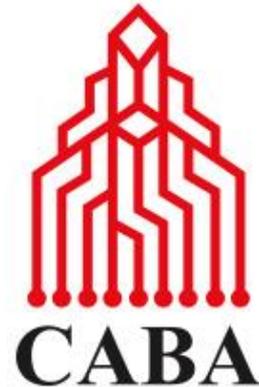


Growth in Green and Intelligent Buildings: The Emergence of “Bright Green Buildings”

**Rawlson O’Neil King
Communications Director
Continental Automated Buildings Association**



About CABA



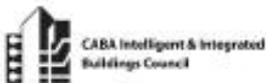
- **International not-for-profit industry association**
- **Dedicated to the advancement of intelligent home and intelligent building technologies**
- **Membership driven**
- **Provides members with networking and market research opportunities**
- **Celebrating 25th anniversary in 2013**



CABA

CABA works to strengthen the large building automation industry through innovative technology-driven research projects. CABA's Intelligent & Integrated Buildings Council (IIBC) has completed a market positioning research study called Bright Green Buildings - "Convergence of Green and Intelligent Buildings."

Frost & Sullivan was contracted to do the research with the final deliverables belonging to the CABA's Steering Committee.



www.caba.org/brightgreen

Green Building Growth

- Between 2005-2011, the green building segment grew 1,700% while the overall US construction industry shrank 17%
- By the end of 2011, green building represented 38% of the US construction market, up from just 5% in 2005. Profits have followed growth, with green building worth \$54 billion in revenue in 2011, and forecast to hit \$200 billion in 2016.

How Bright is a Green Building?

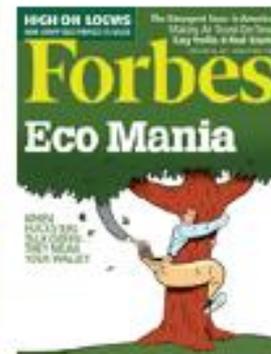
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**Intelligent, green,
and profitable =
bright green building**



GREEN the Best New Cover Story

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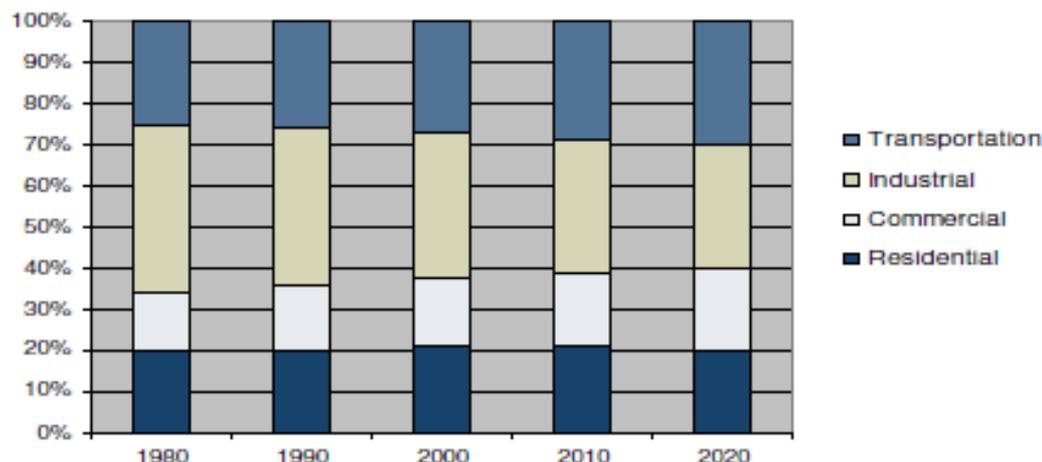
GREEN Important for the Industry

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Being Green improves the bottom line!

Energy Consumption Forecast by Sector (United States), 1960-2020



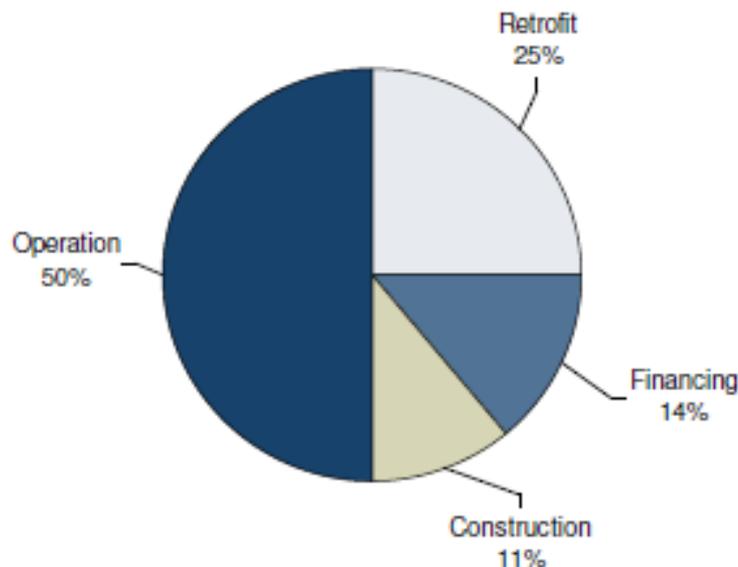
Source: Energy Information Administration (EIA)

