WEBINAR SERIES

Future-proof EPBD: Let's deliver beyond the Renovation Wave!

THIRD WEBINAR

Ensuring the uptake of smarter solutions for better performing buildings

Friday, 4 June 2021, 09:30 - 10:40 CET

EuroACE
Energy Efficient Buildings

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Welcoming Remarks

Julie Kjestrup
EuroACE President

EuroACE
Energy Efficient Buildings

2

2

Instructions

- You are kindly asked to remain muted
- No cameras for the whole duration of the webinar
- Only speakers and moderator will stay unmuted
- A Q&A session will follow each panel discussion
- Ahead and during the Q&A session, questions will have to be sent to “Everyone” in the GoToMeeting chat box.
- Questions should be as concise as possible
- The moderator will group questions and then address them to the speakers
- If time does not allow to cover all questions, they will be forwarded to the speaker for later response
- The PowerPoint presentation and questions will be shared with you in due course

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Energy Efficient Buildings

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3

EuroACE – Energy Efficient Buildings

- The European Alliance of Companies for Energy Efficiency in Buildings
- Formed in 1998 by Europe’s leading companies involved with the manufacture, distribution and installation of energy saving goods and services
- A business association working together with the European institutions to help Europe move towards an efficient use of energy in buildings (new and renovated)

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4

EuroACE – Energy Efficient Buildings

** More than 220,000 employees & more than 1,100 production facilities and office locations in the EU **

Our specificity: our cross-sector representativeness

We represent all energy efficient technologies

>>> heating & cooling equipment, insulation, lighting, maintenance regimes and controls, ventilation equipment & windows

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5

EuroACE – Energy Efficient Buildings

We believe that improving the energy efficiency of buildings, especially renovating existing buildings, is the most cost-effective method of:

- Creating employment and securing economic growth
- Alleviating energy poverty on the long-term
- Providing people with comfortable and healthy homes
- Meeting carbon reduction targets
- Achieving energy security

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6

EuroACE – Renovate Europe Campaign

RENOVATE EUROPE

EU-wide political communications campaign
Focuses exclusively on ambitious energy renovation of the building stock, motivating EU and national institutions to take action
48 partners, including 18 at national level
High political support with the Champions Together for Renovation

#PrioritisePeople
#AccelerateRenovation
#Renovate2Recover

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7

Today's agenda

09:30 | Opening remarks and guidance to participants - Julie KJESTRUP, EuroACE President

09:40 | Digital at the service of the Renovation Wave – Ray PINTO, DIGITALEUROPE

Presentations: "The growing role of smart and digital solutions to keep in check the energy performance of our buildings"
09:50 | Clémence ARTO, Autodesk
10:00 | Christina von WESTERNHAGEN, Johnson Controls (JCI)
10:10 | Dr. Claudio DEL PERO on behalf of the HEART Horizon 2020 project *(invited)*

10:20 | Q&A Session moderated by: Julie KJESTRUP, EuroACE President

10:35 | Conclusions - Julie KJESTRUP, EuroACE President

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8

Digital at the service of the Renovation Wave

Ray Pinto
DIGITALEUROPE

EuroACE
Energy Efficient Buildings

9

9

10

DIGITALEUROPE represents more than 35,000 businesses across Europe

- Our members are **global leaders** and **national trade associations**
- We provide **unique insights** from Work Groups spanning tech and the traditional sectors

Manufacturing & Industrial Ecosystems	AI & Data
Green Deal	Digital Sustainability
Standards & interoperability	Automated mobility

Digitally transforming industries

2

11

12

Deep renovations are digital renovations

The EPBD Roadmap is geared at:

- A target of **35 million** building units renovated **by 2030**
- Reducing energy-related ghg by **60%** compared to 2015 levels
- **EUR 275 billion** of additional investments are needed per year for the climate goals
- **BUT:** We need smart investments

- These ambitious targets demand equally ambitious **political commitment**
- Waste reduction and better experiences requires **optimising design, operations & renovations**
  Digital processes are the only way to make this a reality
- Information – **building data** – is needed to feed into to these processes

- **30%** of projects do not meet the original objectives
- **92%** of planners say that not all information is available when plans are made
- **37%** of materials used in construction become waste

The solution: full lifecycle digitalisation

- We need **a data driven model** and a **long-term vision**
- We need **collaboration from the first stage** to the last stage of the building lifecycle

From Building Information Modelling to the Digital Twin

Currently:

Static building data

- One time **waste reductions**
- Digital technology is the enabling factor of a **cross-collaboration** between architects, engineers, services and contractors

Needs to be included:

Building technology data

Dynamic building data

Enable Digital Building Twins to:

