Intelligent Buildings

Revolutionizing the global real estate market for the next generation



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Foreword

"As we deploy more technology in today's built environment, we unlock new opportunities for innovation, growth, and sustainability."

Denise Lee, VP Engineering Sustainability Office, Cisco

New social norms from a post-pandemic world, the volatility of utility costs, and an increasing focus on environmental change are disrupting the global real estate industry. To deepen our understanding of the changes ahead, a group of leaders and change-agents from across various disciplines and industries came together to help the industry move ahead with speed and scale. The focus? The transformation from the buildings of today to more sustainable and connected Intelligent Buildings.

The voices of this diverse group of industry experts –from real estate and construction to technology and finance – have met over the last four months to evolve and refine the emerging market of **Intelligent Buildings**. As discussions expanded, one theme was glaringly obvious: buildings of the future will *rely on a backbone of technology and integrated ecosystems* working together to deliver more resilient and regenerative environments for people to live, work and play.

Now, we invite you on the transformative journey of Intelligent Buildings. By fostering cross-industry partnerships, facilitating knowledge sharing, and driving investment in groundbreaking technologies, we will help to accelerate the development and adoption of new technology solutions to create more Intelligent Buildings.

Together, we challenge the norms, redefine the boundaries, and build a legacy of new technologies. Intelligent Buildings incorporating sustainability and new innovations can transcend generations to leave a lasting impact on our world.

Please join in the conversation, we are just getting started!

Janise

Denise Lee *Member, Intelligent Building Advisory Board*

Intelligent Building Advisory Board

"The Real Estate industry has a broad role to play in the work experience whether it be at the office or at home. We can expect a continued evolution of smart technology to be embedded into Intelligent Buildings to meet the demands for health, flexibility and cost effectiveness." **Scott Panzer** | *Vice Chairman JLL and CEO Digital Building Solutions*

"How we measure the success of buildings is rapidly changing to keep up with the societal needs around environmental, social and economic returns." **Robert Bailkoski** | *CEO*, *Logicalis*

Data and connectivity are a critical foundation to enable a healthier, more sustainable building, and to create spaces which appropriately provide and react to user comfort and productivity needs. Intelligent buildings are no longer a luxury in an evolving workplace, they are a necessity. **Isaac Mulvihill** | *EVP*, *Delos*

"There's a certain level of resiliency, efficiency and sustainability that can be achieved when we leverage intelligent technology to transition the delivery of services and resources from a just-in-case model to one that responds to actual just-in-time usage." **Christian Bigsby** | *Senior Vice President, Workplace Resources, Cisco*

Growing acceptance of technology by society as a whole is accelerating the adoption of intelligent building technologies as decision makers see the impacts on other facets of business and everyday life. John Petze | Partner and Co-Founder, SkyFoundry

"The rapid evolution of global workplace expectations has created significant demand for a new era of technology and sustainability-focused Intelligent Buildings which can meet the requirements of tenants in 2024 and beyond."

Andrew Karsh | Co-Founder and General Partner, Bay Bridge Ventures

"Real Estate is traditionally a very slow moving market, technology and the changing social norms are changing that."

Bryan Osoro | Vice President of Sales, EOS IT Solutions

"Occupant health metrics lead to improved ESG scores - Intelligent Buildings offer the proof through real time measurement; now is the time!" John Braley | Senior Advisor, Delos

Disrupting the Global Real Estate

Catalysts for Change in the Global Real Estate Market

The recent confluence of events of the past few years – global pandemic, the acceleration of a technology centric world and rising energy costs – has collided with a generational shift in social norms. The upending of the status quo is driven by catalysts for change across the global real estate markets.

Post-Pandemic Vacancy: The shift towards work-from-home since the pandemic could result in 330M square feet of vacant property in North America alone by 2030.¹ Commercial real estate needs to "earn the commute" and create services and environments people want to return to in the office.

Occupancy Volatility: Organizations continue to move towards hybrid work. According to JLL, a vast majority of employers are requiring at least three days in the office.² This results in tremendous volatility in building occupancy, and creates challenges in optimizing heating, security, wellness and amenities requirements.

New Policy and Regulations: Government policy, municipal regulations, IECC/NEC code changes, and the positive impacts of being LEED or WELL certified require rethinking into how we design or retrofit buildings for present and future occupiers.

Rising costs of energy and materials: The cost of construction materials have jumped on average 19% since 2020,³ and energy costs continue to rise and impact construction input costs as well as the cost of operating a building for owners and tenants.

