuable or expensive single asset.

42 percent

Worldwide, buildings consume 42% of all electricity – up to 50% of which is wasted.

30 percent

Facilities investments and operating costs can be more than 30% of corporate annual spending.

1

Buildings are the number 1 contributor to global CO2 emissions.





# Smarter Buildings technology generates significant returns

**25% faster project builds**

Project schedules accelerated up to 42% — an average improvement of 25%.

**75% lower work order costs**

Cost of a single work order reduced up to 88% — a savings of 62% from the industry average.

**40% less energy consumed**

Energy usage reduced up to 40%.





# Who should care?

## Finance Executives

Because ...

.. new accounting rules will add billions in real estate assets to the balance sheets.

## Real Estate Executives

Because ...

.. manufacturing represents top-line revenue and a top-four cost of business for majority of retailers.

## Sustainability Executives

Because ...

.. only one-third of manufacturers have achieved their stated energy reduction goals.





# Real estate and facilities executives face myriad challenges

“The new [lease accounting] standard will increase the complexity of real estate decisions.”

“We need to accelerate our projects to help increase revenues increase/ improve production cycles”

“To achieve our sustainability goals, we need to focus on reduction of our facility energy consumption.”



# IBM's Smarter Building technology

## ... makes staff more efficient

Integrates real estate and facilities processes

Automates operational controls

Alerts to critical tasks and activities

## ... generates higher return on assets

Identifies inefficient stores and processes

Models multiple project scenarios

Compares financial and non-financial returns

## ... mitigates compliance-related risks

Minimizes penalties and overpayments

Automates corrective service requests

Audits decisions, approvals and processes

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# It's Time for Change

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# A Time to Change

It is clear that there is an immediate requirement to significantly and urgently change the way buildings are managed.

*Businesses need to “...prepare for this century, not the last. Turning the oldest building stock in Europe into the most improved, with a nationwide commitment to energy efficiency”.*

UK Secretary of State for Energy & Climate Change, 2011 Annual Energy Statement <sup>1</sup>

*“Efficiency means less costly waste”*

*President Obama at the “Better Buildings Initiative” launch which aims to make US commercial buildings 20% more efficient. The purported impact of the initiative is a reduction US companies’ energy bills by about \$40 billion <sup>2</sup>*

<sup>1</sup>[http://www.decc.gov.uk/en/content/cms/news/aes\\_2011/aes\\_2011.aspx](http://www.decc.gov.uk/en/content/cms/news/aes_2011/aes_2011.aspx)

<sup>2</sup><http://www.good.is/post/better-buildings-initiative-and-innovation-cluster-announced-by-president-obama/>



# Smarter buildings – Who it appeals to

- Companies with:
  - more than 100 buildings in their portfolio
  - over 1 million sq. ft.(100,000 sq.m.) of real estate
  - environmental reduction targets
  - OpEx & CapEx reduction targets
  - ambitions for growth & innovation

- Oversees the finances of the entire company
- *Cost, Data, Globalization, Compliance*

CFO



- Operates property like a business
- *Cost, Data, Reliability, Action, Globalization, Compliance*

Corporate Real Estate



- Sets company sustainability strategy
- *Cost, Data, Action, Compliance*

Sustainability Manager



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# Customer building and real estate challenges



## Costs

Increasing & unpredictable

- Properties operating as silos of systems and data
- Too many business processes require manual intervention
- Difficult to identify true full cost of operating a property
- Low space utilisation



## Risk

Operational & reputational

- Loss of corporate knowledge to 3rd parties
- Hidden costs of building operations
- Increasing operational burden of legislation
- Customer scrutiny of sustainability performance



## Innovation & Growth

Suboptimal productivity

- Disparate building management systems
- Rich data is often unexploited in pursuit of business efficiency
- Variation in employee experience across locations
- Need to improve employee productivity

***Real estate & facilities functions NOW have an opportunity to drive strategic business value***

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# Diverse Portfolios.....



Single  
Bldg



Multiple  
Tenants



Special Use  
Building



Data  
Center



Campus w/  
Multiple Bldgs



Residential  
Real Estate

And.....

