Smart Building Rating Programs Complimenting the ESG and Decarbonization Objectives

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Smart Building Rating Programs Complimenting the ESG and Decarbonization Objectives

Agenda

Environment, Social , Governance

- Capturing reliable and consistent data for ESG reporting and certification platforms measuring building energy consumption, sustainability, health & wellness and NetZero is critical.

Smart Building Systems

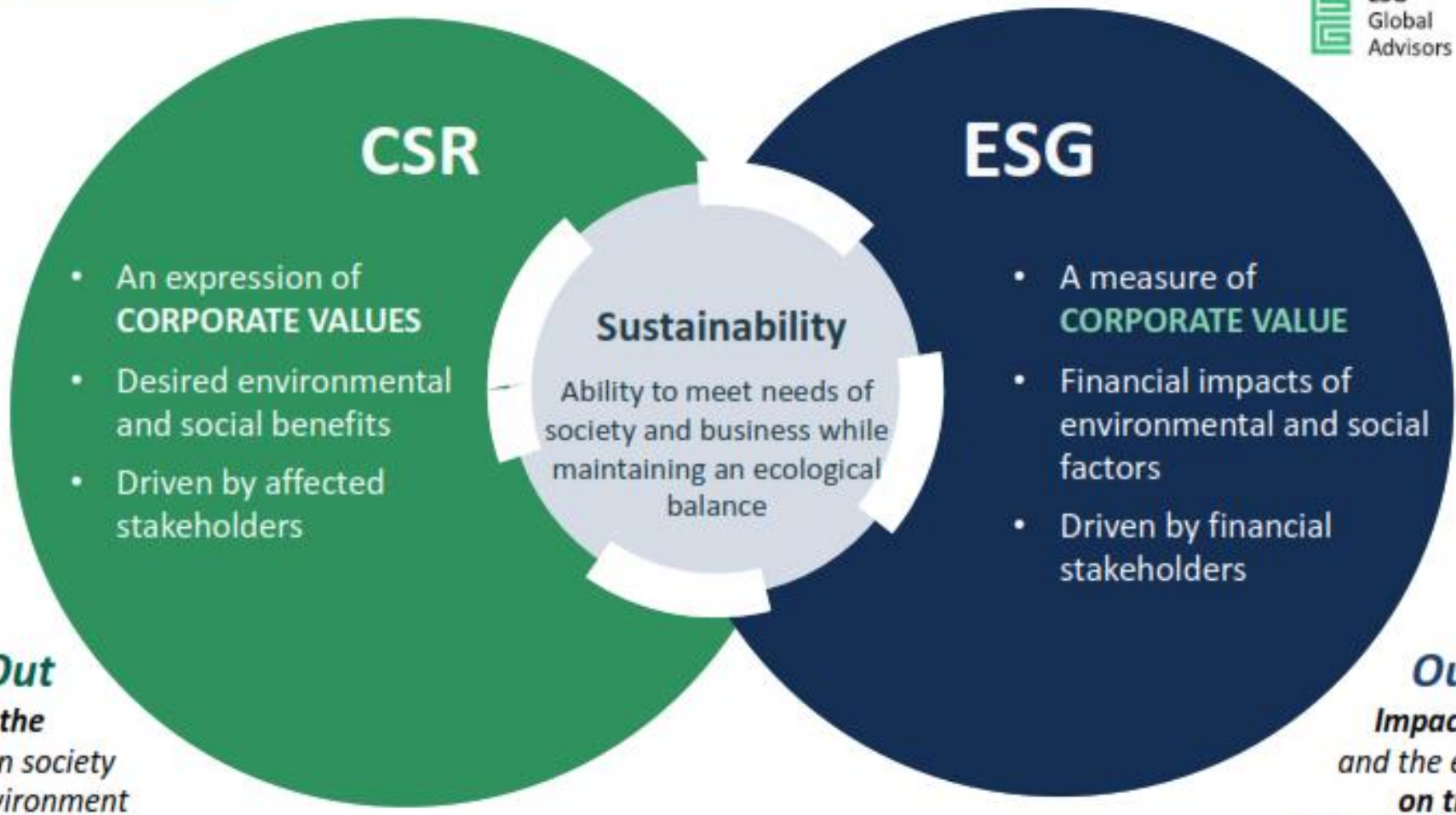
- This session will demonstrate how building owners and facility managers can collect and benchmark data with smart building automation features in existing buildings and how building owners can plan to meet reporting requirements for new construction projects.

BiQ 2.0 – SPIRE - SmartScore

- Assessment and certification programs provide the opportunity to use this data to create the interoperability of these systems to minimize energy and operating costs for owners while enhancing the comfort and productivity of operators and occupants.

Defining CSR, ESG and Sustainability

ESG Global Advisors



Inside-Out

Impacts of the company *on society and the environment*

"Impact Materiality"

Outside-In

Impacts *of society and the environment* ***on the company***

"Financial Materiality"

ESG- Environment, Social, Governance in Real Estate

Top 10 Risks

Physical Climate-Risk

Risks from rising sea levels, extreme weather events like hurricanes and floods, increased temperatures, and other environmental changes. These risks can directly impact the value, operability, and sustainability of real estate assets.

Source World Economic Forum Global Risks Report 2023

Roadmap to ESG & Climate Change Reporting

There are five steps in developing an effective ESG strategy that will successfully position organizations to establish an approach and roadmap for ESG reporting and disclosures.

Source: Integrating ESGs: Guideline and case study | CPA Canada

CRE Investors care about ESG- Well–implemented ESG Strategy raises value and mitigates the Risks

- Integrating ESG considerations into investment strategies is vital for managing climate risk. It involves not only recognizing the risks but also actively integrating ESG investment and management strategies.