- **Simulate** before implementing and **continually optimise**
- **Monitor** and automate the operations of **whole environments**
- **Dynamic modelling** to accurately predict
- **Integrate disparate systems** (IoT/IoA, edge and cloud computing)
- Continually **save time, waste and wasted energy**

High potential digital solutions

- **Platforms with an interoperable architecture:**
  - Applied in homes, buildings, data-centres, infrastructure and industries
  - Enables innovation at every level from connected products to edge control, and apps, analytics and services
  - One of our members' platform has already been implemented on more than 480.000 sites,
    - saving up to **80%** of engineering costs,
    - **75%** in maintenance costs,
    - up to **50%** in carbon footprint

- **Online environment for Digital Twin modelling:**
  - Allows you to define the digital entities that represent the people, places, and things in your physical environment using custom twin types called models
  - This way you can model any environment, even entire cities, and bring digital twins to life in a scalable and secure manner
  - The open modeling language creates an interoperable and scalable digital twin model
  - These model definitions are a specialised vocabulary built on top of the platform

How can the Renovation Wave enable digital?

- **Mandate collaborative digital technologies: BIM and Digital Twins in public tenders**
  - Create a roadmap with requirements for digital technologies in buildings
  - Require tenders to involve different parties in the building's construction and management from the start

- **Set and enforce ambitious targets:**
  - **Carbon neutral by 2050**: Mandatory CO2 reduction target for the building stock

- **Standardise internationally:**
  - No need for a new European building information standard, **we need interoperability**
  - The EU to pioneer **building data to be transferred** when buildings change ownership (e.g. in renovations)

17

Presentations: "The growing role of smart and digital solutions to keep in check the energy performance of our buildings"

Clémence Arto
Autodesk

EuroACE
Energy Efficient Buildings

18

18

Leveraging digital solutions to keep in check the energy performance of our buildings: From pre-design to operation and maintenance

Clemence Arto

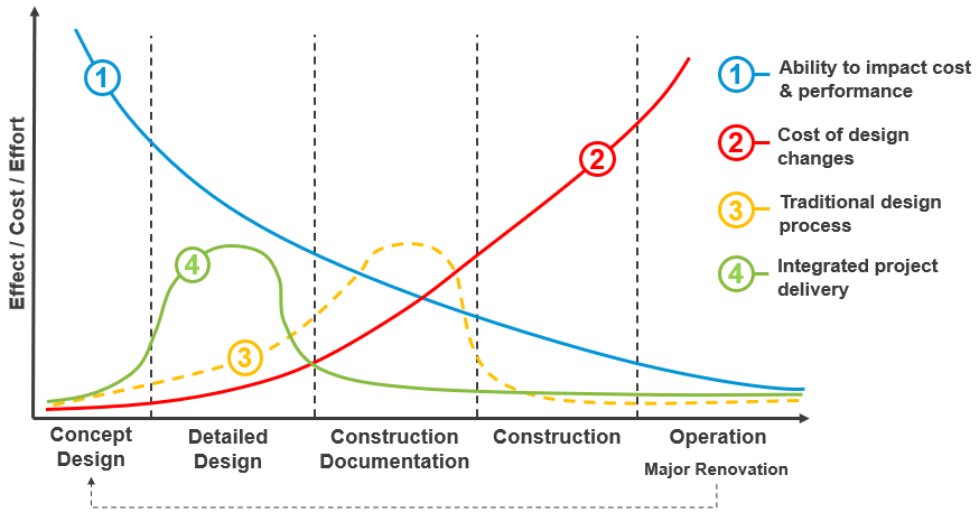
Head of European Governments Affairs

AUTODESK.