- Intense pressure on budgets
- Need to increase efficiency and productivity
- Corporate Citizenship and Perception

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# What are Smarter Buildings?

Smarter



Intelligent



Inter-  
connected



Instrumented



- Enables optimal property portfolio decision making
- Cost effective for its owners – reducing energy and operational costs
- Operationally efficient
- Comfortable and productive for property occupants
- Safer and more secure
- Environmentally responsible meeting corporate environmental and social responsibility reporting and goals



**The vast majority of Buildings are really very dumb!**

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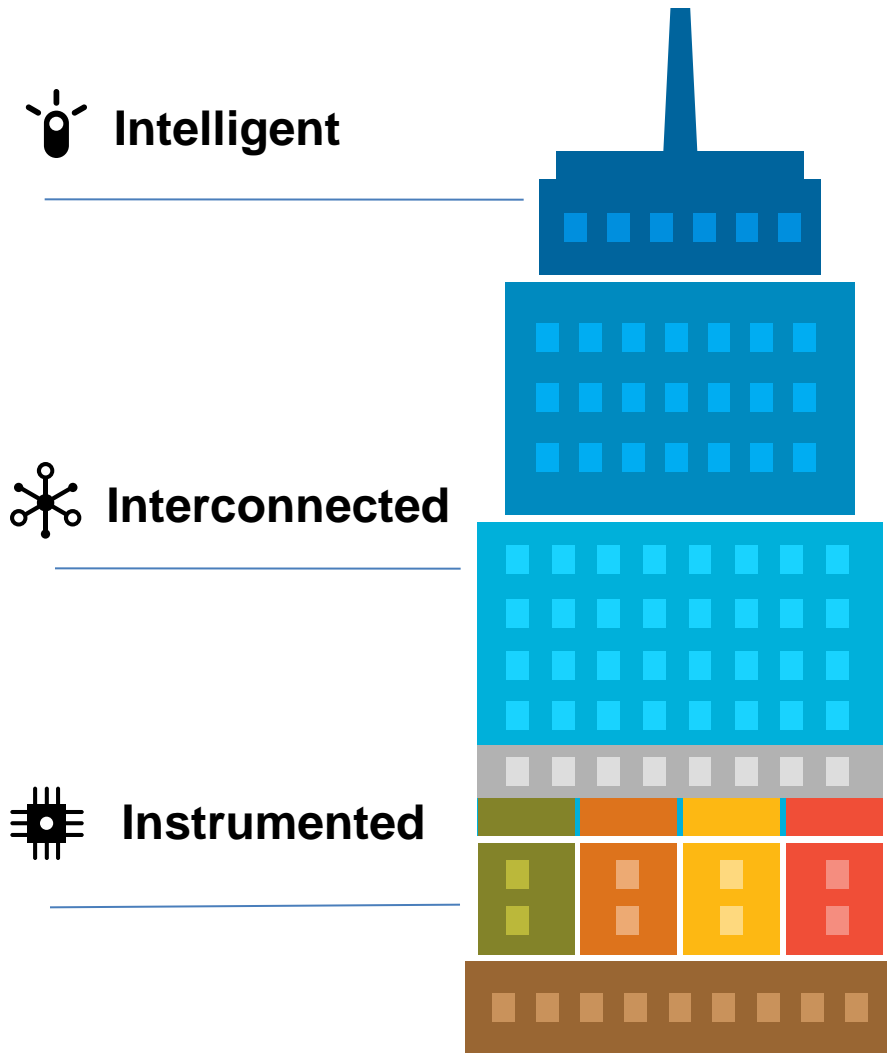
# The reality is rather different.....



About 80% of current buildings will still be around in 2050.....

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# Why is IBM interested?