Generational shift and changing social norms: Millennials and Gen Z they will account for the largest segment of the global workforce by 2029.⁴ They are digital natives with high expectations around workplace flexibility and sustainability. They demand, not just expect, that their employers deliver on their stated commitments to corporate social responsibility.

"Driven by the radical changes in social norms, we see consumer demands shift towards hybrid work, demand for health & wellness standards and greater service offerings in their workspaces."

John Braley Senior Advisor, Delos

Market at a Pivotal Moment in Time

Shifting Expectations of the Next Generation

The shift to Intelligent Buildings is heavily influenced by social norms and represent a *generational change* in expectations of how a building should enable them to do the best work of their lives. It is anchored in the absolute conviction that the building environment's highest priority is *in the service to the occupant.* When done right, it culminates in the consumer and built environment coming together as one.

These themes within the context of this generational shifting of social norms stand out:

- 1. User Experience. The pandemic forever changed where work takes place and hybrid work is here to stay. The race is on to develop the technologies for collaboration, connectivity, and community, while accommodating varying corporate driven occupancy rates, presents a complex yet vital challenge for today's real estate industry.
- 2. Digital Transformation. Embracing emerging technologies to further automate and optimize the myriad of antiquated building management systems will finally unlock the full potential of digitized real estate and enable the creation of environments that enhance quality of life, optimize resource utilization, increase productivity, and mitigate environmental impact.
- **3.** Sustainability. The pressure to build, renovate, and operate more sustainable, energy-efficient buildings to conform with government mandates on sustainability goals and stringent environmental regulations is a strategic imperative for long-term success, and will require new thinking and models of economic viability.
- 4. Health and Wellness. With real estate professionals being tasked to prioritize occupant wellbeing while simultaneously navigating evolving regulations, standards, and user expectations, Health and Wellness has moved to the forefront of building design, construction, and operations.

Office vacancy rates in superstar cities increased between 2019 and 2022.

Share of office space that was vacant, %



Office space vacancy rates dramatically increased from 2019 to 2023 in large cities including Houston, San Francisco, and Shanghai

Note: In this exhibit, the cities are defined as follows: the San Francisco–Oakland–Hayward metropolitan statistical area (MSA); the London region; the New York–Newark–Jersey City MSA; the Houston–The Woodlands–Sugar Land MSA; lie-de-France; the Munich MSA; the Tokyo region; the Shanghai region; and the Beijing region. Source: INP Paribas; Colliers; CoStar; E&G Real Estate; German Property Partners; Sanko Estate Company; McKinsey Global Institute analysis

McKinsey Global Institute

Impact of Shifting Social Norms Owner, Operator

There are a number of key stakeholders that influence the lifecycle and

Owner

Includes builders, developers and/or financers in the construction of buildings

Measure ROI on investments: Does adding a gym or other amenity spaces increase return-to-office foot traffic? Incorporating intelligent technology and software today can shed light to the answers.

Deploy open and extensible technology stack: The legacy of proprietary network and protocols of building management systems locks in customers but also locks out interoperability and innovations.

Conformance to sustainability requirements: Governments have begun to provide incentives for new builds and major retrofits to achieve sustainability goals, as well as imposing penalties for failing to do so.

Operator

Includes landlords, tenants and operators who manage and/or lease building space

Lower maintenance cost and energy consumption: The emphasis on sustainability has added new weight to limiting truck rolls and saving power.

Predict demand and eliminate waste: Occupancy volatility associated with hybrid work makes providing the right level of amenities without compromising tenant experience, or minimizing waste, more difficult.

Simplify management: the "smartness" of the building used to come at the expense of complicated building management systems. Collaborative technology and AI will reduce work, not increase it.

Driving the return to workplace: LEED certified buildings can drive higher rents by 31%, while these green environments can attract talent and foster return to office. 40% of millennials have accepted one job offer over another because that company was perceived to be more environmentally sustainable, and millennials and Gen Z make up 72% of workforce. <u>CBRE 2022</u>

"The recent disruption of workplace expectations, combined with a critical time period for the transition towards clean and low energy use infrastructure has created strong interest from global investors for Intelligent Buildings which can achieve both their financial return as well as sustainability mandates."

Andrew Karsh | Co-Founder and General Partner, Bay Bridge Ventures



Across Three Perspectives and Occupant

Success of a building, we take a look at what's changing within three key groups

Occupant

Including employees, end-users and clients

Improve Wellness & Productivity: Intuitive and adaptive temperature control and ventilation, daylight harvesting and circadian lighting, have proven to improve tenant well-being and enhance productivity. The technology to deliver these experiences has matured.