19

Integrating sustainability earlier in the process

The MacLeamy Curve



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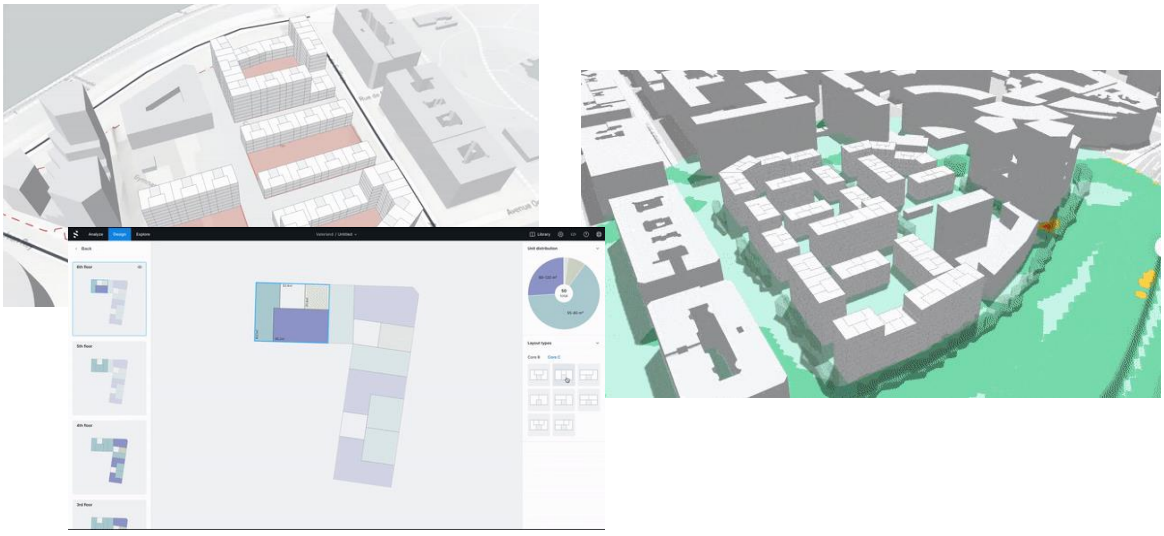
Analyze external conditions in the pre-design phase



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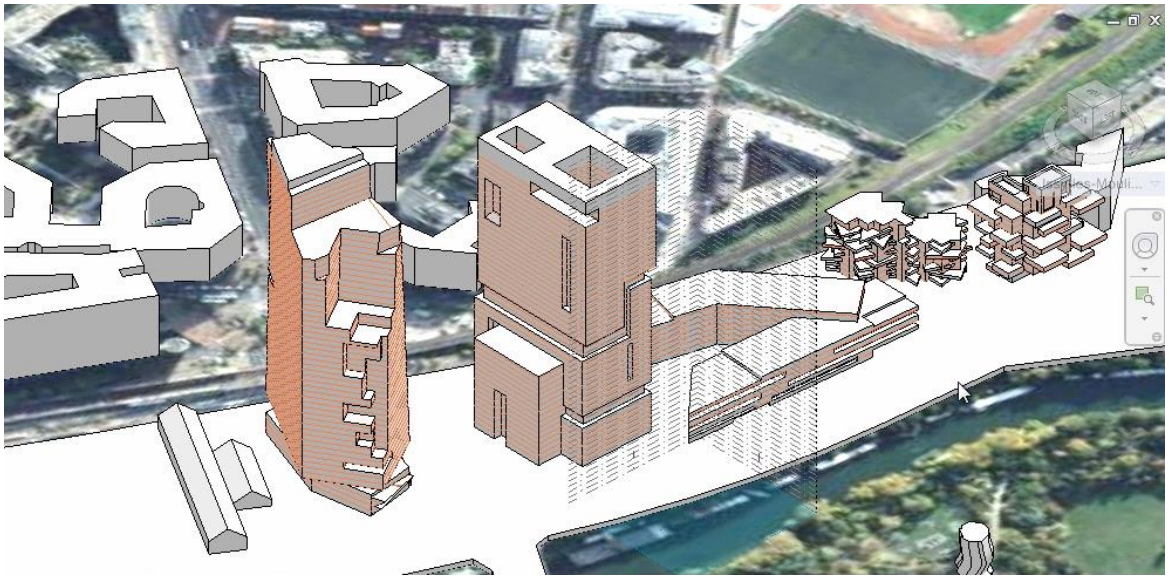
Modelize environmental impact of a building in the design phase