## Use Analytics software To:

- Filter and prioritize building alerts
- Isolate poor performing assets
- Benchmark buildings and building equipment across enterprise portfolio
- Improve visualization with advanced dashboards

## Deploy software To:

- Aggregate resource consumption and equipment performance data
- Establish limits and rules representing performance standards
- Alert on sub-optimal operational conditions
- Automatically create Work Orders

## Aggregate data from multiple and disparate sources

- Install meters and sensors at selected points in the infrastructure
  - High energy and water use points
  - Reliability exposure points
  - Waste monitoring



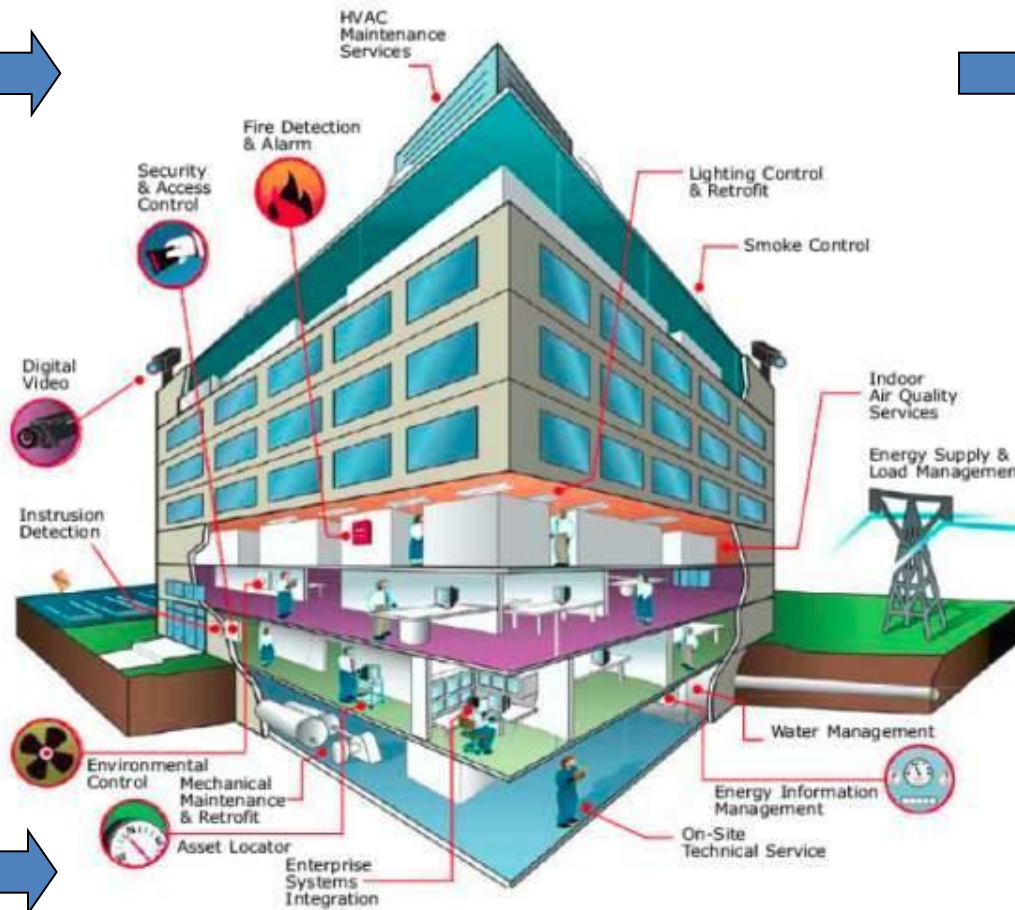
# What does a Smarter Building provide?

## Dashboarding for Key Stakeholders

- Benchmark data for occupants, operators
- Real-time visibility to events: weather, utility pricing, consumption

## Converge Energy and Business Data

- Energy data
- Space Utilization
- Occupancy
- Financial (leases, bills)
- Building ops



## Industry-specific Analytics

- Are my building systems out of spec?
- Predict and correct equipment performance
- Root cause analysis

## Control Mechanisms

- Automate building controls
- Optimal equipment scheduling (lead/lag)

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# What is the level of maturity of the majority of your buildings?