- Commercial buildings account for 18% of energy consumption
- Energy costs represent about 30% of an office building's total operating costs-excluding staffing costs

- Energy Star notes that building managers can reduce energy consumption by up to 35%
- Energy Star states when investments are used to upgraded energy systems and technologies these incurred costs can achieve a 20 percent to 30 percent ROI

Why will intelligent technologies cost less than traditional technologies?

Building's Life Cycle Cost Over 40 Years



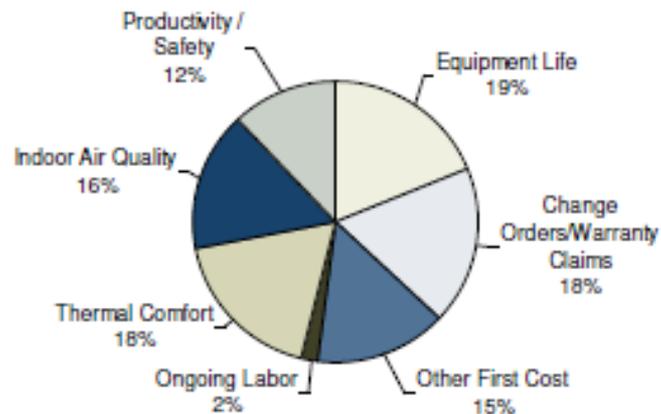
Source: ASHRAE

Life Cycle Cost

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...because life-time operating costs are significantly lower and labor costs are also likely to drop significantly.

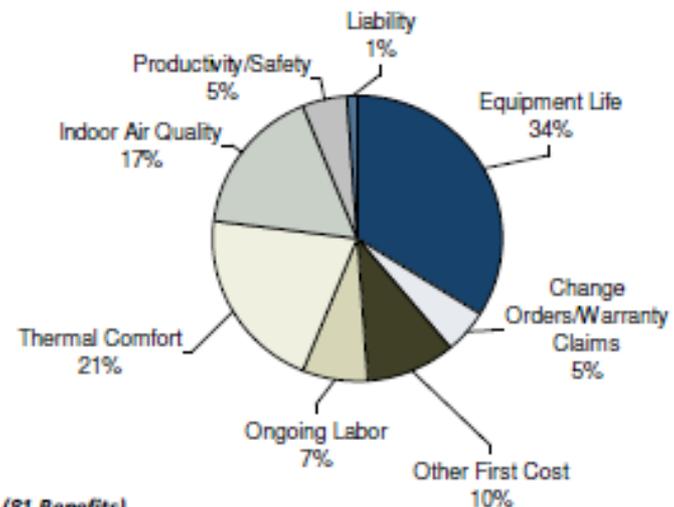
New Building Non-Energy Impacts of Commissioning (United States)



44 Projects (96 Benefits)

Source: Evan Mills, et al., LBNL

Existing Building Non-Energy Impacts of Commissioning (United States)



36 Projects (81 Benefits)

Source: Evan Mills, et al., LBNL

Comfort and Productivity

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- Productivity costs remain fairly under-recognized in the ROI equation.
- Occupant productivity, especially in owner-occupied buildings, has a significant measurable impact on the ROI calculation.
- Factory owners can show increased production, retailers can increase sales per square foot, hospitals can discharge patients earlier

Energy costs represent about 1 percent of the overall cost of doing business, investment expenses about 10 percent and staffing costs can be up to 85 percent.



Corporate Social Responsibility

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- Most global corporations are issuing annual corporate social responsibility (CSR) reports, typically signed by the CEO
- Investors are concerned about taxation (ex. carbon tax)
- Growing more clear consumer preferences and demands green and social responsibility (green inside and out)
- 234 climate leaders have pledged to reduce total U.S. GHG emissions by 10 to 30 percent from 2002 to 2012
- AIA and its members issued the "2030 Challenge"