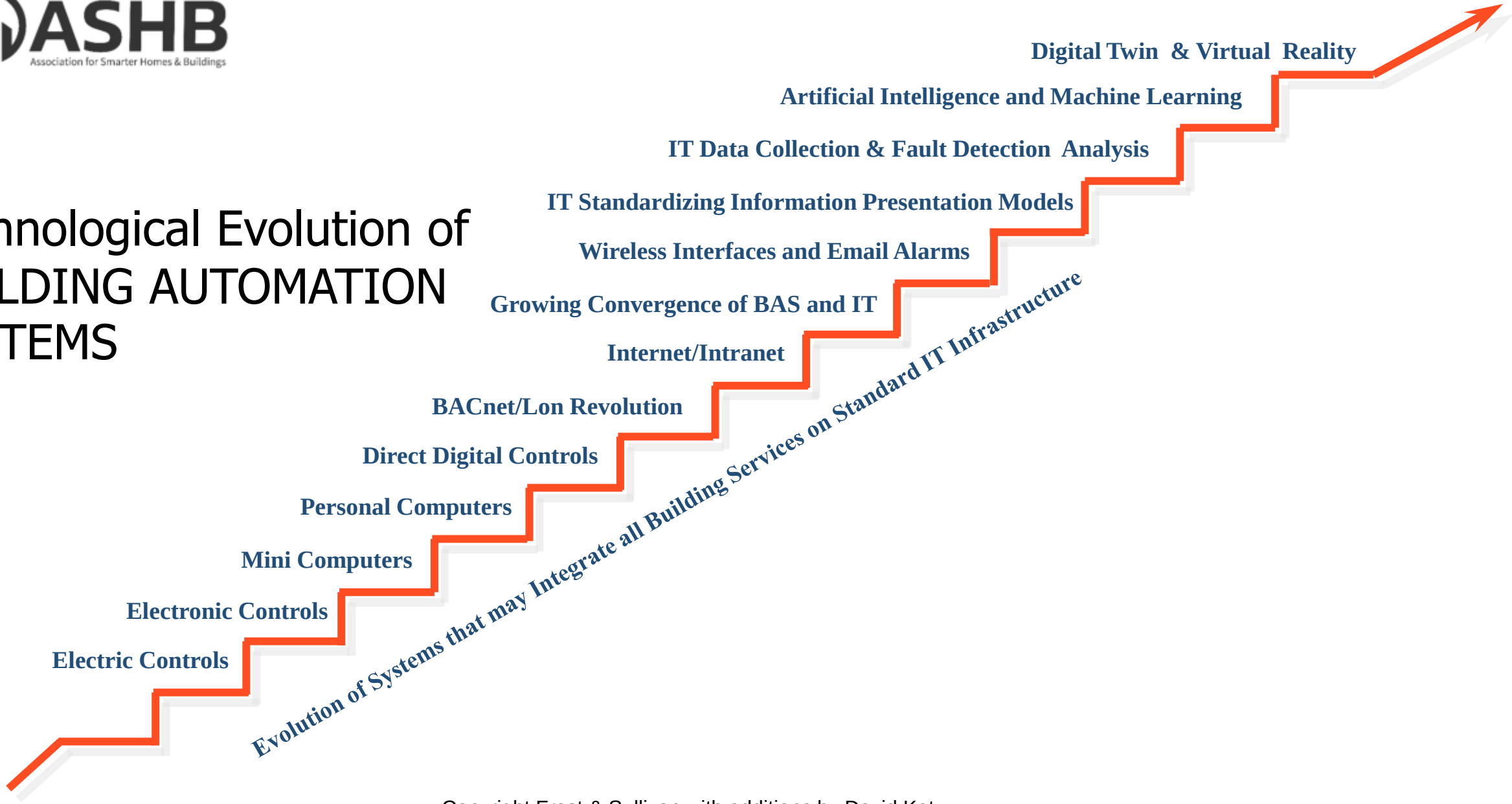
- Properties with strong ESG credentials may attract a wider range of investors and tenants, potentially leading to higher occupancy rates and returns.

Green & Smart Building Contribution to SDG

Every building should become a smart and green building to address industry-wide unprecedented change and facilitate its owning and operating team's ESG strategies.

Cohesion: "*How to Leverage ESG for Long-Term Value in Commercial Real Estate*"

Technological Evolution of BUILDING AUTOMATION SYSTEMS



- The Association for Smarter Homes & Buildings (ASHB) (formerly the Continental Automated Buildings Association (CABA)) has been advancing the connected home and intelligent buildings sector since 1988.
- ASHB's 350+ members include OEMs, distributors, installers, integrators, software developers, building owners/developers, facility managers, and service providers.
- ASHB is led by a prestigious board of directors represented by organizations from across the intelligent buildings and connected home spectrum:

What is an Intelligent Building? Also now labeled Smart

Source: Compass Intelligence, 2015

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Integration of IT and Energy Technology providing the Data for ESG reporting

- Evolution is similar to computer technology
- Two-Way communication with “Smart” devices
- Emerging network of devices - Switches, routers and software
- Devices will have unique IP addresses
- Smart Meters, Smart Buildings and Smart Cities
- Smart Distributed & Renewable Energy Systems