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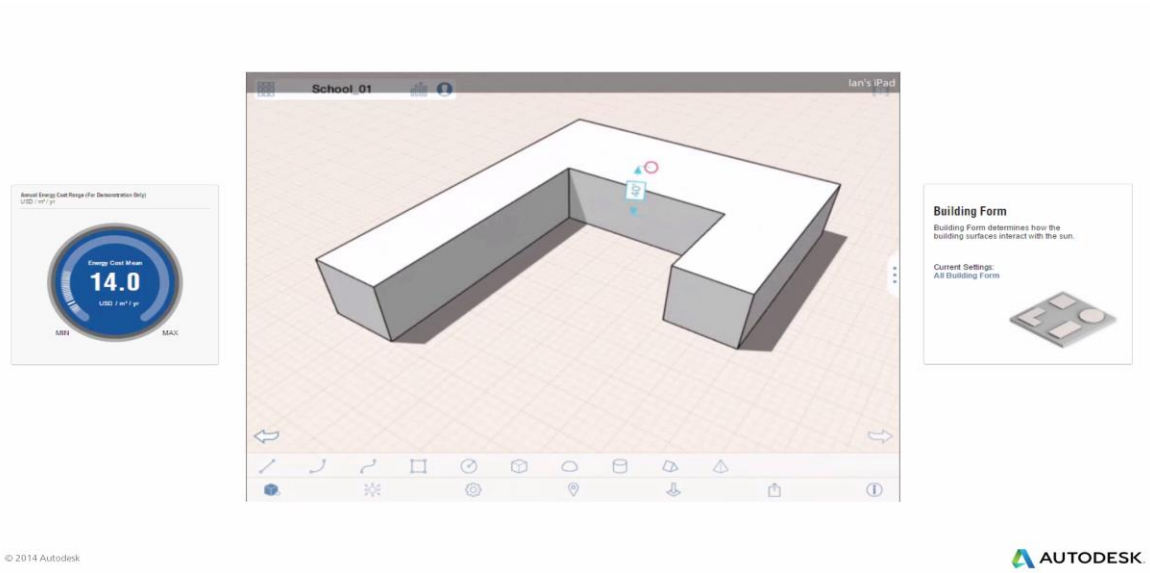
Anticipate buildings' energy cost in the project phase



23

Digital Twin: optimise the exploitation and maintenance of a building

24

Breaking the construction process' silos thanks to digital solutions

- A full building's lifecycle approach
- Focus on sustainability from the earliest stages of construction
- A collaborative process: shared common platform to gather BIM and IoT data
- Measurable and adjustable targets

25

AUTODESK.

Make anything.™

26

Presentations: "The growing role of smart and digital solutions to keep in check the energy performance of our buildings"

Christina von Westernhagen
Johnson Controls (JCI)

EuroACE
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27

27

Johnson Controls presentation for EuroACE webinar

June 4th, 2021

The power behind your mission

Johnson Controls – Global Digital Solutions – Center of Excellence Network

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28

OpenBlue
Metasys: Addressing key needs & challenges

Healthy People

Healthy Places

Healthy Planet

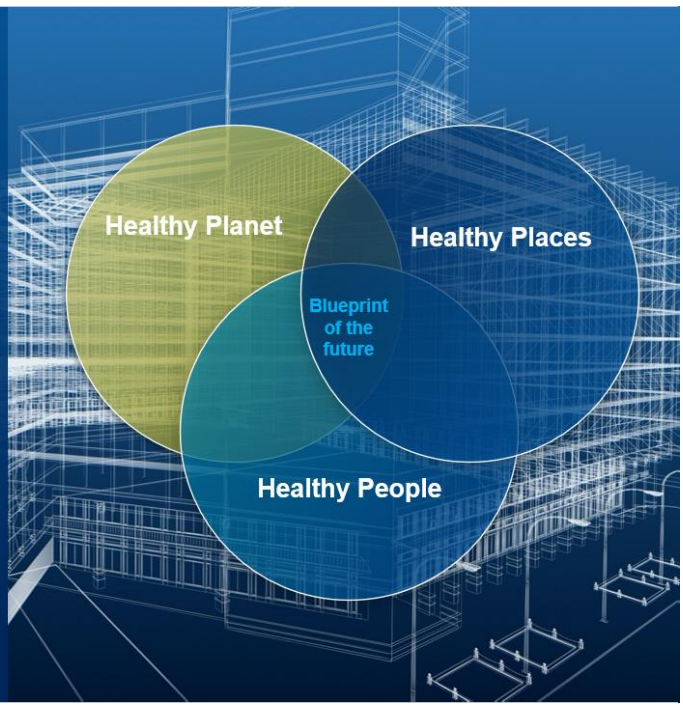
Combine all three to deliver on your business and financial goals.

29

Overview of OpenBlue Healthy Buildings

OpenBlue Healthy Buildings is the most comprehensive suite of connected solutions that powers wellness & high performance teams, optimizes the performance of customers, buildings and assets, and drives customer sustainability goals and community health.