 **AIA** | THE AMERICAN INSTITUTE OF ARCHITECTS



CLIMATE LEADERS 
U.S. Environmental Protection Agency

F R O S T  S U L L I V A N

www.caba.org/brightgreen

Convergence Intelligent and Green

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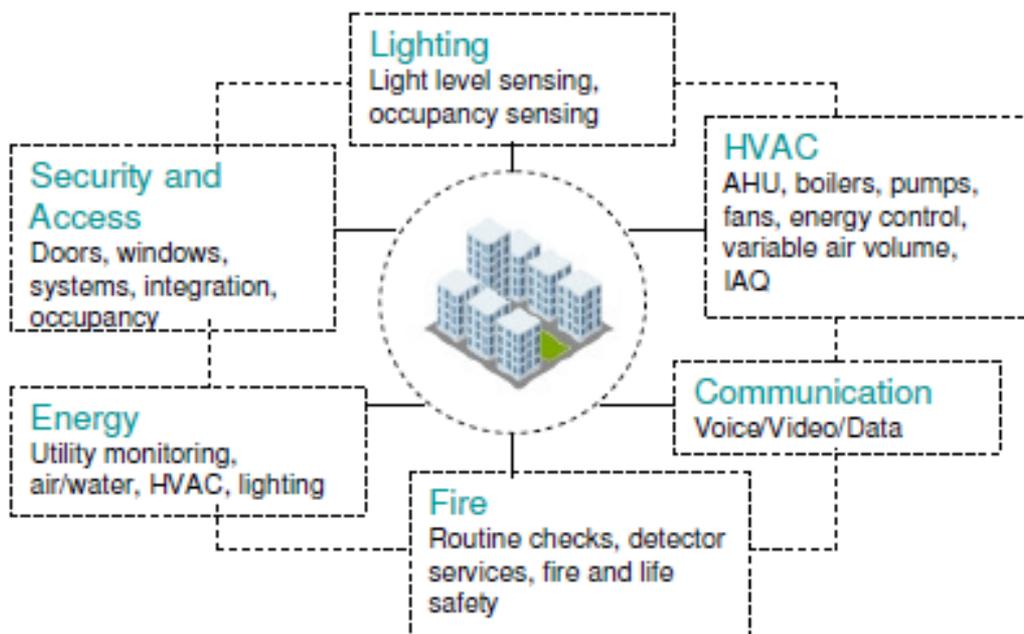
Source: Frost & Sullivan

Bright Green Technology

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- Integrating intelligence is a mandatory requirement to provide clients with the best solutions and the simplest connections to real-time, web-based data, and corporate enterprise.

Building owners can save energy by enhancing connectivity and visibility to all of the applications in use.

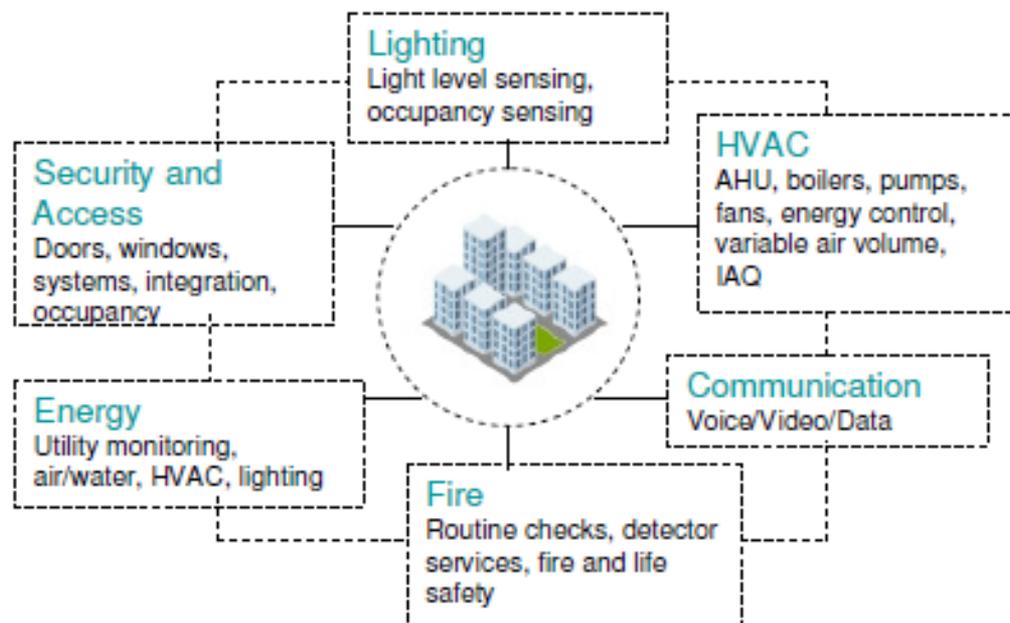


Bright Green Technology

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Bright Green Technology

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- An intelligent infrastructure solution provides the foundation for a reliable and high performing communications infrastructure and a strong backbone to power the lifeline of an enterprise.
- IP convergence is becoming a reality. The days of separate voice and data networks are becoming history.

Networking solutions both converge and automate technologies to improve responsiveness, efficiency and performance.