| Benefit area                  | Maturity Level Low  | Maturity Level Medium  | Maturity Level High  |
|-------------------------------|---|--|--|
| <b>Building asset records</b> | No asset data available in central repository                                     | Asset and Performance data available centrally but accuracy and completeness questionable or not available centrally | High quality accurate asset data available centrally. Advanced analytics applied to identify asset failure trends. |
| <b>Building Operations</b>    | Data only in individual control systems   |  |  |
| <b>Help desk</b>              | No centralised or formal Helpdesk system  |  |  |
| <b>Portfolio Information</b>  | Incomplete portfolio information  |  |  |
| <b>Performance management</b> | Incomplete supplier performance information/lack of performance management system |  |  |
| <b>Financial management</b>   | Incomplete financial information/lack of interface with financial systems         |  |  |



# Evolution of a smarter building

Value

**Gain** greater control over your facilities data, systems, people and processes.

**Build** more effectiveness into your operations across the lifecycle of facilities assets.

**Achieve** a smarter buildings strategy to generate higher returns on facilities assets.

Manage

- Increased productivity
- Improved compliance
- Historical analysis
- Reduced cost

Optimize

- Improved decision-making
- Mitigated risk
- Real-time analytics
- Increased return on investments

Transform

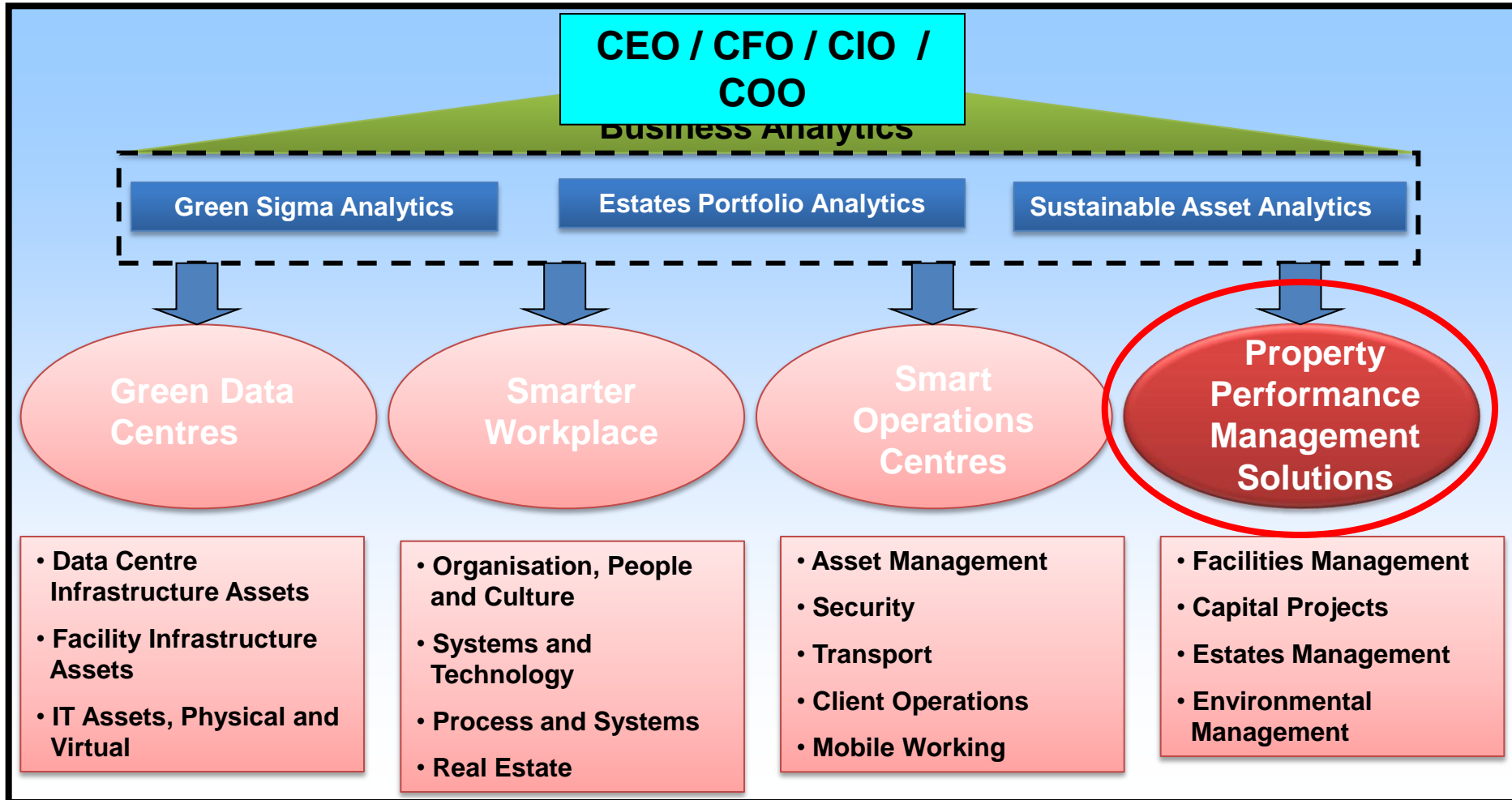
- Automated real-time response
- Predictive analytics
- Institutionalized controls
- Increased return on assets