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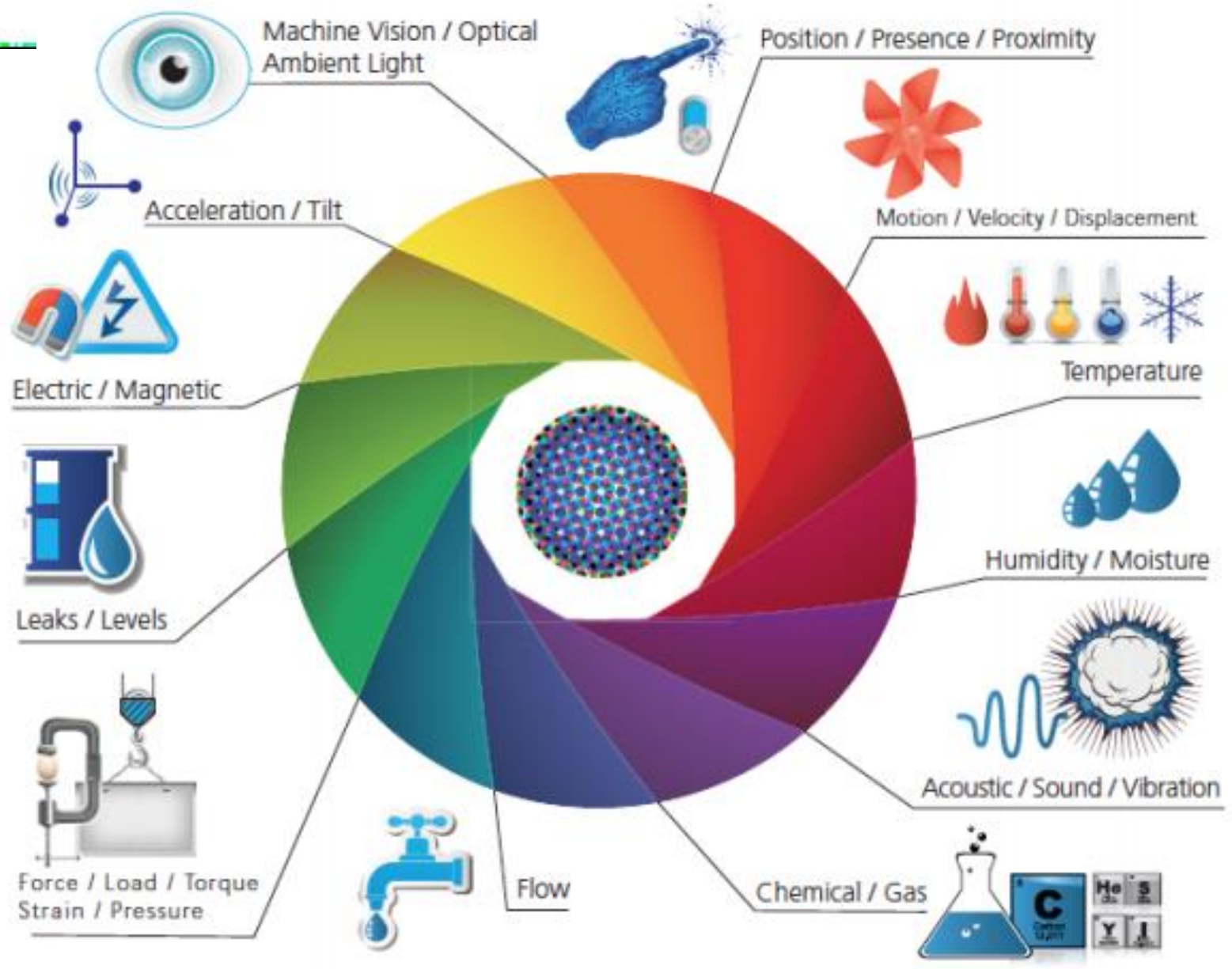
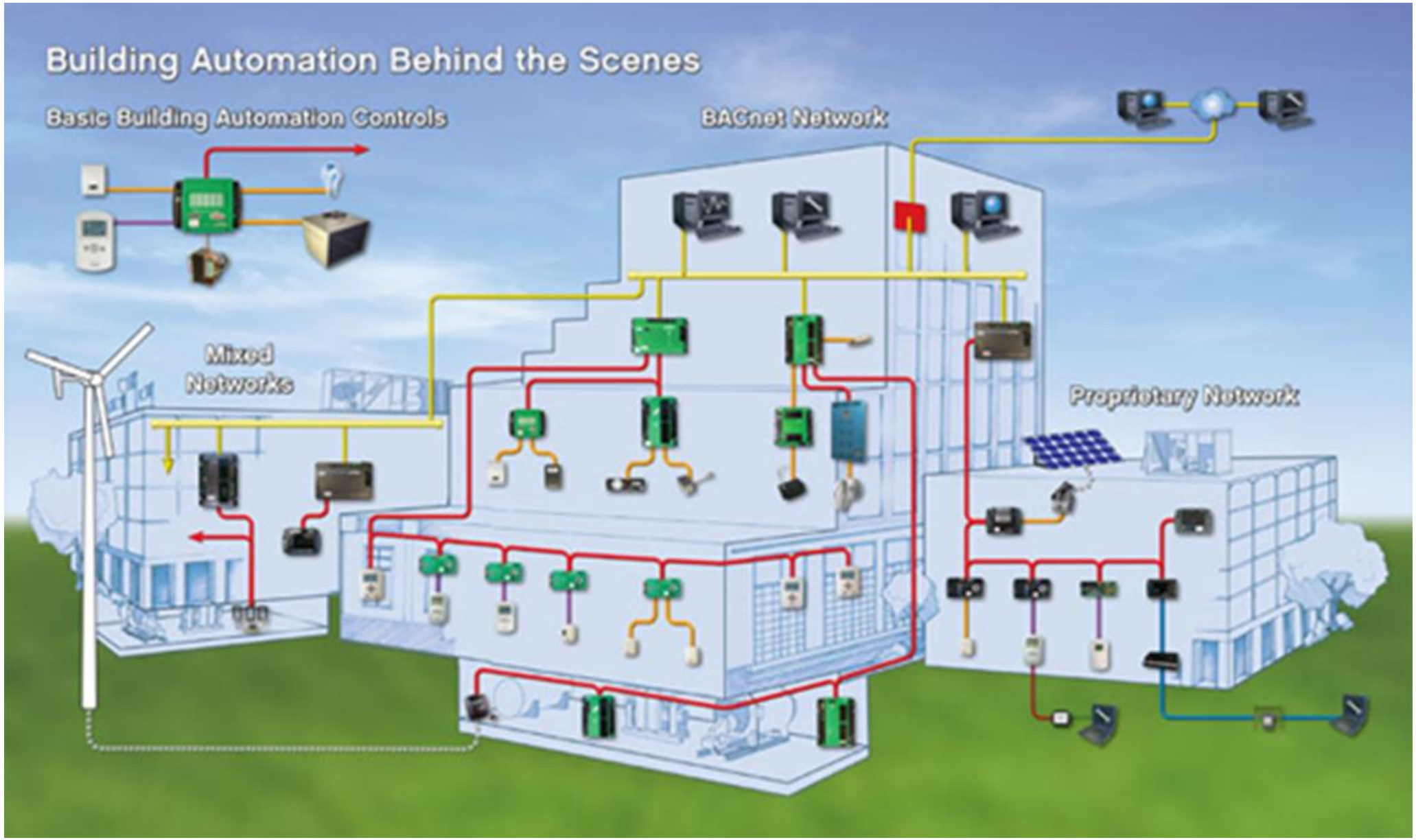
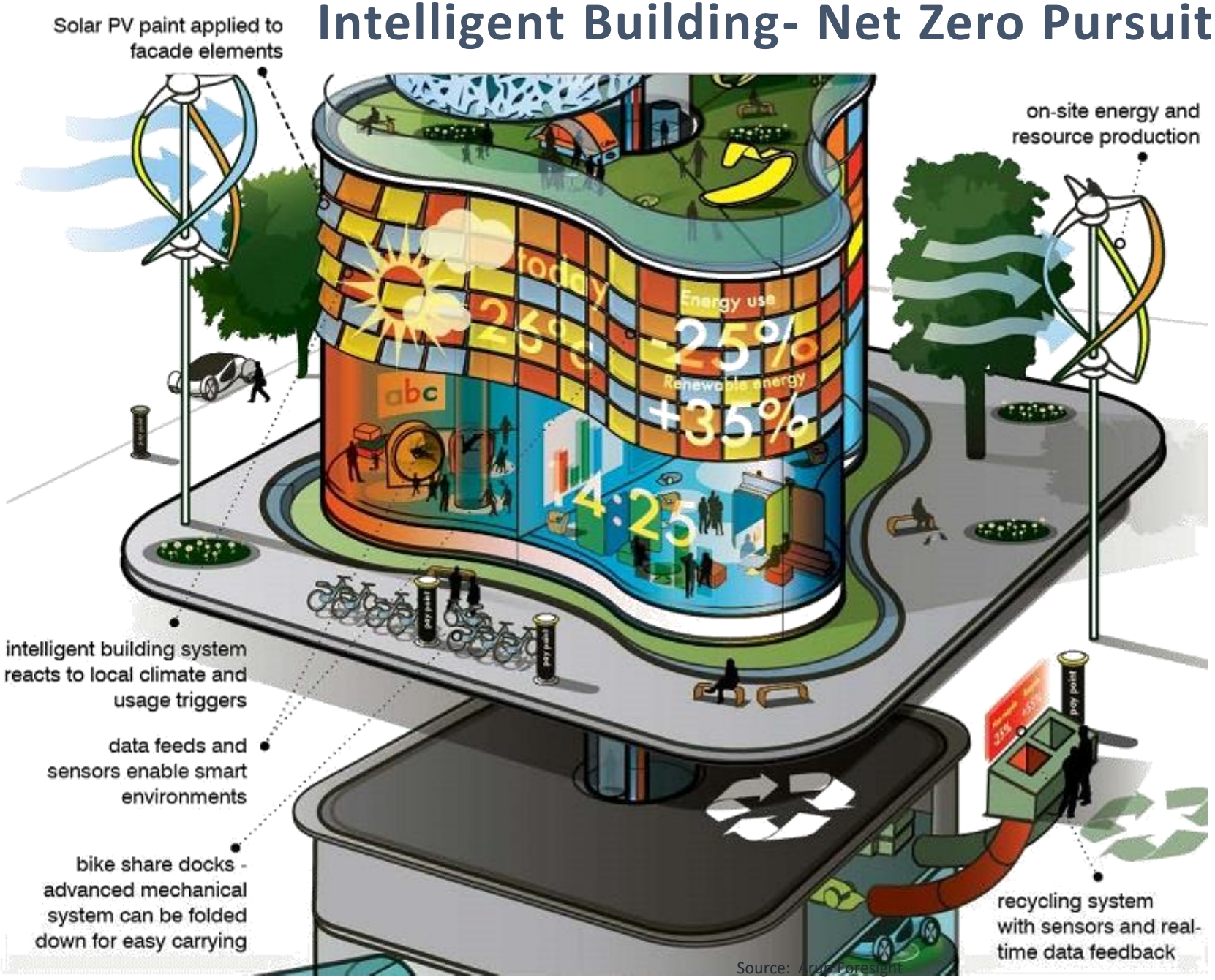
Sensors Everywhere



What is an Intelligent Building? Also now labeled Smart



Intelligent Building- Net Zero Pursuit



Source: Arup Foresight

Multiple systems provide the data on the Environmental Impacts for the energy production and usage while other systems can record the Social activities of the operators and the occupants and their Governance policies and procedures.