Key Highlights of Rating Tools

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USGBC - LEED® Tool

6 interrelated tools
69-point scale
Certified-1,674 (US)

GBI – Green Globes™ Tool

Multiple Ratings
1000-point scale
Certifications :Over 830 (NA)

iiSBE - SBTool™ Tool

Generic Framework
18 building types
6-145 criteria

Energy Star Program

By USEPA & USDOE
Over 50 EE categories
Rated 62,000 buildings (07)

- Intelligent technologies enable buildings to meet core objectives of sustainability (Energy, Water, CO2)
- Enhances social responsibility goals with measurable returns from active intelligence (Design Innovation, Integration, LCA, O&M Saving, ROI)

Currently only tool addressing building intelligence with a comprehensive framework.

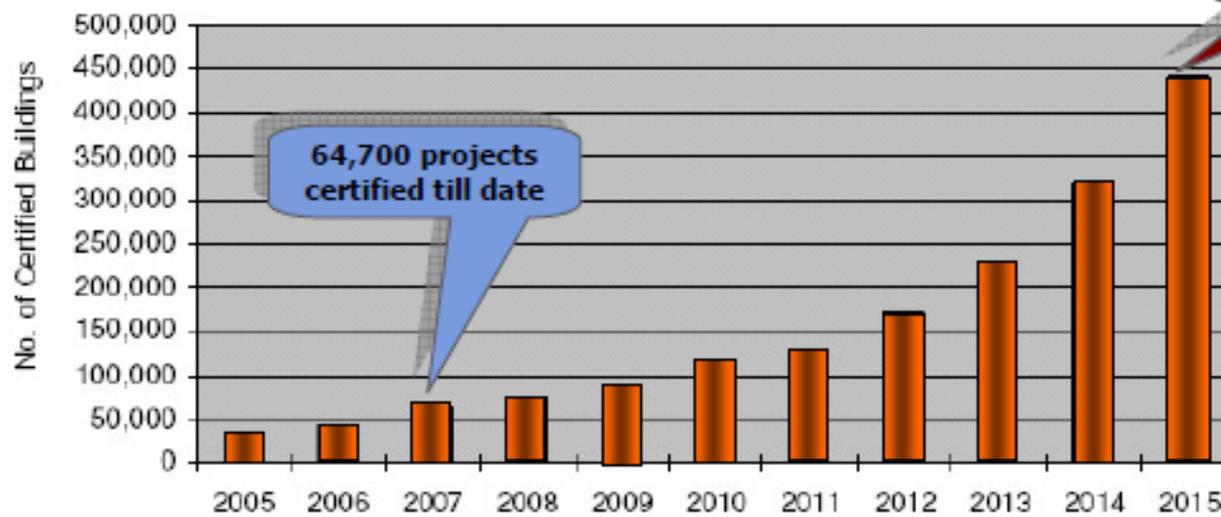
CABA BIQ Tool

By BIQC & CABA IIBC
Evaluates intelligence
Provides guidance to achieve desired integration

Green Ratings Overview & Forecasts

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Green Building Certification Projection (North America) 2007-2015