- Agile
- Scalable
- Flexible
- AI-infused



30

Healthy People

Power wellness & high performance teams

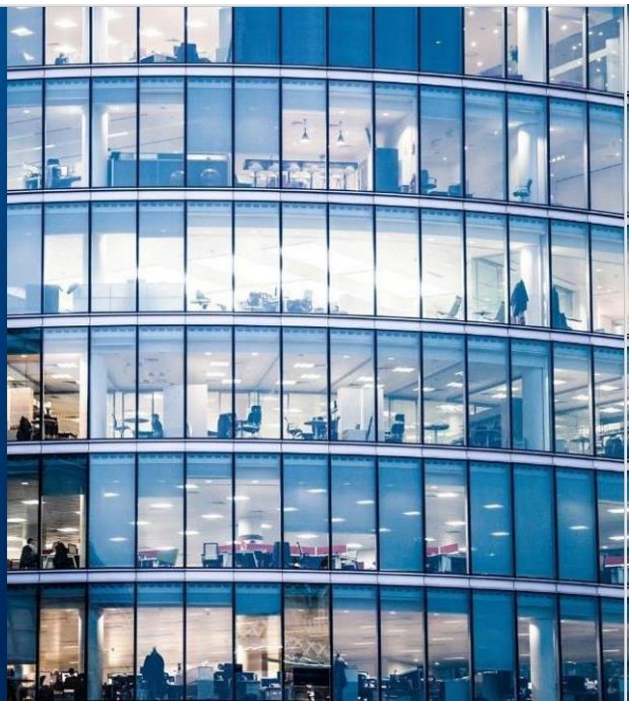
- Delivering clean air
- Keeping people healthy and safe
- Driving productivity and high performance
- Ensuring comfort and wellness
- Increasing peace of mind and confidence
- Reacting faster to any disturbance
- Delivering personalized experiences
- Increasing engagement including on sustainability program of company
- Give people Control of their environment
- Supporting talent retention

31

Healthy Places

Optimize the performance of customers, buildings and assets

- Building performance (including space optimization, capital planning and more)
- Asset performance (asset life, uptime, reduced capex)
- Operational performance (workflow, continuity, equipment usage, etc.), optimize your teams
- Flexible building and operating modes
- Energy security and efficiency
- Advanced security, emergency response and compliance
- Remote operations (monitor, control, maintain)
- Resilience and future-readiness



32

Healthy Planet

Drive customer sustainability goals and community health

- Reduce energy use
- Cut down on waste
- Lower water usage
- Achieve carbon neutrality
- Holistic Security and Safety of people and buildings
- Increase building value
- Enhance business reputation
- Streamline sustainability reporting
- Maximize return on green investment
- Integrate data in smart cities

33

Building Management

Customer Challenges we aim to solve

Achieving business and financial goals

Mitigating infection risks for occupants

Increasing occupant comfort, safety and wellness

Driving productivity and performance

Reducing operating and lifecycle costs

Maintaining and scaling operations quickly with minimal impact to staffing and budget

Increasing operational performance

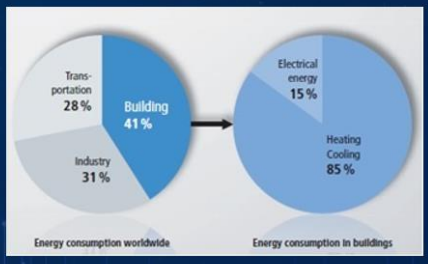
Improving energy consumption and achieve carbon neutrality

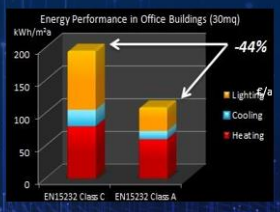
Maintaining building value

34

Energy savings through Room Automation

- Buildings account for 41% of primary energy consumption. **85% of energy consumption** in buildings is used for room **heating and room cooling** and 15% for electrical energy (mostly lighting).
- The focus has to be placed on **room automation and the central plants**, because rooms, where energy consumption occurs, provide the **greatest secondary potential** for savings and the central plants can improve the **primary energy efficiency** of buildings.
- The **EN 15232** (European Performance of Building Directive, EPBD) defines a structured list of Building Control functions, Automation (BAC) and Technical Building Management (TMB) impacting the overall **energy performance** of buildings and specifies 4 different BAC efficiency classes: A, B, C and D.





-11%

Energy Performance and Cost per Office (30 m²) for Class A and Class C buildings

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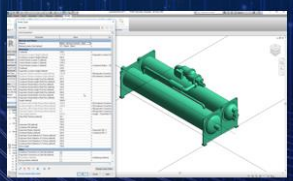
35

What is BIM

- BIM is an acronym for Building Information Modeling
- BIM is both a process and a technology used by the construction industry to design, analyze, build and maintain structures
- The BIM process allows buildings to be designed and analyzed digitally prior to starting physical construction
- BIM technology allows each trade to digitally assemble the structure in a collaborative environment, avoiding equipment clashes, cost over runs and delays
- Each BIM element contains information that can be extracted and used for many purposes including Digital Twins



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36

BIM Growth

- Leading countries for BIM adoption:
  1. United Kingdom
  2. United States
  3. France
  4. Finland
  5. Sweden
  6. Denmark
  7. Norway
  8. Singapore
  9. United Arab Emirates
  10. China
  11. Australia
  12. Germany

Source: United BIM

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37

BIM Growth

- The number of BIM projects are increasing around the world
- More than 80% of the projects and tasks on our schedule are BIM
- The requirement for all trades to participate in the BIM workflow is key to a successful project
- The BIM workflow is very different than what many of us are used to
- Not understanding the BIM workflow can cause serious disruption to the project
- This impacts our Sales teams, Engineers, Designers, Techs, PM's and Contractors
- BIM is a small acronym, overlooking it can add up to large cost overruns
- Engage the correct resources prior to bidding!