Maturity

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# IBM acquires TRIRIGA to deliver Smarter Buildings



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# Smarter Building Solutions

TRIRIGA

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# IBM solutions for smarter buildings enable energy, operations and space efficiency



## Environmental & Energy Management

- Real-time energy & operating analytics
- Event filtering & correlation
- Utility consumption tracking
- Carbon measurement
- Environmental investment analysis
- BMS integration

## Facilities Management

- Space utilization
- Capacity planning
- Move, add, change
- Reservations
- CAD integration

## Facilities Maintenance

- Asset management
- Work management
- Inventory management
- Supply chain
- Key management
- Condition monitoring
- BMS integration

## Capital Project Management

- Condition assessment
- Capital planning & budgeting
- Construction estimating & project management

## Real Estate Management

- Strategic portfolio planning
- Budgeting and forecasting real estate expense
- Lease & contract admin

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### Environmental & Energy Management

- Real-time energy & operating analytics
- Event filtering & correlation
- Utility consumption tracking
- Carbon measurement
- Environmental investment analysis
- BMS integration

**Achieve Sustainability Goals**

### Facilities Management

- Space utilization
- Capacity planning
- Move, add, change
- Reservations
- CAD integration

**Increase Utilisation of Facility Assets**

### Facilities Maintenance

- Asset management
- Work management
- Inventory management
- Supply chain
- Key management
- Condition monitoring
- BMS integration

**Extend the Life of Critical Assets**

### Capital Project Management

- Condition assessment
- Capital planning & budgeting
- Construction estimating & project management

**Generate Highest Return on Invested Capital**

### Real Estate Management

- Strategic portfolio planning
- Budgeting and forecasting real estate expense
- Lease & contract admin

**Build More Effectiveness into Real Estate Operations**



# Environmental and energy management to achieve sustainability goals

IBM has emerged as a leader in carbon and energy management software based on its advanced capabilities and solid market momentum.

*David Metcalfe, Chief Executive Officer, Verdantix*



## Main Features

- Pre-built integration to building management systems and equipment sensors
- Advanced real-time energy and environmental analytics
- Environmental funding analysis for capital projects such as energy efficiency programs



## Benefits

- Automates capture of energy, waste and water consumption data to accelerate data analysis
- Identifies inefficient assets and generates corrective work orders to increase energy efficiency
- Enables continuous energy performance optimization

### Featured IBM solutions:

IBM TRIRIGA Energy Optimization; IBM TRIRIGA Real Estate Environmental Sustainability Manager

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# Smarter Building Environmental.....

## SMART IS

Solving building systems shortcomings with the most appropriate, effective & energy efficient approaches.



### Tulane University:

Connecting to existing building systems to collect metered data; incorporating advanced analytics to uncover sub optimal conditions; bringing disparate data together to drive better decision making and measurably reduce overall energy costs. Alliance Partner: Johnson Controls.

## SMART IS

Integration of energy and asset management to lower operating cost.



### IBM Rochester, MN:

Incremental energy savings of approximately 5% yearly through various improvements and programs; after the installation of IBM Intelligent Building Management, the team achieved an incremental 8% savings. Alliance Partner: Johnson Controls.

## SMART IS

Optimizing energy consumption lowers operating costs and reduces carbon emissions.