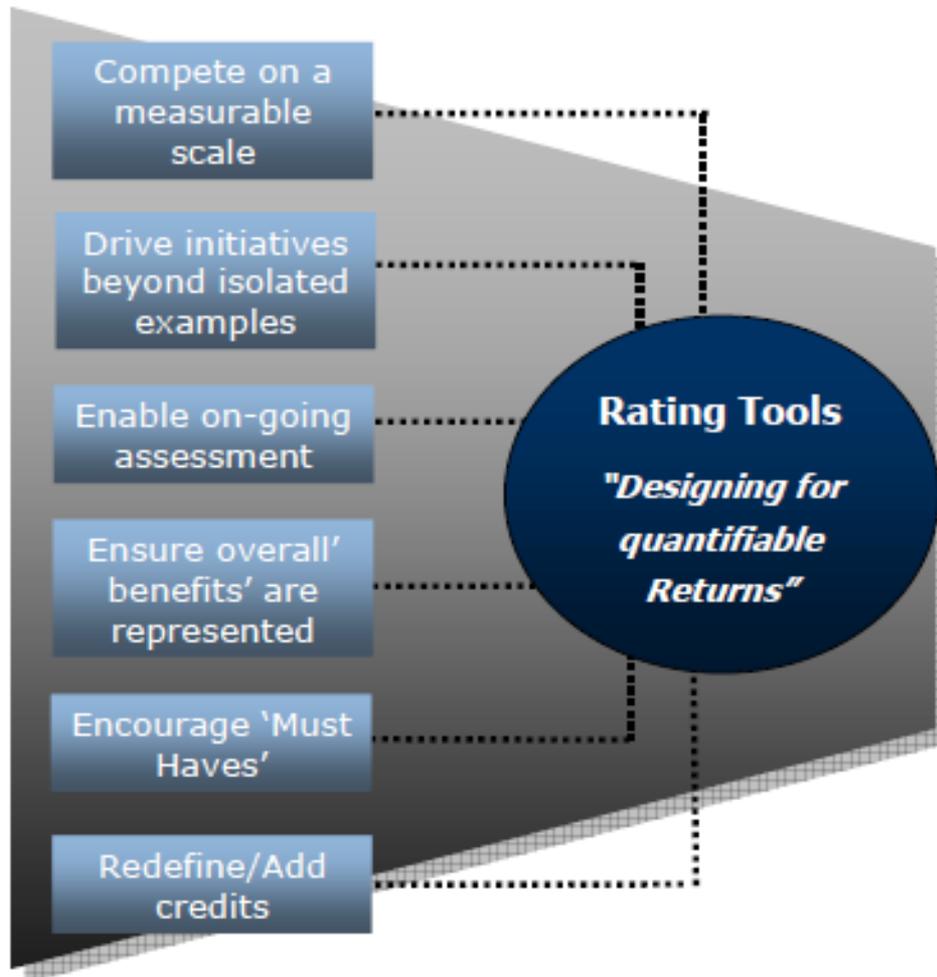
Source: Frost & Sullivan

Projected CAGR: 30%

- Drivers are expected to far outweigh the restraining factors, leading to robust growth in cumulative certifications year-on-year by LEED, Energy Star, Green Globes, and BOMA Go Green.

Positioning for Better Value

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- ***Rating tools must be redesigned to support green and intelligent solutions judiciously - No single rating system is comprehensive***
- ***Time to include more prescriptive details to maximize full potential***

Making Green & Intelligence work together

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- Promote alliances between systems that currently address 'green' and 'intelligence' distinctively
- LEED – currently represent a fine balance of both prescriptive and encouraged measures to reduce inefficiencies in buildings
- Green Globes – combines an assessment process, a rating system and guidelines for integrating sustainable design into buildings with continual tracking; incorporates LCA
- Expand the rating tools to include performance standards for all building types – environmental and IT-centric intelligence
- CABA's BIQ - a strong contender, being the only tool currently capable of measuring operational efficiency generated by active intelligence in buildings
- Develop standards for automation and systems' interoperability, as well as monitoring and reporting performance information
- Instigate Public Policy measures and dialogues with Government, public bodies, ASHRAE, CABA, USEPA, USGBC, GBI etc., to translate performance standards into enforceable codes and regulations

Proposed Collaboration

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- **Assess collaborative possibilities of BIQ and green rating tools like LEED and Green Globes**
- **Direct technical and policy initiatives to evaluate stakeholder buy-in**
- **Create a quantifiable framework for measuring green performance**
- **Combine established industry experience of such organizations to address interdependency**
- **Enable Green Buildings to endure the confirmed realities of the marketplace**

Rating with Green Tools

Site, Water, Materials, Indoor Environment, Energy, LCA



Intelligence Rating with BIQ

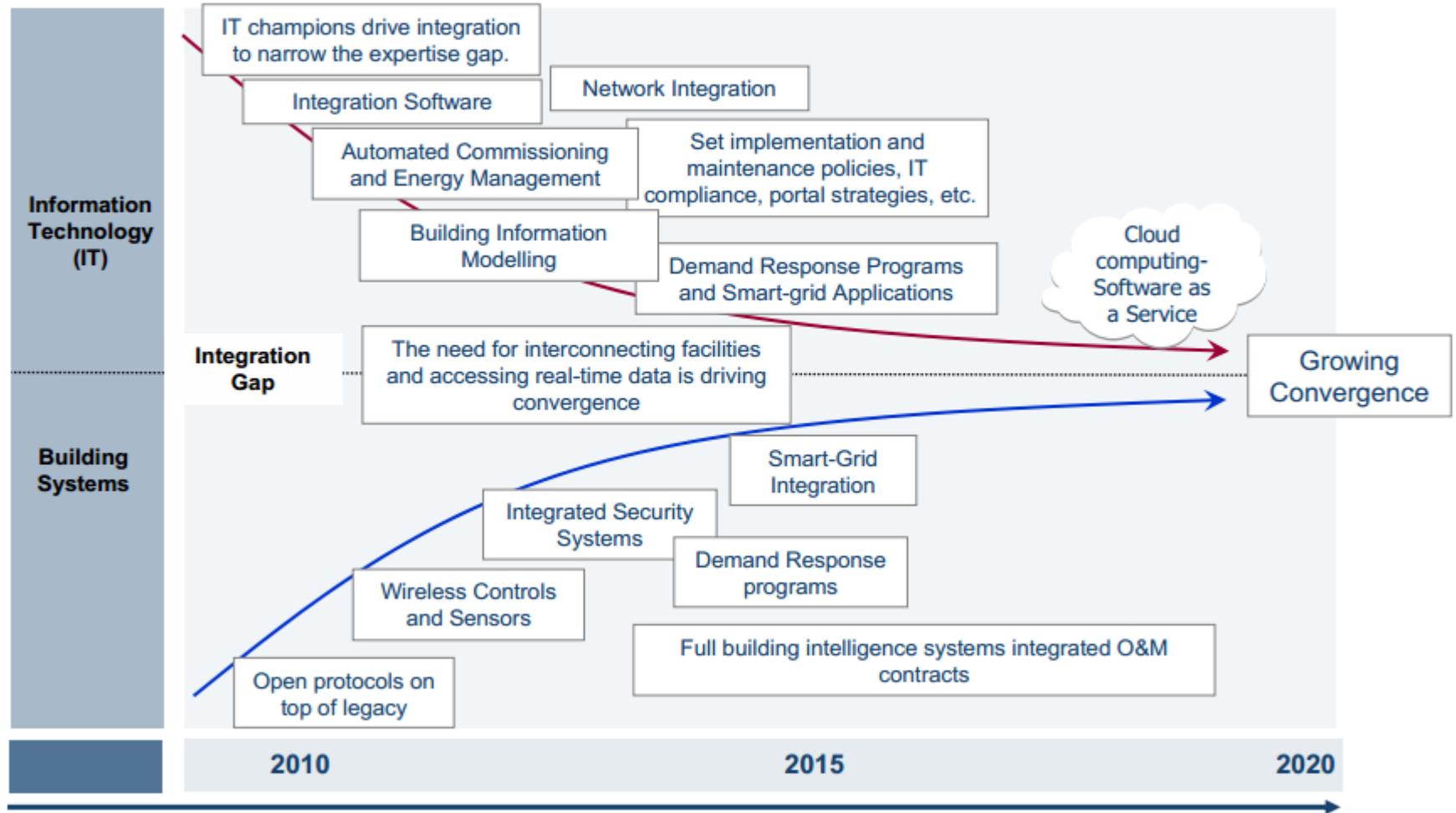
System integration & design
Interoperability of sub-systems
BAS management
Commissioning & Intelligence Evaluation
Quantification of benefits (ROI)