EMERGING HVAC TRENDS

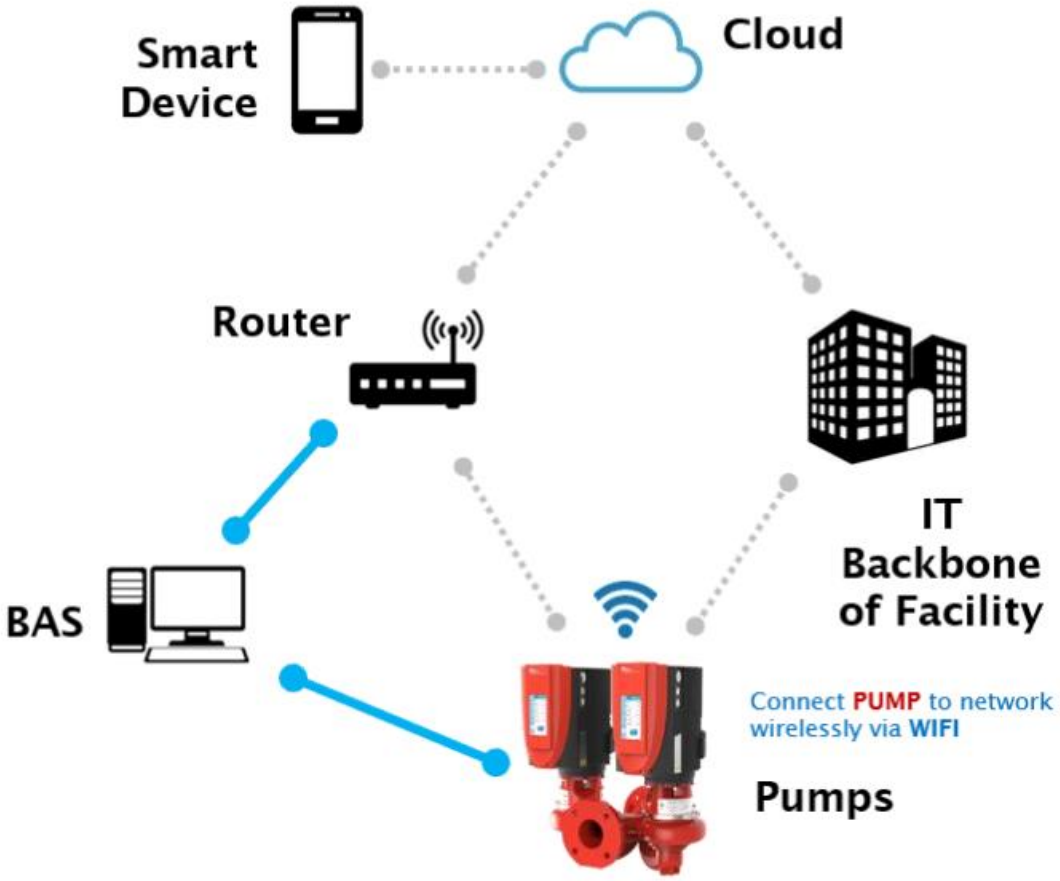
ARMSTRONG

Facilitating Connectivity

Wireless connectivity

Wired connectivity

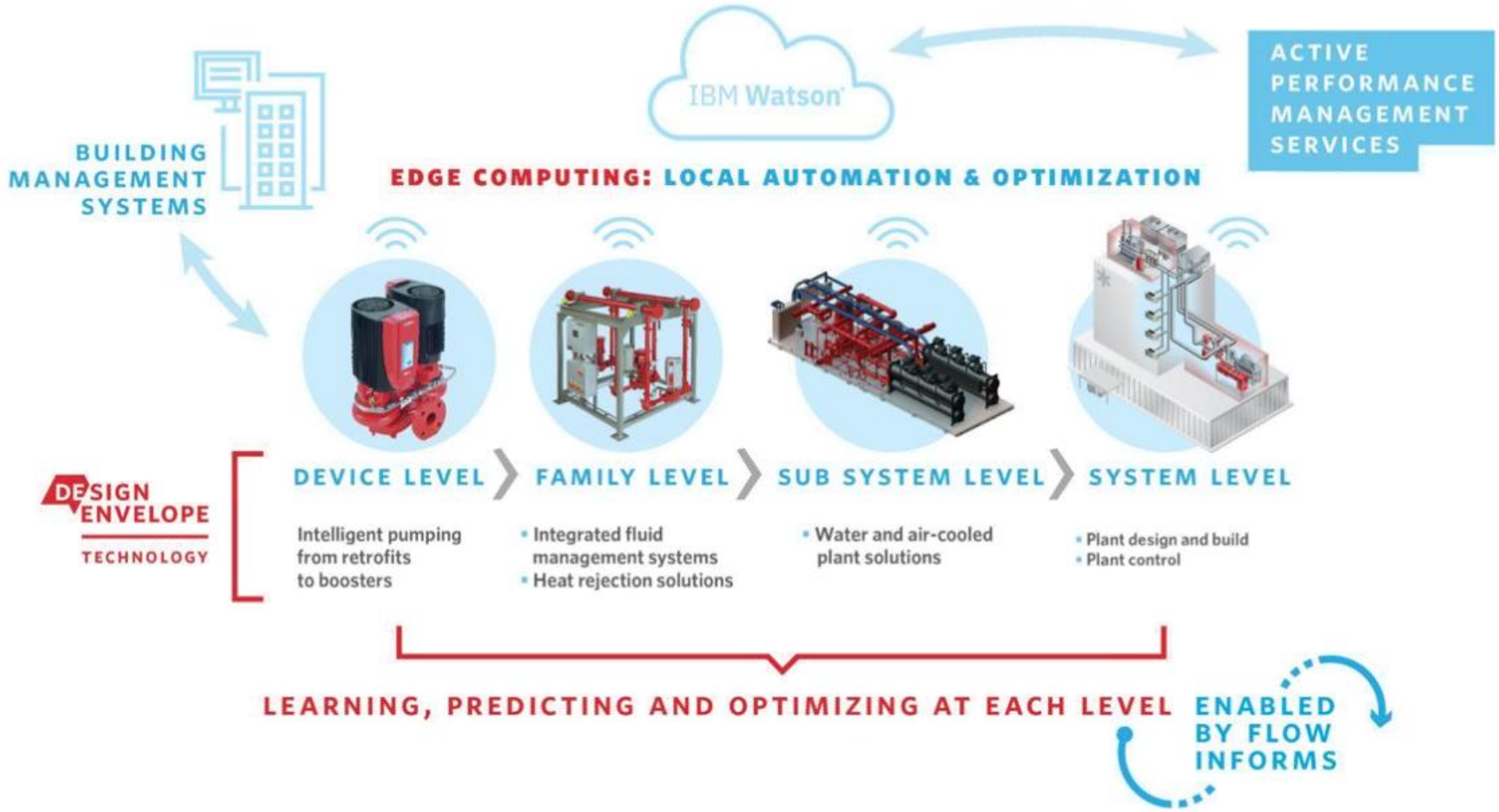
5G is coming!