### Bryant University:

An IT initiative to create an energy-efficient data center shifted to a partnership between IT & Facilities to construct smarter buildings. A 15% reduction in energy use and 50% reduction in data center floor space has reduced their carbon footprint. Alliance Partner: Schneider Electric.

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# Facilities management to increase utilization of facility assets

IBM's Strategic Facility Planning is just that. Strategic.  
*Michael Bell, former Research Vice President at Gartner, Inc.*



## Main Features

- Scenario modeling and analysis for all types of facility planning — strategic, master and tactical
- Employee self-service with automated service management processes and controls
- Workplace reservation management for shared workspaces, conference rooms and assets



## Benefits

- Determines best-fit facilities planning scenarios to increase return on facilities assets
- Accelerates product/service and move requests to increase service efficiency and reduce costs
- Increases space utilization to reduce occupancy and operating costs

**Featured IBM solutions:**  
IBM TRIRIGA Facilities Manager

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# F10 Conglomerate

Delivering global real estate strategies and services while reducing overall real estate spend

US Conglomerate that works on things that matter. Finding solutions in energy, health and home, transportation and finance. Building, powering, moving and curing the world. Not just imagining. Doing. XX works. XX is a Fortune10 Global Company with 5500 plus sites in 120 countries. Supporting a Conglomerate of major Businesses with unique Asset Classes

| Business Challenges   | IBM Solution  | Business Benefits   |
|---|---|---|
| <ul style="list-style-type: none"><li>▪ Single web-enabled solution that supports end-to-end RE lifecycle planning, analysis, development, delivery, operations, facilities planning and execution</li><li>▪ Flexible Business Driven Rules, Data Views and Approvals</li><li>▪ Managing global portfolio with corporate governance and consistency</li><li>▪ Enhancing financial reporting</li><li>▪ Reduce risk</li></ul> | <ul style="list-style-type: none"><li>▪ IBM TRIRIGA Real Estate supporting global Lease Administration and Accounting processes</li><li>▪ IBM TRIRIGA Facilities supporting space and move processes</li><li>▪ IBM TRIRIGA Operations supporting site operations and service delivery processes</li><li>▪ IBM TRIRIGA WPM providing power business analytics and executive dashboards for decision support</li><li>▪ IBM TRIRIGA Workplace Reservation Manager supporting Mobility and Hoteling needs</li></ul> | <ul style="list-style-type: none"><li>▪ Eliminated silo'd systems and improved data quality</li><li>▪ Provided global visibility of overall portfolio usage, enabling company to eliminate underutilized facilities, resulting in a reduction of real estate expenses of over <b>\$1 Billion Dollars</b> per year.</li><li>▪ Provided tools that helped achieve strategic, tactical and operational goals</li><li>▪ Provided consistency in RE Deal tracking, business case financials, approvals and deal audits</li></ul> |

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# Facilities maintenance to extend the life of critical assets

IBM software will help implement our NexGen IT vision and give USAF a data-driven approach to manage its real property and physical assets, as well as help us predict issues before they impact service and safety.

*Chief Information Officer, U.S. Air Force*



## Main Features

- Self-service and duplicate request management processes for corrective maintenance
- Preventive maintenance processes and integrated Service Level Agreements
- Routine-based inspections and integrate condition-based maintenance



## Benefits

- Avoids costly dispatches of internal or external service providers to resolve duplicate issues
- Automates generation an dispatch of preventive maintenance tasks to extend life of critical assets
- Evaluates operational, financial and environmental returns to optimize investments

### Featured IBM solutions:

IBM TRIRIGA Workplace Operations Manager; IBM Maximo Asset Management

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# Smarter Building examples

## SMART IS

Solving building systems shortcomings with the most appropriate, effective & energy efficient approaches.



### Tulane University:

Connecting to existing building systems to collect metered data; incorporating advanced analytics to uncover sub optimal conditions; bringing disparate data together to drive better decision making and measurably reduce overall energy costs. Alliance Partner: Johnson Controls.

## SMART IS

Integration of real time identification of asset performance issues and automated maintenance notification



### IBM Rochester, MN:

On assets where the IBM solution was deployed, reactive maintenance was decreased by 16% and total maintenance hours by 49%. IBM campus in Rochester, MN.