Addressing the Middle Ground

- ✓ Fixed Assessments + Need Based Evaluation
- ✓ Credit technology upgrades for Integration Benefits
- ✓ Credit Environmental information management & CO2 reductions
- ✓ Credit demand side management strategies
- ✓ Prescribe cost benefit analysis submissions
- ✓ Recognize productivity and manpower utilization/performance
- ✓ Reward conservation initiatives based on demonstrated payback

Integrated Buildings – Emerging Course of the Industry

Evolution of Convergence between Building Systems and IT Systems



Smart Grids and Intelligent Buildings

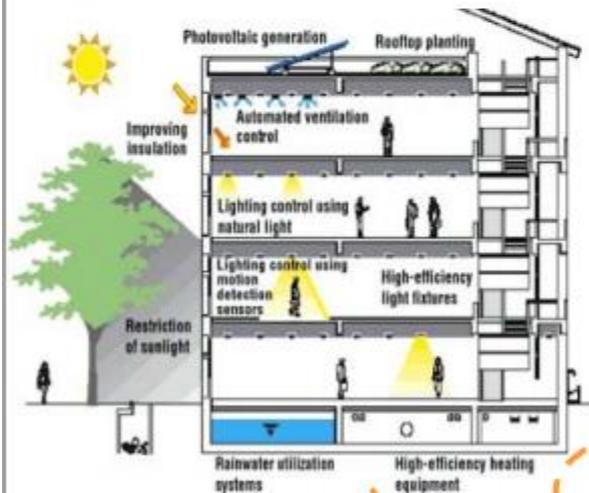
An Answer to Next Generation Infrastructure

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- ❑ Fully networked systems that integrate data, voice and video with security, HVAC, lighting and other controls on a single IP-network platform
- ❑ Conserve resources such as energy and water, reduce emissions, and decrease waste