EMERGING HVAC TRENDS

ARMSTRONG

Active Performance Management

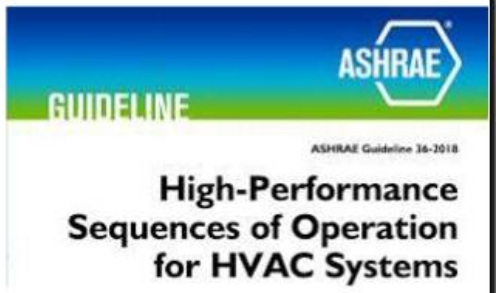


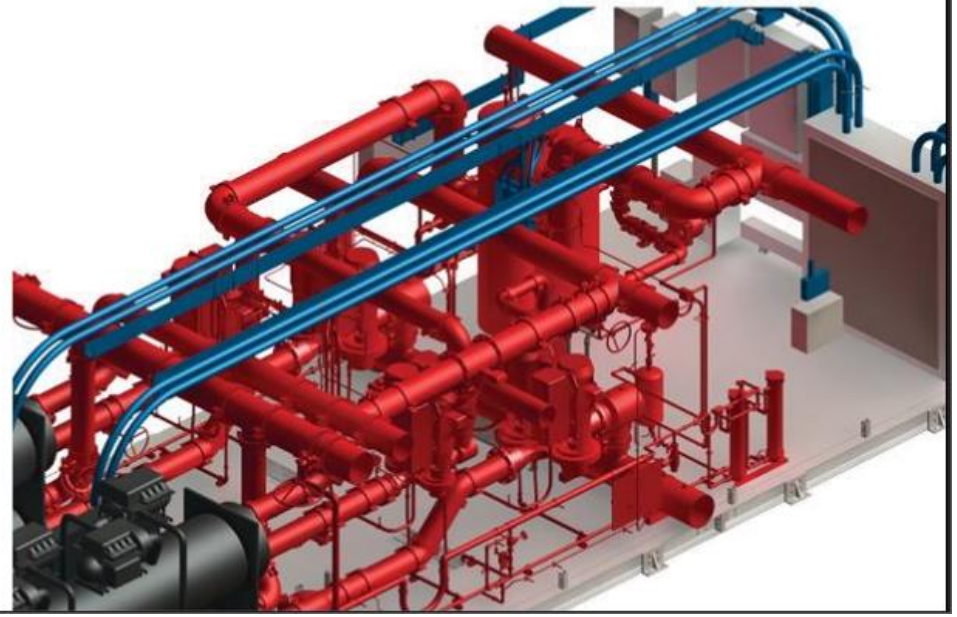
EMERGING HVAC TRENDS

ARMSTRONG

Standardization of designs – suppliers and associations trends For designers

- HVAC design firms have always had “standards”. Industry associations are now publishing best-in-class design compendiums
- Manufacturers off-site built subsystems are gaining traction due to low unemployment rates
- Advanced software used by HVAC designers lowers costs and adds capabilities
- These trends lead to standard and more reliable subsystems





EMERGING HVAC TRENDS

ARMSTRONG

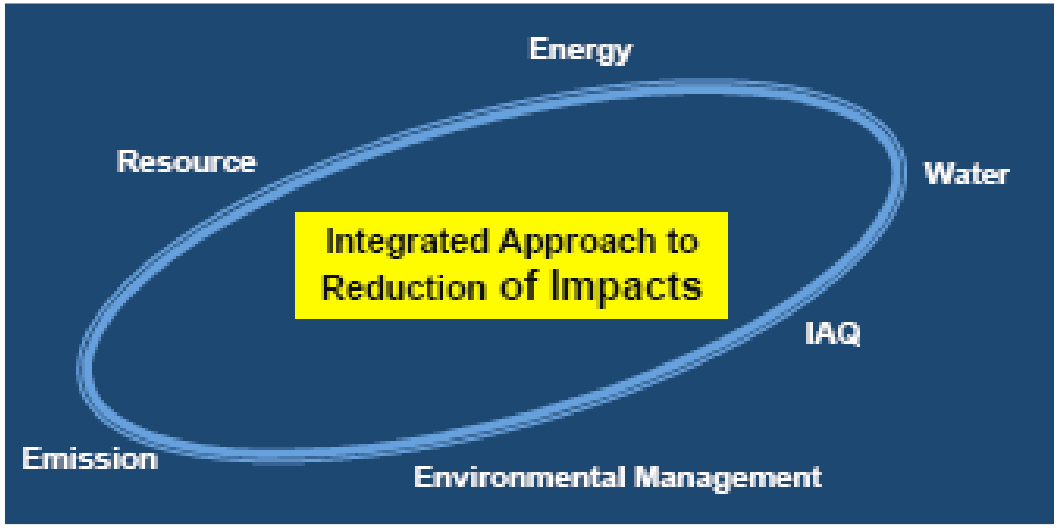
Machine Learning (ML) and AI for design and controls – Possible future

- Some companies have started using ML and AI for optimization
- Building designs using standard subsystems can be managed through AI
- Industry will shift to using AI as:
  - Designer and programmer
  - digital twin, optimizer and operator
  - ongoing commissioning agent

Digitalization and why we want it?

Digitalization	Why we want it?
Embedded digital controls & sensors	Low cost, flexible, precise control
Local, area, and remote communications	Access to info. Integration & interoperability
Cloud: data storage, optimization, diagnostics, user interface	High processing power & memory @ low cost Access to large databases & experience
Software as a service	High end software maintenance & updates
Analytics: conditions, machine learning or AI	Design & operation insights. Service when required
Asset management/traceability, digital twins	Suppliers evaluation, budgeting, insights
Videos, Augmented/Virtual reality for training	Lower cost service force
Apps to access services	Single point of access

Intelligent and Green Building Perspectives



- **Energy – Efficiency - Metering - Onsite Emergency & Renewable generation – GridWise capable - Demand Response ready – Net Zero**
- **Water – Efficiency – Metering – Treatment – Cleaning- Landscaping**
- **Environmental Management – Storage Tanks - Mold – Maintenance – Operations – Emergency Response - Training**
- **Indoor Environment – Daylighting – CO2 and CO monitoring – IAQ Controls – Filters**
- **Emissions, Effluent and Other Impacts on the Environment**

  Noise – NOX – SO2 – Chemicals – Transportation – Heat Island Roofs

MANY GREEN & ENERGY SAVING BUILDING STANDARDS

- BOMA BESt - Canada's National Environmental Certification Program for existing buildings
- Energy Star – Portfolio Manager for Benchmarking and Energy Star Certification
- ASHRAE – Building Energy Quotient – Building eQ
- LEED – Leadership in Energy and Environment Design Programs
- Green Globes – Online Green Building Rating
- WELL, Fitwell – Wellness programs covering occupant issues
- Carbon Reduction – Net Zero – Zero Energy - AIA 2030 – Carbon Neutral

Post Pandemic now includes Indoor Air Quality like RESET and others.

Digital Twins in Real Estate

Digital twin use cases have evolved with real estate professionals' top priorities

Source: Verdantix Digital Twin Essentials: A Guide For Real Estate Professionals (2023 Issue)

Real estate management objective priorities

Question: Rank the following real estate management objectives by importance for your organization over the next three years?