## SMART IS

Optimizing energy consumption lowers operating costs and reduces carbon emissions.



### Bryant University:

An IT initiative to create an energy-efficient data center shifted to a partnership between IT & Facilities to construct smarter buildings. A 15% reduction in energy use and 50% reduction in data center floor space has reduced their carbon footprint. Alliance Partner: Schneider Electric.

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# Capital project management to generate highest return on invested capital

[IBM] provides strategic decision-making tools, rather than just tactical applications, and it hits on all of the top priorities that executives need to accelerate and deliver cost-effective capital programs.

*Global Director, European Manufacturer*



## Main Features

- Program and project portfolio management, with funding request analysis
- Critical path scheduling, critical date alerts and automated reminders
- Consultant and contractor management processes and controls



## Benefits

- Generates high return capital projects that balance risks, financial and environmental returns
- Identifies critical tasks and processes to reduce program and capital project schedules
- Automates procurement and contract life cycles to reduce change orders and overpayments

### Featured IBM solutions:

IBM TRIRIGA Capital Project Manager

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# Global Coffee House

Driving Revenue Days into business through project improvements

Global Coffee House has become a beacon for coffee lovers everywhere, with close to 18,000 stores in over 60 countries. Why do they insist on XXXX? Because they know they can count on genuine service, an inviting atmosphere and a superb cup of expertly roasted and richly brewed coffee every time.

## Business Challenges

- Managing aggressive new store expansion goals (300 new stores/month globally)
- Improving communications between internal and external stakeholders during store construction and renovation projects
- Improve service-management for each store while maintaining the familiar processes

## IBM Solution

- IBM TRIRIGA Projects & Real Estate for new store transaction projects (adding lease admin and accounting in 2014)
- IBM TRIRIGA Offline for vendor interaction during projects
- IBM TRIRIGA Operations (new) for store operations and service management
- IBM TRIRIGA Project (new)
- IBM TRIRIGA Facilities (new)

## Business Benefits

- Eliminated silo'd project management systems and improved data quality
- Improved communication with vendors and internal Starbucks departments during store openings
- Shortened new store delivers (from site selection to cup of coffee) from 50+ days down to 32 days to **gain revenue days for each store**

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# Real estate management to build more effectiveness into real estate operations

IBM has been among the earliest to focus on and develop functionality for the impending FASB/IASB accounting change.

*Rob Schafer, Research Director, Gartner*



## Main Features

- Site selection analytics with project-specific weighting of financial and non-financial criteria
- Critical path scheduling, date alerts and automated reminders
- Real estate payment reconciliation processes and controls
- Lease accounting financial analysis, and audit controls



## Benefits

- Generates higher return real estate transactions that balance financial and non-financial needs
- Identifies critical tasks & processes to reduce real estate transaction & lease administration cycle times
- Identifies landlord overcharges to reduce occupancy & operating costs
- Accelerates compliance with new global lease accounting standard

### Featured IBM solutions:

IBM TRIRIGA Real Estate Manager

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# Global Cell Phone Manufacturing Firm

Delivering global real estate strategies and services while reducing overall real estate spend

A global telecommunications and wireless services organisation with 2006 revenues of over 41 billion, an operating profit of €5.5 billion euros, an employee base of 68,000 employees, and operations in 130 countries worldwide, the company's extensive real estate portfolio consists of 480 buildings comprised of over 22 million square feet of office, R&D, production and warehouse space