Ensure digital equity and collaborations: With the shift to hybrid work, an estimated 98% of all meetings will have at least one remote participant. However, less than 15% of current conference/meeting rooms are currently capable of supporting rich meeting experiences.⁵

Space Personalization: Organizations will increasingly need to optimize their real estate to accommodate the needs of those in the office only intermittently. The practice of hot-desking and hoteling has not always yielded the best outcomes. Intelligent buildings offers a better experience by providing ondemand personalization of any workspace whereby the end-user's identity, presence, and preferences securely follow them to wherever workspace they go.

Space Visualization: Intelligent buildings will facilitate the end users' ability to find available workspaces quickly, matched to the type of workspace they need, and enable them to locate colleagues and working groups quickly for greater onsite collaboration and teamwork.

Hyperconnectivity: Intelligent buildings will support high-speed, highly reliable wireless communications to enable high-speed and high-fidelity HD voice and video communications across a multitude of devices.

"Using the building's data-driven, passive health intervention can assist with both occupant health and operational efficiency."

Isaac Mulvihill | Executive Vice President, Delos

76% of employees would quit if flexible/hybrid work ends⁷





Historical Timeline of the Evolution of



Technology advancements supporting evolution

installed Automation and speed Introduced in field Iaunched Control Network)	1976 First solar panel system installed	Adoption of BACnet (Building Automation and Control Network)	1997 WIFI introduced at 2 Mbit/s link speed	1998 Gigabit Ethernet Introduced	2000 First LED lighting used in field	2001 IP telephony first launched
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Buildings, from Green to Smart to Intelligent



Now, Intelligent Buildings are:

- Predictive: Rich sensor and telemetry data combined with AI models, allow operators to predict equipment maintenance, utility and amenity demands, thus enabling advanced automation to improve both tenant experience and operational efficiency.
- Grid-Interactive: Local energy generation and storage, as well as load shedding and load shifting capabilities enable buildings to reduce grid draw or even feed the grid during peak demand hours.
- Adaptable: Open data format and communication protocols, along with flexible infrastructure support extending the building's capabilities with cutting edge technology.
- Secure: Ever-expanding data-sets and interconnectivity require cyber and physical security to be included from the design phase, not as an afterthought.

2021 Al powered automation in building systems

Opportunity by the Numbers Evolving



Out of Office: Global Office Space Vacancies at Record High



* 65 markets analyzed in North America, 23 in Europe and 25 in Asia-Pacific Source: JLL Research

Current return-to-office rates will continue to gradually increase



Building Design and Operations

HABUILDING COUNCIL

LEED Certified Growth as of 2/2023

105,000 LEED Accredited Buildings

205,000 LEED Accredited Professionals in 185 countries

24

31

WELL 4X Growth

in 18 months (WellCertified)

17 million People **36,000** Locations **120** Countries



Building Operation Energy Consumption

30% Globally 2022 (IEA) ²⁶

42% EU 2021 (energy.ec.europa.eu) 27

40% US 2022 (nrel.gov) 28

23% ASEAN 2019 (usaid.gov) 29

EU Green Deal Energy Performance Building Directive would apply to 30 million building unit renovations

Directive sets out how Europe can achieve a zero-emission and fully decarbonized building stock by 2050

(https://ec.europa.eu/)





(US Green Building Council)

reduces \$\$\$

Implementing

smart building

solutions

30%

30

25

13

32

Smart and Intelligent Buildings



Powerhouse Brattørkaia Trondheim, Norway

The <u>Powerhouse Brattørkaia</u> designed by the internationally renowned architecture and design firm Snøhetta, is an energy-positive building that incorporates cutting-edge, energy-efficient technology, materials and design. With 2 000 m² of solar panels on the roof, 500 m² of solar panels on the facade, and a seawater heat pump located in the Trondheimsfjord, the building is a net producer of energy.



22 Bishopsgate is a people-led smart building, designed to meet the changing needs of the modern occupier and inspire a new way of working. The London building embodies the structural and cultural shifts in how people work and live, prioritising their health and wellbeing.



"The Real Estate industry has a broad role to play in the work experience whether it be at the office or at home. We can expect a continued evolution of smart technology to be embedded into Intelligent Buildings to meet the demands for health, flexibility and cost effectiveness."