N=303

Source: PRE-PUBLISHED: Verdantix Global Corporate Survey 2023: Smart Building Technology Budgets, Priorities & Preferences

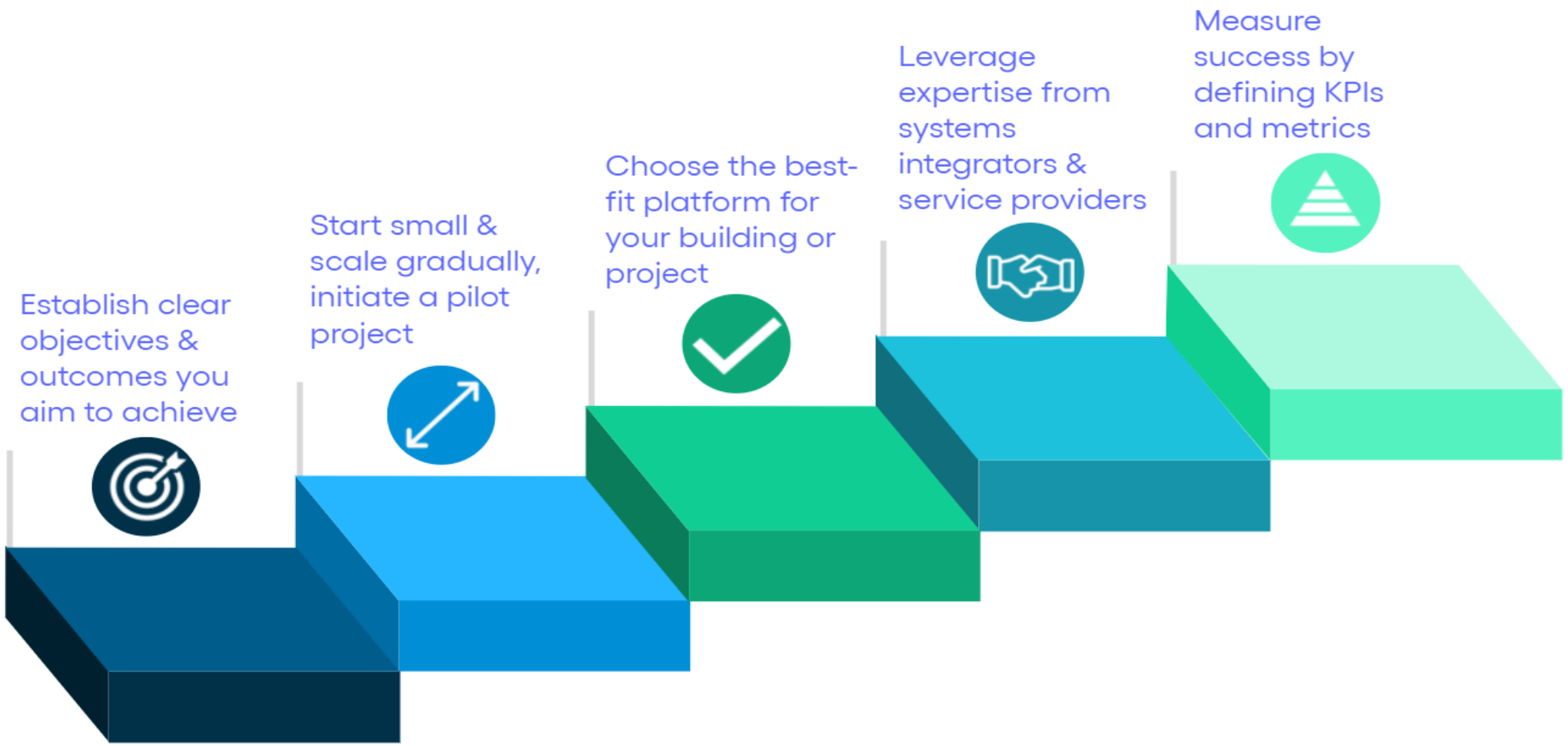
Digital Twins in Real Estate

An array of digital twin applications will emerge as more synergies are discovered between different domains

Source: Verdantix Strategic Focus: The Value Proposition For Smart Building Digital Twins

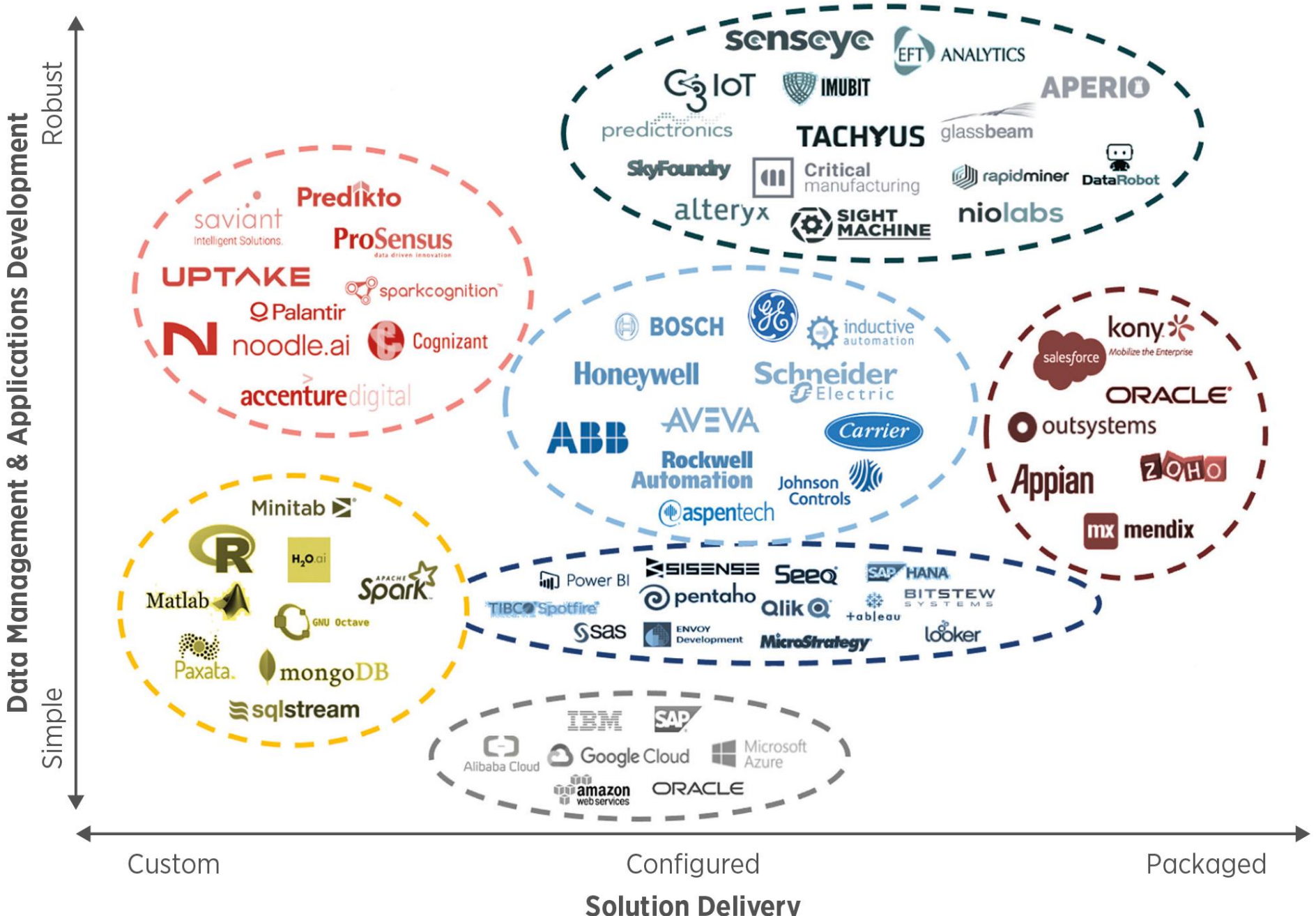
Digital Twins in Real Estate

Five strategies for a successful start in your digital twin initiative



Source: Verdantix research and analysis

The Data Analytics Landscape Expands Deployment Options



The Data Analytics Landscape Expands Deployment Options

Professional Service-Driven Analytics

Tools with strong predictive analytics capabilities, but require third-party or data science expertise to use effectively

Data Integration, App Dev & Data Management Platforms

A category of players that will offer packaged solutions that automate data management, analytics and process optimization

Analytics Tools

Languages and tools for analytics scripting, coding, and modelling, often requiring technical expertise for effective use

App Development Tools/Platforms

Platforms that focus more on data management and providing the tools for users to build analytics applications

BI/Data Visualization Tools

Tools and products that focus on providing dashboards and data visualization for descriptive analytics and decision making

Equipment OEM Data & Analytics Solutions

Solutions, platforms, and packages that are configured with end use equipment and analytics application solution

Cloud and Infrastructure Providers

Scalable cloud computing and secure infrastructure for data ingestion, storage and data management, including encryption, authentication, monitoring

History of Intelligent Building Rating Systems

The Asian Institute of Intelligent Buildings (AIIB) published the **Intelligent Building Index (IBI)** manual version 2.0 in **October 2001**. This IBI manual has been used in intelligent building auditing in Hong Kong. It has also been employed as a study reference guide in some tertiary education institutions in Singapore and Hong Kong.