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38

BIM at Johnson Controls

Enterprise Property Group

Design, Analysis and Sustainability

Manufacturing (Products)

Installation (Projects)

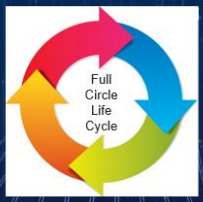
Digital Solutions \ OpenBlue (Digital Twins)

Public Private Partnerships

Long-Term Model Maintenance

Building Information Modeling

JCI Headquarters - Shanghai, China



JCI Headquarters - Cork, Ireland

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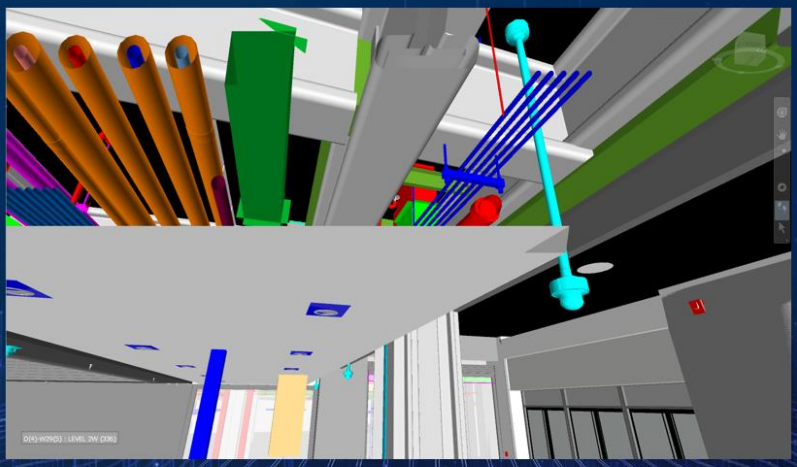
39

BIM Examples

- BIM allows for the strategic placement of equipment prior to construction – reducing waste, change orders and missed delivery dates



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40

BIM Examples

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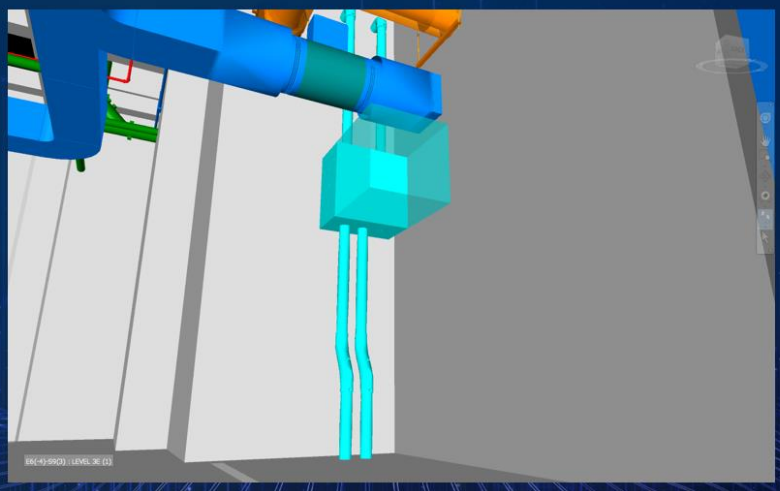

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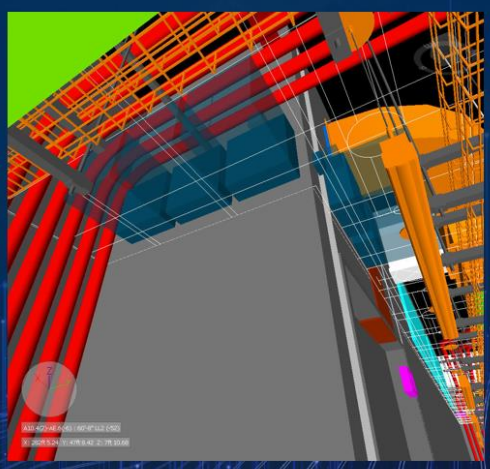
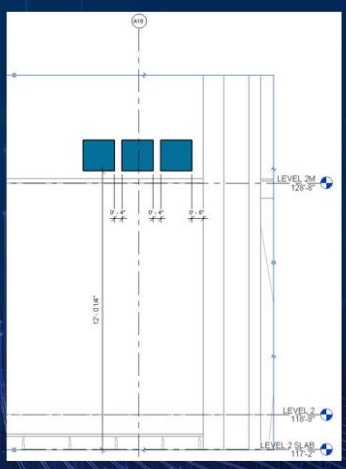
41