Scott Panzer | Vice Chairman JLL and CEO Digital Building Solutions

an icon of energy efficiency.



from Around the World

BSD City, Indonesia

BSD has received numerous awards from national and international institutions for green buildings and sustainable design. On the environmental front, they are finalizing their GHG inventory roadmap and will embark on new initiatives to purchase renewable energy certificate to continue to reduce building emissions.



From 2022 to 2026, the number of smart buildings is expected to jump over **155%** from **45M to 115M**³³ Jupiter Research



Taipei 101

During the sustainable journey from green building to healthy building, <u>Taipei 101</u> has been affirmed by double platinum certification in LEED and WELL and has accumulated rich practical experience. In the future, Taipei 101 will continue to deepen its sustainable performance, and hopes to become the highest ESG platform to exert its influence and assist more tenants and enterprises to realize the goal of sustainable development.

Sydney Opera House

During the 3-year partnership, the **Sydney Opera House and Honeywell** collaborated on achieving the Opera House's goals, including becoming a climate-positive building by 2023. The Opera House has already reduced its water consumption by 30% through improved monitoring and reduced energy use by 20%.



7

How to Measure ROI and

The construction of green or sustainable buildings has seen a significant increase in recent years worldwide. This sharp increase is due to the multiple benefits of these types of buildings. Smart or intelligent buildings, in contrast, are technologically oriented as they rely more on information technology (IT) than green buildings.

With Intelligent buildings, the facilities and systems (air conditioning, lighting, electricity, and security) are integrated as well as automated management systems to increase energy efficiency, comfort and security. These buildings successfully merge building management / operation technology (OT) and IT systems that can dynamically optimize system performance and simplify facility operations, and improve a multitude of in-building tasks, such as ensuring the physical safety and health of occupants, real-time monitoring of systems and services, and the streamlining daily operations.

Generative AI is making tremendous strides in this area. It can help make use of this data in ways that modernize processes through automation, provide valuable IT/OT insights, and improve occupant experiences. Gen AI stands apart from other forms of artificial intelligence because it analyzes data it collects and then uses the insights gained to "generate" logical and intelligent next steps or answers to questions. The capabilities of generative AI have been growing significantly, and the technology has several noteworthy use cases in smart buildings.³⁴

"Measuring environmental, power consumption, employee satisfaction and space utilization using a data driven approach is key to determine the ROI of investments and critical to empower organizations to make Intelligent Building decisions."

Eric Knipp | VP, Systems Engineering, Americas, Cisco



Make it Real with Data

Using metrics in a smart building is crucial for monitoring and optimizing various aspects of the building's performance. Metrics help in assessing energy efficiency, occupant comfort, security, and overall building operations. Here are key areas where metrics can be applied in a smart building:

- Energy Consumption Monitoring: Measure and analyze the building's energy consumption in real-time. Use metrics to identify patterns, peak usage times, and areas of high energy consumption.
- Occupancy: Track the occupancy of different spaces to optimize HVAC and lighting systems for energy efficiency while maintaining occupant comfort.
- Usage Patterns: Analyze data on space usage patterns to inform decisions on space design, allocation, and configuration.
- **Carbon Footprint**: Measure and track the building's carbon footprint to support sustainability goals.
- **Operational Costs:** Track and analyze operational costs, including energy costs, maintenance expenses, and other operational expenditures.
- **Regulatory Compliance:** Ensure that the building meets relevant standards and regulations and use metrics to demonstrate compliance.

By leveraging these metrics, building managers and operators can make informed decisions, optimize resource usage, improve occupant satisfaction, and enhance overall building performance in a smart and efficient manner.

"Logicalis is dedicated to helping its clients deliver sustainable business outcomes that matter. Architecting intelligent, connected, automated buildings is a central element of that strategy."

Robert Bailkoski | CEO, Logicalis

Making it real: The University of British Columbia (UBC) implemented analytics and fault detection into their industrial controls managing heating plants, utility metering systems and more. With over 100K data points integrated from160+ buildings, conservation efforts have generated more than \$10 million per year in recurring savings. SkyFoundry Case Study

Spotlight on Penn1, NYC Measuring results at Cisco



We chose Penn1 for the detailed profile because we have firsthand experience building, operating and occupying it. And it has been around long enough for us to know what worked, what didn't, and what we want to do next.

The retrofit in 2021 changed several factors in the office design, including a reduction in lab space; the relocation of some meeting rooms from the perimeter of the floor into the middle; changes in daily occupancy levels due to a switch to support hybrid working; and addition of smart technologies such as lighting, window shades, security cameras, and occupancy sensors powered by PoE (Power over Ethernet).