From March to May 2003, Hong Kong was seriously suffered from the attack of Severe Acute Respiratory Syndrome (SARS) virus. AIIB anticipated the need to introduce a new index module no. 10 “Health & Sanitation” in addition to the IBI version 2.0. The six-star residential estate, The Leighton Hill, was awarded the Distinction Award on Module 10 in 2003.

History of Intelligent Building Rating Systems.

3.1 Audit Result

The Two IFC was audited and has the overall Intelligent Building Index (IBI) at a score 95.06%. The breakdown of module scores is given in Table B.

Table B: Module Score of Two IFC

M1 – Green	93.28
M2 – Space	96.39
M3 – Comfort	91.42
M4 – Working Efficiency	97.00
M5 – Culture	95.31
M6 – High-tech Image	94.78
M7 – Safety & Structure	94.76
M8 – Management Practice & Security	96.66
M9 – Life Cycle Costing	96.00
M10 – Health & Sanitation	94.84
Overall IBI Score	**95.06**

History of Intelligent Building Rating Systems. 2007

A trio of volunteers —

David Katz, prime consultant with Sustainable Resources Management

Frank Spitzer, technical consultant with IBI Group;

Jiri Skopek, program developer with ECD Energy & Environment

With input from CABA members, the Building Intelligence Quotient Consortium was formed and developed the BiQ 1.0. The Appraisal Institute was a founding member of the BiQ Advisory Committee.

Continental Automated Buildings Association (CABA) administered the BiQ for its members until 2013 when it became outdated as many new smart building technologies evolved.

Key Highlights of Rating Tools

www.frost.com

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

CABA

BiQ™

What is a smart building today?

- Bricks, data and mortar: it's time to build in the intelligence
- The digital era, particularly the rise of artificial intelligence (AI) and information technology (IT), is reshaping assumptions about buildings and how data is collected and managed.
- BY SANKAR S. VILLUPURAM JANUARY 31, 2020

- As the digital era has reshaped everything about our world and our work, it's become clear we need to revisit some of the assumptions about the shape of the buildings where people congregate. It's not just offices. Today, wherever there are people, there is data that could be better served by the buildings or assets people are using.
- The next generation of building design will take place in an era marked by artificial intelligence (AI). This promises to take data and turn it into incredibly responsive services and experiences. Yet to date, the built environment industry has been slow to understand the implications, and slower to spot the opportunities. Too often, buildings' information technology (IT) packages are more of an after-thought, something to fit in, not an opportunity to be seized.

What are the smart building rating systems today?

The value of standard assessments/scorecards

- A tool for the champion
- Uncover how/why shiny new tech might fail
- Track the transition to smartness over time
- Create a way to benchmarking buildings against each other
- Prioritize investments when funding is limited
- Tie asset value to smartness

What are the smart building rating systems today?

What is the IB Index?

The International Intelligent Buildings Organisation in Australia is leading an industry consortium to create an **Intelligent Buildings Index** (IB Index). This industry first technology standard uses qualitative and quantitative IB performance measures to rate a building's relative intelligence. Utilising a state-of-the-art literature review, international stakeholder engagement and calibration against a global spectrum of "smart" buildings, the IB Index offers a technical framework and classification system upon which to support strategy development and decision making.

Who is involved in the IB Index Initiative today?

The IB Index initiative is chaired by Dr Michael Easson (EG Funds) with Shen Chiu (Investa) serving as Technical Advisor and Julie Jupp (UTS) as Research Lead.

What are the smart building rating systems today?

WiredScore

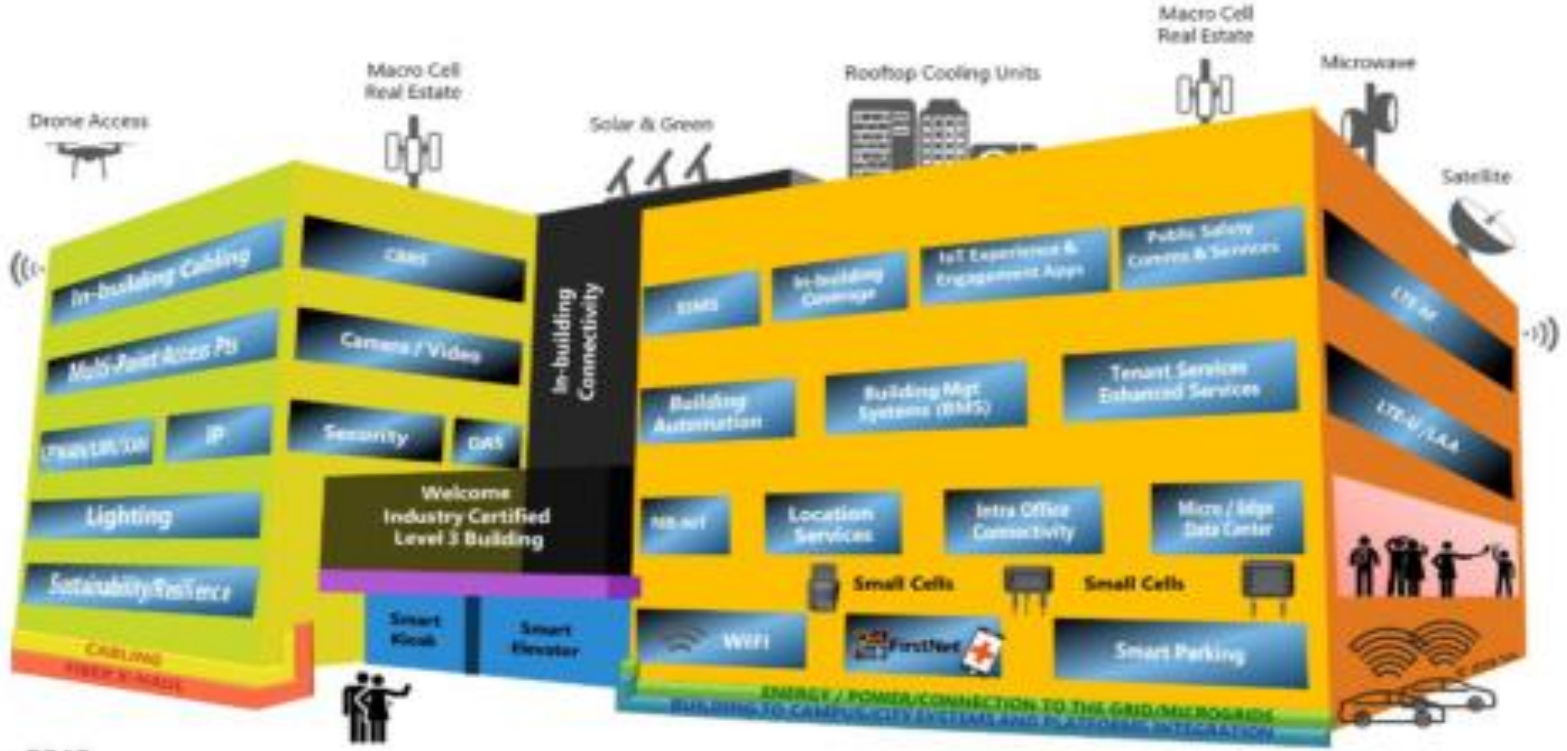
WiredScore assesses, certifies and improves digital connectivity and smart technology in homes and offices on a global scale. Digital connectivity is vital to the way we live and work, which is why WiredScore's mission is to make the world's buildings smarter and better connected, to enable a more collaborative, innovative and dynamic future. The future is smart, and smart buildings can help landlords deliver both inspirational experience to the users of the building whilst achieving operational efficiency. WiredScore expanded its areas of investigation and launched ***SmartScore.*** BOMA Best Smart building project is using these rating systems in their pilot as they investigate options.