BIM Examples

- BIM allows for the strategic placement of equipment prior to construction – reducing waste, change orders and missed delivery dates





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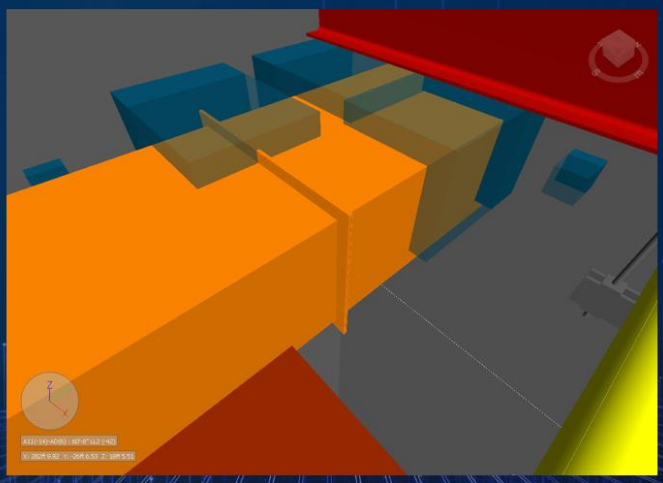
42

BIM Examples

- A clash between the HVAC duct and our door swing reservations. Correcting the clash on-screen saves time, reduces waste, change orders and missed delivery dates



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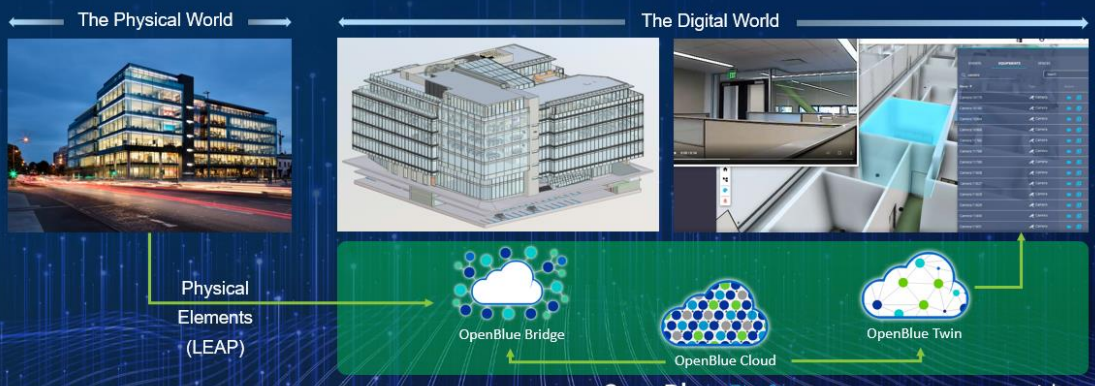
43

What is the OpenBlue Twin (i.e., Digital Twin)?

- A Digital Twin means different things to different people (owners, operations staff, employees, visitors, etc.)
- OpenBlue Twin is a platform, not a product
- Data from the physical world is connected to, processed, analyzed, controlled and displayed on a digital replica of the physical elements



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44

Are Digital Twins New?

- NASA developed the first "Twin" 51 years ago for the Apollo 13 space mission
- *"The simulators were some of the most complex technology of the entire space program: the only real things in the simulation training were the crew, cockpit, and the mission control consoles, everything else was make-believe created by a bunch of computers, lots of formulas, and skilled technicians".*