Data doesn't exist before and after the retrofit to isolate the energy impact of each of these changes, so the calculations below looked at the impact for the total design change.

Over time, the energy usage in Penn 1 varies based on internal variables such as occupancy levels, equipment usage, and environment control settings, as well as external variables such as time of year, lighting levels, and solar heating intensity. To compare energy usage preand post-retrofit, the daily energy rate for equivalent months was therefore used in the calculations. Figure below shows the averaged **36% drop in energy usage** per day from May 2019 to Feb 2023. <u>Full report here</u>



Figure 3 below shows the energy data usage profile averaged per day for the period from May 2019 to Feb 2023. The dates below represent the start dates of each billing period.



Figure 3. Penn 1 Energy Usage per day (May 2019 - Feb 2023)

"Penn1 was the first site in our portfolio that we designed with a primary objective of quality over quantity: quality of technology, quality of settings, and quality of data being collected. We had to be efficient in the footprint and responsible in the way we built this space to assure we can amend from our learnings in subsequent phases. Consider this a living lab for our customers, partners, and employees."

Christian Bigsby | Senior Vice President, Workplace Resources, Cisco

What's Next for Future of Work





Incorporating Cisco innovation from lessons learned

Bigger Huddle Rooms

The majority of huddle rooms in Penn1 (traditional / brainstorming huddle room) optimally hosts three occupants, but data shows actual occupancy is ~3.6 persons / room. 4-person huddle rooms are now the mainstream in newer developments.

Fewer Individual Desks

Only 30% of Penn 1 floor space was dedicated to individual productivity v.s. 70% in conventional offices. Pushing this boundary even further aligned with our fit for purpose spaces, we tuned this number down to 10% in Atlanta.

Equality in the Meeting Rooms

Among meeting rooms of similar sizes, the most popular is the "Innovation Suite" reference design, where no apparent hierarchy can be inferred from the seating.

How technology can accelerate sustainability

Ambient AI will be the standard in Intelligent Buildings which is the notion of edge intelligence provided by traditional IT systems which in turn will drive a best in class and always improving occupant experience as well as operational efficiencies for delivering sustainable outcomes. **Bob Cicero** | *Americas Hybrid Work and Sustainable Real Estate Leader, Cis*co

"Migrating from AC powered building infrastructure to a low-voltage, Power over Ethernet can reduce build costs by hundreds of thousands of dollars." Bryan Osoro | *VP of Sales, EOS*

"As more and more renewable generation and energy storage capacity comes online, a DC-Microgrid architecture with an FMP (450VDC, touch safe) Backbone and PoE / USB-C Last-Mile is our vision forward for power distribution in Intelligent Buildings. Andrew Lu | Director, Engineering Sustainability Office, Cisco



Myth #1:

Intelligent buildings are too expensive to build and have too long of an ROI for investors

False

Owners and *operators* who apply intelligent building technologies as part of the holistic design process have realized initial costs very close to non-intelligent designs. In addition, intelligent buildings lead to higher asset value and lower operational costs. For example, when using PoE-enabled smart lighting, the higher equipment cost is offset by lower installation and operational costs.

The ROI for *owners* and *operators* varies based on different factors, including the specific technologies used, the building's location, and local energy prices. Utilizing incentives and funding programs available across the globe encouraging the construction of more energy efficient and more sustainable buildings can help to reduce upfront financial investment.

Myth #2:

Intelligent building technologies are proprietary and therefore not interoperable

False

With the rising costs of materials and need for connectivity, the building industry continues to move towards more open, integrated and standardized systems. With the generational shift happening in the workplace, *occupants* have come to not only expect reliable connectivity of Ethernet, but also the support and range of open, non-proprietary protocols and standards, including BACnet IP, Modbus, TCP, MQTT, designed to ensure interoperability between different systems and devices. *Owners* and *operators* continue to find new ways to connect the Internet of Things (IoT) devices typically use standard internet protocols, making them more compatible with each other.



Most organizations are trying to figure out exactly what the workplace should be in today's new distributed work reality. Technology can offer a better way to design and construct which can decrease costs (capex) and provide less expensive design choices (i.e. POE). Read More in this <u>Deloitte Case Study</u>

and Why You Can't Afford to Wait

Myth #3:

Smart or intelligent buildings are top of mind for Chief Sustainability Officers

False

CXOs are evaluating their real estate portfolios for a variety of reasons. CTOs, CIOs, CSOs, and IT leaders are interested in reducing energy costs for growing IT demands. Facility and building managers are interested in the day-to-day operational efficiencies offered by intelligent building systems. And C-suite level executives, including CEOs and CFOs, are interested in intelligent buildings to reduce operational costs, improve the health and productivity of the building's inhabitants, and strengthen the company's brand as a leader in sustainability and innovation.