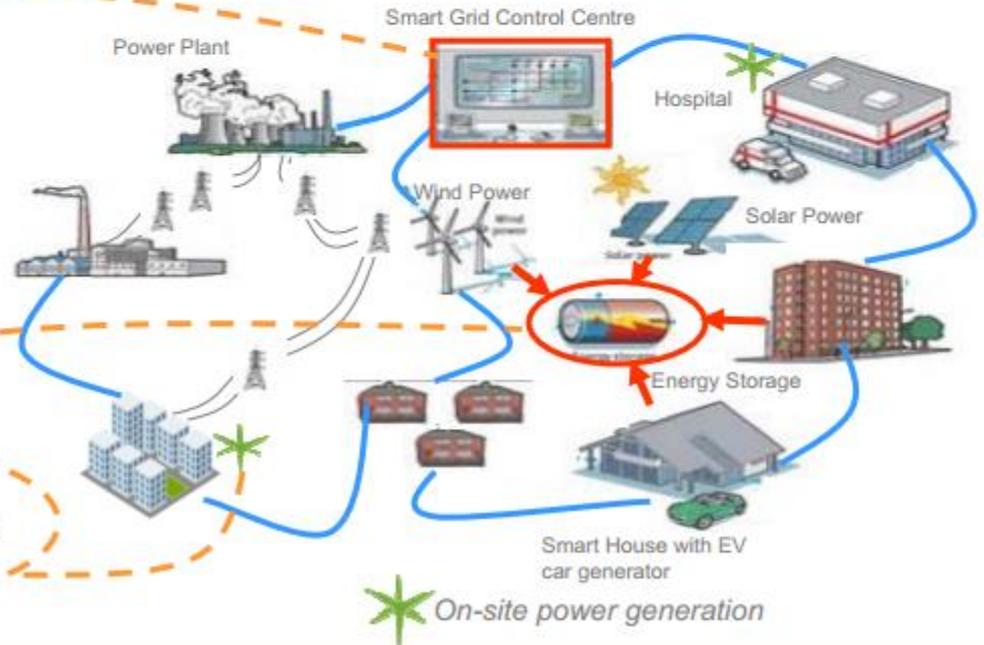
- ❑ Advanced metering infrastructure (AMI) facilitates 2-way communication
- ❑ Offices, hospitals selling excess energy back to grid
- ❑ Demand response; energy use can be shifted to off-peak hours

Transformation of Conventional Buildings to Integrated Buildings



BAS Controls;
Software, Wireless
Sensors, DR

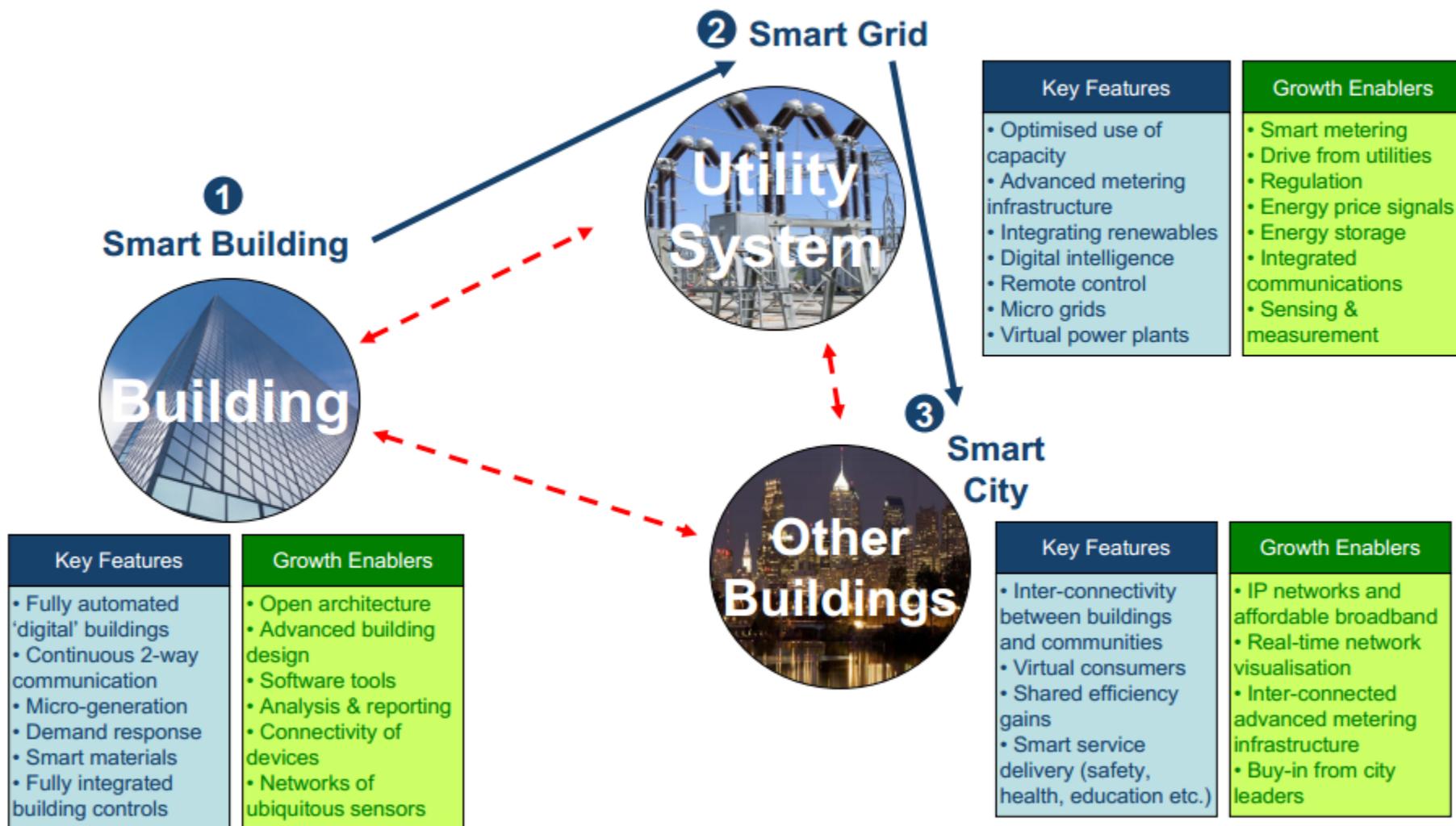
Transformation of Conventional Grid to Energy Internet (Smart Grid)