SmartScore

SmartScore champions cutting-edge technology in real estate. Providing a global standard, SmartScore identifies best in class smart buildings that deliver an exceptional user experience, drive cost efficiency, meet high standards of sustainability and are fully future-proof.

What are the smart building rating systems today?

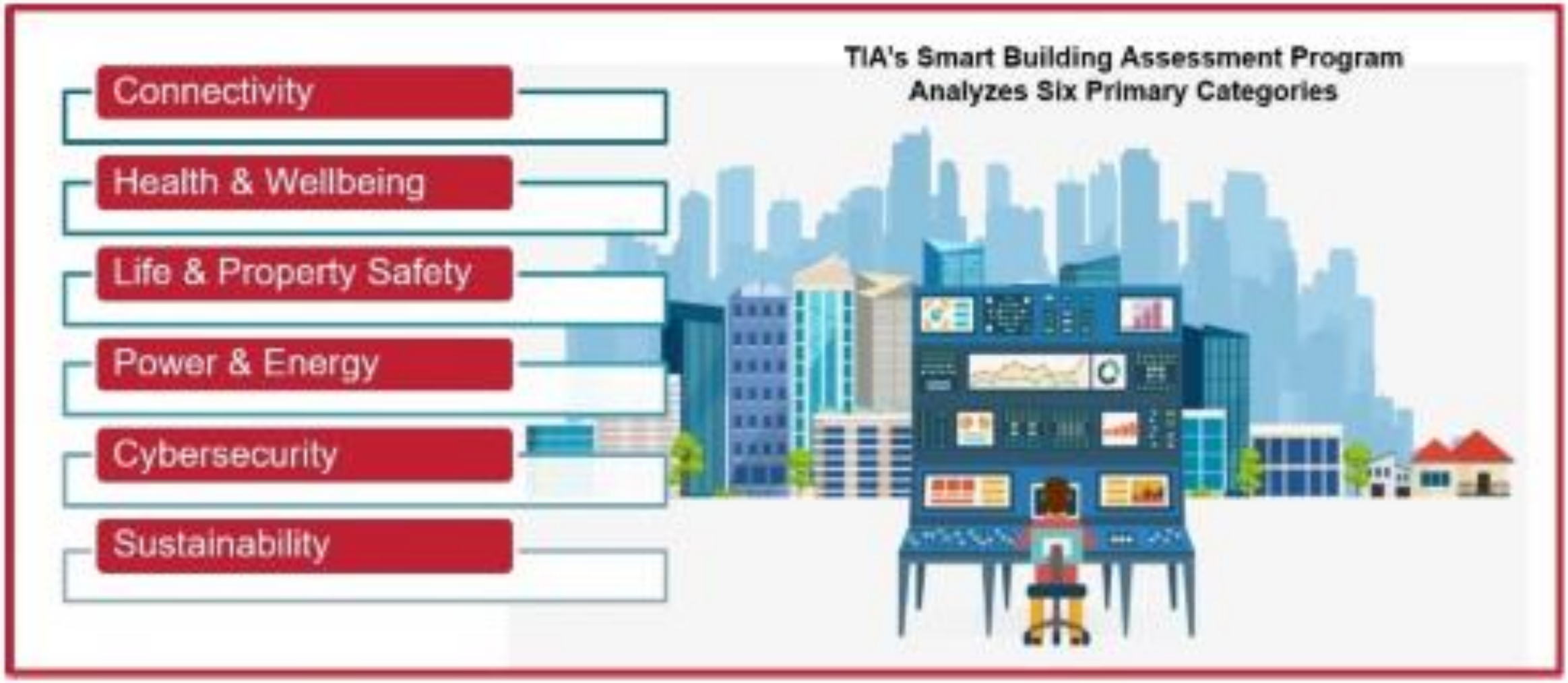
TIA defines a **'smart building'** as one that uses an **integrated set of technology, systems and infrastructure to optimize building performance and occupant experience.**



Source: TIA Smart Buildings, 2019

What are the smart building rating systems today?

SPIRE™ Smart Buildings



Buildings Intelligence Quotient 2.0

In 2013 BiQ Advisory Board Chairs, Tom Lohner and Chris Larry of TENG (now EXP) suggested the following market, federal and socio-economic issues, trends and requirements must be addressed in version 2.0:

- Measurement and verification of building and sub-system performance compared to original high-performance building specifications and/or optimized. performance following retro or re-commissioning of systems
- Enable continuous commissioning by extracting real-time system data, analyzing data and developing system metrics to assess on-going performance.
- Enable predictive maintenance management.
- Ability to participate in the Smart Grid.
- Employ wireless technologies in a cost-effective fashion to improve the occupied environment and optimize energy consumption (HVAC and lighting).
- Enable sustainability reporting (Global Reporting Initiative)
- Provide a energy and performance metrics that enable continuous improvements and energy reduction goals to be achieved
- Provide a foundation for the Net Zero energy building by 2025

Buildings Intelligence Quotient 2.0

In 2019 prior to the pandemic the China Academy for Building Research (CABR) contacted David Katz after finding the initial BiQ 1.0 on the website.

They were developing the China Standard for Evaluation of Smart buildings and also wanted to offer the new BiQ 2.0 if it was updated.

CABR already offers LEED in China and had discussions with GBI for Green Globes. They also wanted a global smart building program in addition to their own standard.

A new BiQ Group was incorporated and the new BiQ 2.0 was co-developed over 2 years with input from smart building experts in Canada, USA, UK and China.

Buildings Intelligence Quotient 2.0

- We are offering a FREE DEMO during our BETA testing period.
- Register on www.building-iq.com with answers to a few questions about the purpose of your requesting a DEMO of the BiQ.
- It could be for a specific building where you have received the owners' permission to enter the data on that building in our system.
- It could be for an agreed upon DEMO provided for your review to see how the BiQ 2.0 can be offered by your company.
- Your contact information should include your email and phone number.

Summary

Environmental, Social and Governance (ESG) reporting requires valid information from accurate sources of data as new accounting and reporting rules are created for sustainability that will impact the valuation of companies' both public and private.

- Green building programs like Green Globes have both the energy and the environmental data and are expanding to Net Zero measurement.

- Wellness programs like WELL and FitWel cover the occupant issues and could include the IEQ and other healthy and social activity issues.

- Smart Building Programs like the BiQ, SPIRE and SmartScore provide a wealth of information on the many systems in the building, how they operate and what data they collect that can be used as the accurate sources of data for ESG reporting including the new focus on Decarbonization with deep retrofits.

Q+A

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SRM SUSTAINABLE RESOURCES management

ONTARIO SUSTAINABLE ENERGY ASSOCIATION

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