Myth #4:

The regulations and permits required for the construction of more sustainable and intelligent buildings are too complex.

False

Regulations are in place to ensure safety, quality, and environmental standards and vary depending on the specific location of the project, type and intended use of the building, specific health and sustainability-focused design principles, operational practices and intelligent building technologies being used. Advocates and standards organizations around the world are helping to simplify and clarify the requirements for owners and operators to encourage more widespread adoption. For instance, sustainability and wellness standards, defined by the US Green Building Council and the International WELL Building Institute through LEED and WELL, define healthy and sustainable building practices including the use of intelligent building technologies to enhance health, sustainability and positive user experiences.

Myth #5:

Al will replace human beings in the way buildings are designed

False

Artificial Intelligence (AI) is playing an increasingly important role in the design and construction of buildings and can help automate some tasks, provide predictive analytics, optimize design options, and reduce errors, which can make the design process faster and more efficient. But the creative, intuitive, and ethical decision-making aspects of architectural design are areas that AI cannot replace humans. Understanding the needs and desires of the occupants who will use the building – something that involves empathy and human connection – is a critical part of design that AI can't fully capture.

10

Multi-Use Development Projects

Selected and iconic examples at every



Hudson Yards

Hudson Yards was designated Manhattan's first LEED Gold neighborhood development. The designation, by the U.S. Green Building Council, is a global recognition of achievement and leadership in the area of sustainability. The resulting development, with a first-of-a-kind microgrid, stormwater reuse, five acres of public green spaces, pedestrian-friendly design and easy access to public transportation, set the standard for forward-thinking, low-impact urban planning. Learn More



The National Capital will be built to achieve Indonesia's target as a developed country, in accordance with Indonesia's Vision 2045. Initial stage set for Aug 2024 includes basic infrastructure for 500,000 residents in the initial stage. <u>Learn More</u>





Canary Wharf

When it comes to social and environmental responsibility, we're market leaders. Through our sustainability initiatives, we have demonstrated our commitment to safeguarding the environment and creating conscious city living. We will continue to develop forward-reaching initiatives that can make a difference now and beyond. Learn More

From Concept to Reality

stage from around the world



National Landing

National Landing is poised to become the most connected downtown in America. Building on its rich legacy of transportation infrastructure, National Landing is constantly evolving with a new emphasis on next-generation multimodal mobility. Guided by a singular vision, the public and private sectors are together investing more than \$4 billion into the transportation network to meet the needs of current and future residents, employees, students, and visitors.

Learn More

The Line Saudi Arabia

NEOM is the land of the future, with an ambition to redefine livability, business and conservation at its heart. These distinct regions and sectors will be fueled by USD 500 billion from the Public Investment Fund of the Kingdom of Saudi Arabia and local and international investors. NEOM will become a community powered by talent and diversity across 14 sectors. Learn More





California Forever

The initiative proposes to build a new community, with homes and retail in safe, walkable neighborhoods in East Solano County in California. The planned development would include a new city with tens of thousands of new homes, a large solar energy farm, orchards with over a million new trees, and over 10,000 acres of new parks and open space. Learn More

A Glimpse Into the Near Future

Embracing what's to come

Disruption can redefine industry standards and overturn established norms. Innovation across technology, sustainability, and business models can help manage change and new expectations through insights, visibility, and tools. Positive outcomes include intelligent occupancy management, flexible space, and better talent attraction and retention.

There are a few areas ripe for disruption:

Capital Structure and ROI: Existing design and construction methods are dictated by thin margins and repetitive business models. Traditional capital structures need to be rethought to facilitate innovation in the building industry. Sustainability can be a tool to deliver ROI. 74% of corporate real estate executives would pay a premium to retrofit a space for sustainability criteria.³⁴

Systems Integration: Proliferation of proprietary systems limit innovation. Open systems are required to connect IT and OT networks for greater flexibility and integration – crucial for implanting intelligent technologies in buildings.

Building Design: Disruption in design must be focused on user needs and experiences. Focusing on occupant needs and desires will allow for intelligent buildings designed for differentiation and flexibility vs. quality of finishes.