Smart Concepts and the Key Enablers for Growth

Smart Technology within Buildings, Grids and Cities

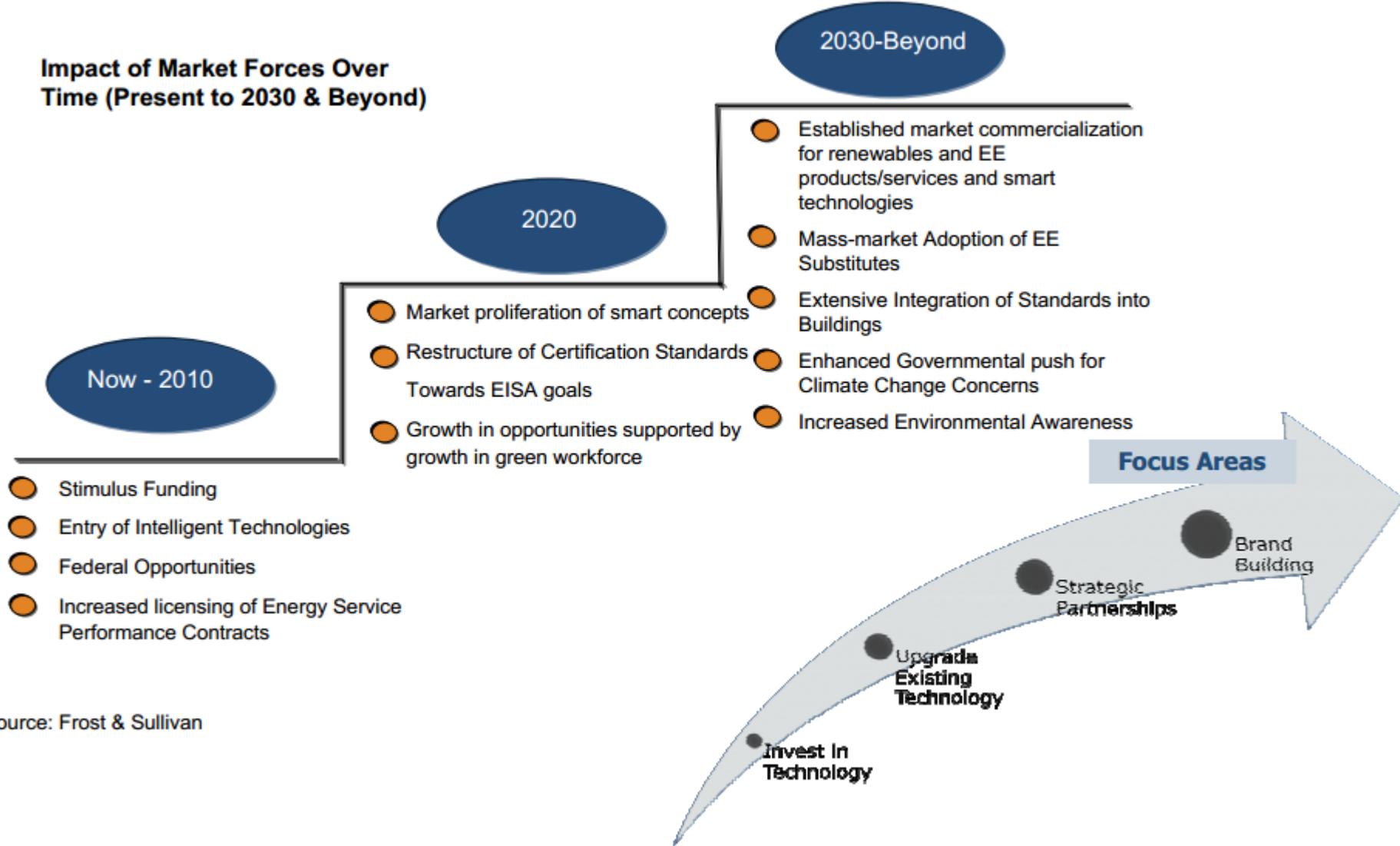
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Source: Frost & Sullivan.

Opportunity Roadmap

Impact of Market Forces Over Time (Present to 2030 & Beyond)



Source: Frost & Sullivan



Your Information Source for Home & Building Automation

1173 Cyrville Road, Suite 210

Ottawa, ON K1J 7S6

613.686.1814

Toll free: 888.798.CABA (2222) Fax: 613.744.7833

CABA@CABA.org



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