| Business Challenges  | IBM Solution   | Business Benefits  |
|--|--|--|
| <ul style="list-style-type: none"><li>• Higher than industry average occupancy costs</li><li>• 50% annual churn rate that resulted in over 28,000 moves per year</li><li>• Over 65 disparate, decentralized systems located in five different regions used to manage real estate lifecycle</li><li>• No consistency in operating processes, standards or performance metrics</li></ul> | <ul style="list-style-type: none"><li>▪ <b>IBM TRIRIGA Real Estate</b> (portfolio and lease administration) isolated overpayments and reduced hold over charges</li><li>▪ <b>IBM TRIRIGA Facilities</b> supporting space and move processes</li><li>▪ <b>IBM TRIRIGA Operations</b> supported site operations and service delivery processes</li><li>▪ <b>IBM TRIRIGA WPM</b> providing power business analytics and executive dashboards for decision support and assisted in streamlining business processes</li></ul> | <ul style="list-style-type: none"><li>• Reduced electricity energy consumption by 7% in 2006</li><li>• Reduced real estate portfolio by 3 million square feet</li><li>• Reduced annual occupancy costs by €500 million euros</li><li>• Reduced global workplace organization staff from 480 to 127 employees</li></ul> |

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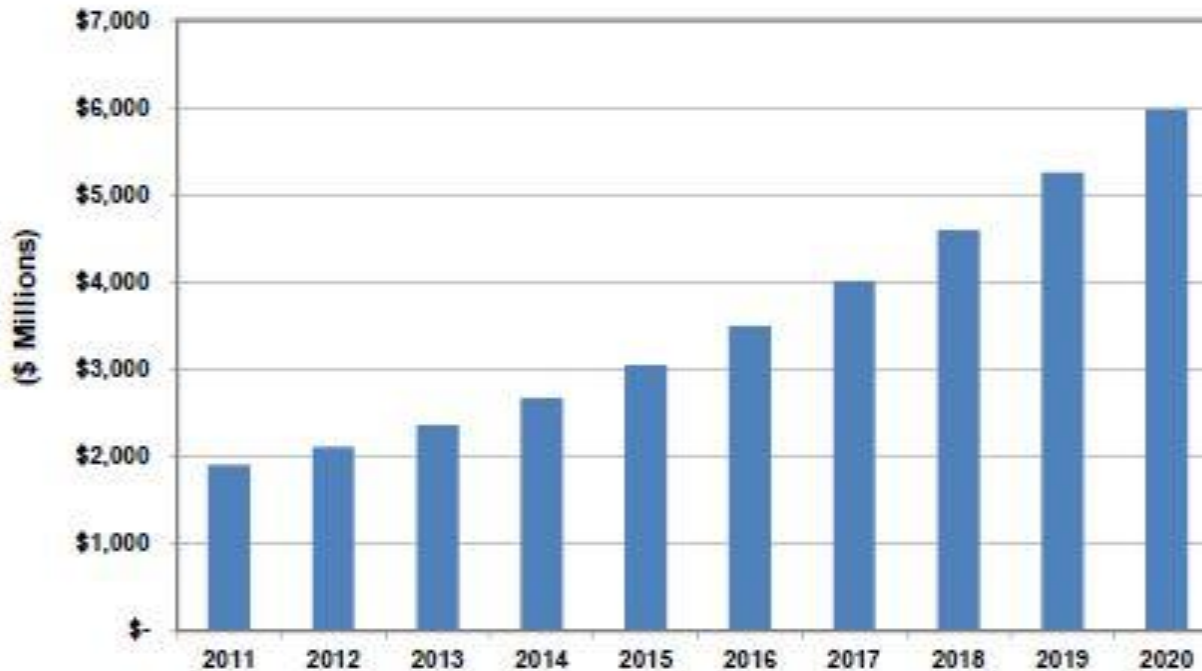


# Ten Trends to watch for (opportunities)

- Building energy management hits the cloud
- Co-opetition is on the rise in the building industry
- Targeted acquisitions help key players deliver end-to-end monetised energy services
- Demand for smart building products in Asia Pacific will soar, driven largely by China
- U.S. energy service companies turn to the federal sector
- Building communication protocols are converging in more ways than one
- Demand response is shifting into automatic
- Sub-meters find new opportunities in smarter buildings
- Building information modeling (BIM) is transforming the design process
- The interface between smart buildings and the smart grid is blurring

# Trends.....

Chart 2.1 Building Energy Management Systems Market Revenue, World Markets: 2011-2020



(Source: Pike Research)

- As cloud based solutions mature and improve, Building Energy Market will grow – est \$1.9 billion (2011) to \$6 billion (2020) – GTS, GBS, and SWG Opps.