Metric Management: Intelligent building design moves beyond a world where badge data is good enough for organizations. Combing network and BMS data can help them understand building occupancy and use of space to inform for HVAC and lighting usage, delivering a lower TCO.

Productivity / Experience (WELL): The same data used to report on metrics about the built environment can impact the health and wellbeing of occupants. Intelligent buildings can deliver new levels of environmental monitoring and management to improve the office experience.



Looking into future possibilities, the evolving real estate industry reflects our shared aspirations and showcases our capacity to innovate, adapt, and cater to the needs of current and future generations. What role will you play in this journey?

Predictions on the Horizon

At the intersection of hybrid work, accelerated technology advancements and sustainability imperatives, the future of the real estate industry is full of possibilities.

Integrated Technology Meets Generative AI. We will see a further expansion of the technology partner ecosystem for energy efficiency – energy management. The integration of technologies in 'plug and play' solutions will accelerate the use and adoption of newer innovations across a traditionally fragmented vendor space and change the design, construction, build, retrofit and rebuild phases.

Digitizing the Real Estate environment with sensors will continue the rapid expansion of data. The use of data analysis and insights, along with the advancement of generative AI, will boost the progress of machine learning. This will enhance our understanding and allow for improved automation of energy management in all devices and endpoints. Opportunities for policy management and automation will further the use of generative AI and the adoption and growth of more Intelligent Building spaces.

Beyond Green to Regenerative

As the 'climate conscious' younger generations continue to join the workforce, they will demand to work in sustainable buildings with energy efficient spaces, powered by renewable energy, circular consumption, and reduction of waste.

As intelligent buildings become more common, there will be a shift towards multi-purpose real estate, combining commercial, residential, and industrial uses. This will lead to the creation of smart cities and even larger ecosystems where buildings are not just standalone structures, but part of eco-centric communities designed to blend seamlessly with nature.

Talent

In all these predictions, the need to enhance the skills of the existing workforce, train new talents, and create courses for future professionals is critical. This forms the basis for continuous technological innovation that supports the growth of Intelligent Buildings, contributing to a sustainable future.



"While the need to make the built environment more intelligent, efficient and sustainable has existed for decades the convergence of new enabling technologies, grid interactivity and societal expectations are creating the environment for these investments to be assessed by more than simple ROI calculations." John Petze | Partner & Co-Founder, SkyFoundry

Getting Started



As our world becomes more connected and the need for sustainability becomes more apparent, the concept of intelligent buildings will continue to gain momentum. The generational shift in expectations around hybrid work, digital transformation, sustainability, and health and wellness requires owners and operators to ensure better experiences for occupants. And attracting occupants back to healthier office environments leads to more profitable business models for both owners and operators.

Planning and designing an intelligent building is a complex process. Working with a team of experienced professionals will help to ensure the best results for everyone – owners, operators, and occupants.

More and more building certifications focus on environmental metrics are seen to grow the value of the building through an effective and powerful digital footprint. Here are nearly a dozen recognized certifications below.







International









Designing an intelligent building involves several key steps:

- 1. Define Your Goals and Objectives: Clearly define what you want to achieve from improving energy efficiency, reducing operational costs, attracting and retaining tenants, to integrating renewable energy sources.
- 2. Assemble a Qualified Team: Gather a team of experts to help you make informed decisions, including architects, engineers, IT professionals, sustainability experts, and others who have experience with intelligent building design.
- 3. Conduct a Needs Analysis: Understand the needs and requirements of the building's occupants. Determine what features they value most indoor air quality, natural lighting, thermal comfort, or smart technology integration.
- 4. Choose the Right Technologies: Based on your goals and the needs analysis, choose the appropriate technologies HVAC systems, energy-efficient lighting, automation systems, loT devices, etc.
- 5. Design Phase: Start designing the building with your team, considering the chosen technologies and the building's future occupants. The design should be flexible and scalable, allowing for future upgrades as technology evolves.
- 6. Integration: Plan how different systems will be integrated. Intelligent buildings work best when their various systems can communicate and work together.
- 7. Construction: Regularly monitor the progress to ensure the original design and goals are being met.
- 8. Continuous Monitoring: Use sensors and smart systems to continuously monitor the building's performance. This data can provide insights for further improvements.

For more information on getting started, contact us at: <u>hello@intelligentbuildingsystems.io</u>



Contributors

Robert Bailkoski, Chief Executive Officer, Logicalis

Robert serves as CEO of Logicalis, an information technology company focused on helping organizations succeed in a digital-first world. Robert understands that sustainability is a clear differentiator, both for Logicalis and the customers they serve. Logicalis is helping organizations improve the emissions generated by their IT environment.

Christian Bigsby, Senior Vice President, Workplace Resources, Cisco

Christian leads the Real Estate and Facilities organization known as Workplace Resources at Cisco. In his three decades in the real estate industry, Christian has worked as an interior designer, a facility manager, and a real estate director. Over the past 15 years, he has helped transform the way people interact within the work environment and how they think of "the office" and "the lab." Looking to the future, he and his team are constantly innovating to define the next generation of workplaces to drive the company's real estate and services into a true competitive advantage in the retention and pursuit of talent.









John Braley, Senior Advisor, Delos

As a Senior Advisor Delos, John brings his 25+ years of experience in real estate and construction to bring the company's health and wellness platforms to designers, developers, financial institutions, and technology partners. John has helped launch programs in multi-family residential, student housing, office, education, and other building sectors, as well as establishing strategic partnerships with industry leaders like Johnson Controls International (JCI) and Cisco.

Andrew Karsh, Co-Founder and General Partner, Bay Bridge Ventures

Andrew Karsh is Co-Founder and General Partner at Bay Bridge Ventures, an institutional venture capital firm focused on investing in industry leading climate technology companies. With more than 25 years of experience in managing investments on behalf of major asset owners globally, he previously spent ten years as a Portfolio Manager within the Investment Office at CalPERS. During this time he managed a portfolio of \$10Bn+ in direct alternative investments and also represented the organization as part of the UN Global Investors for Sustainable Development working group alongside 30 of the largest global financial institutions.

Denise Lee, Vice President, Engineering Sustainability Office, Cisco

Denise is Vice President for Cisco's Engineering Sustainability Office, defining Cisco's long-term sustainability vision and roadmap. Working on building new business ecosystems and embedding new technology across Cisco's end-to-end portfolio. She and her team collaborate across every function of the business to develop and create integrated capabilities that serve as the foundation to incubate and scale sustainable products that accelerate the journey to Net Zero for Cisco, its customers and partners.





Isaac Mulvihill, Executive Vice President, Delos

Isaac Mulvihill leads Delos' Product division, focused on developing and partnering with innovative health and wellness product manufacturers. Isaac works closely with many school districts, government entities, commercial clients and reseller partners to deliver Delos and partner products. Isaac began his career at Delos building an antimicrobial, air purifying photocatalytic thin film technology and has since worked in various positions to invest in, partner with and develop products which underpin Delos' commercial programs.

Bryan Osoro, Vice President of Sales, EOS IT Solutions

Bryan serves as Vice President at EOS, supporting the largest companies on the planet, whom all have progressive sustainability initiatives. He's been connecting technology to business for over 20 years and has a particular passion for connecting the unconnected, with a recognition that the real power comes from creating actionable insights gleaned from widespread connectivity.





<u>Scott Panzer</u>, Vice Chairman, JLL

Scott serves as Vice Chairman of JLL, a global real estate services company that combines innovative technology and data intelligence with their world-renowned full service real estate advisory platform to unveil untapped opportunities for client success globally. Scott is also CEO and Founder of Digital Building Solutions, an infrastructure "farm to table" technology enterprise that provides Power over Ethernet integration with end-to-end solutions for all things PoE.

John Petze, Partner and Co-Founder, SkyFoundry

John is a co-founder of SkyFoundry, a technology company that develops software solutions designed to help clients derive value from their investments in smart systems through the application of advanced data analytics. Previously, John was CEO of Tridium and also served as the Global Sales Director for Intelligent Buildings at Cisco. John has over 40 years of experience in the intelligent buildings industry and is an expert in automation, control, IoT and energy management.

Special thanks to the Cisco team for their invaluable insights and contributions: <u>Bob Cicero</u>, Americas Intelligent Buildings Leader; <u>Eric</u> <u>Knipp</u>, Vice President, Systems Engineering; and <u>Andrew Lu</u>, Intelligent Buildings and Sustainability Lead

To stay tuned for what's next please contact us at: <u>hello@intelligentbuildingsystems.io</u>



Endnotes & Additional Resources

<u>Smart Buildings</u>, also known as intelligent buildings, put technology at the service of people to create more comfortable, safe and productive environments. This concept can be adapted to residential, commercial and industrial buildings. A smart building could be considered synonymous with sustainability. Optimize their resources to obtain greater performance, in addition to contributing to and disseminating sustainable development. (*Source: Nexus Integra*)

Resources:

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