- Gene Kranz, NASA Chief Flight Director for Apollo 13

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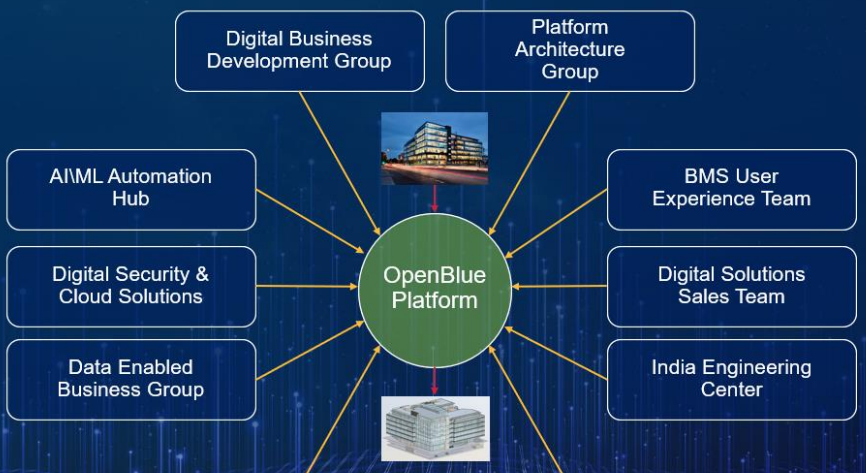
45

The Digital Twin team



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46

Digital Twins – What are they?

- Data from physical assets is connected to, and displayed on, a digital replica (i.e., the "Twin") of those assets – it is the bridge between the physical and the digital world
- A Digital Twin (i.e., OpenBlue Twin) is a platform, not a product
- A Digital Twin is not an "off the shelf" offering, it is a custom application based on the clients needs, Use Cases and Assets
- A simple example of a Digital Twin is a ride sharing service (Uber, Lyft). Data from physical assets such as the client's information, their location, the drivers location, the type of car, it's direction of travel, traffic and time to location (i.e., all physical assets) are collected and displayed digitally on the client's mobile device (i.e., the Digital Twin)

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47

OpenBlue. Digital Twin

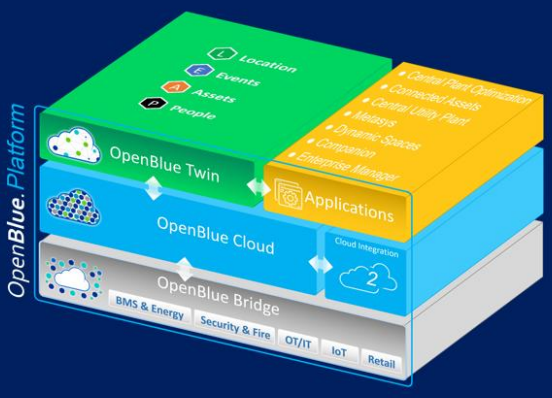
OpenBlue Twin is the representation and context between Location, Assets, Events, and People within the building graph. "LEAP" is the foundation to intelligent buildings.

Digital twins bring together data across the as-built environment to unlock greater insights for applications and machine learning modeling

OpenBlue Twin provides a common context and interactive building graph so applications and ML can create new repeatable outcomes

Brick 400+

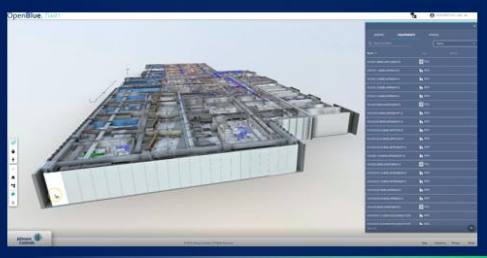
OpenBlue Twin aligns to BRICK which brings 400+ pre-defined out-of-the-box twin definitions eliminating the need to develop from scratch.



Digital Twin Visualization

3D BIM /2D Maps

Digital Twinning is integrated into the 3D BIM for contextual visualization of physical to digital attributes of LEAP.



48

OpenBlue. Twin

The attributes of the as-built environment relevant for digital twins are defined as LEAP

L	E	A	P
Locations	**Events**	**Assets**	**People**
Information about the building location. Also defined location information within the building.	From critical telemetry alarm events needing urgent action to enrichment events like weather, analytical events, or any influences improving operational performance on the building.	Information about the building, assets, devices, or equipment and the subsystem points that are used to build and operate the building from end-to-end.	Who is in the building, where are they and what are their relationships or role within the context of locations, events, and assets creates a comprehensive data set.

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49

OpenBlue. *Twin*

Digital Twin delivers value with datasets

Digital Twin Visualization

Digital Twinning is integrated into the 3D BIM for contextual visualization of physical to digital attributes of LEAP (Location, Events, Assets, & People)

Design

Construction

Commissioning

Early involvement in asset design w/architects upstream provides more control down stream.

3D BIM
Existing As Built

4D
Historical Asset Simulation

5D
CapEx & OpEx Run Rates

6D
Sustainability & energy simulation modeling

7D
Responsive Building FM Mgmt Apps

AI Automation

Digital Twin Enablement

Change Management Simulation

Capital & Operational Expense Forecasting

LEAP (Location, Events, Assets, & People)

Assets, Points, & Geometry

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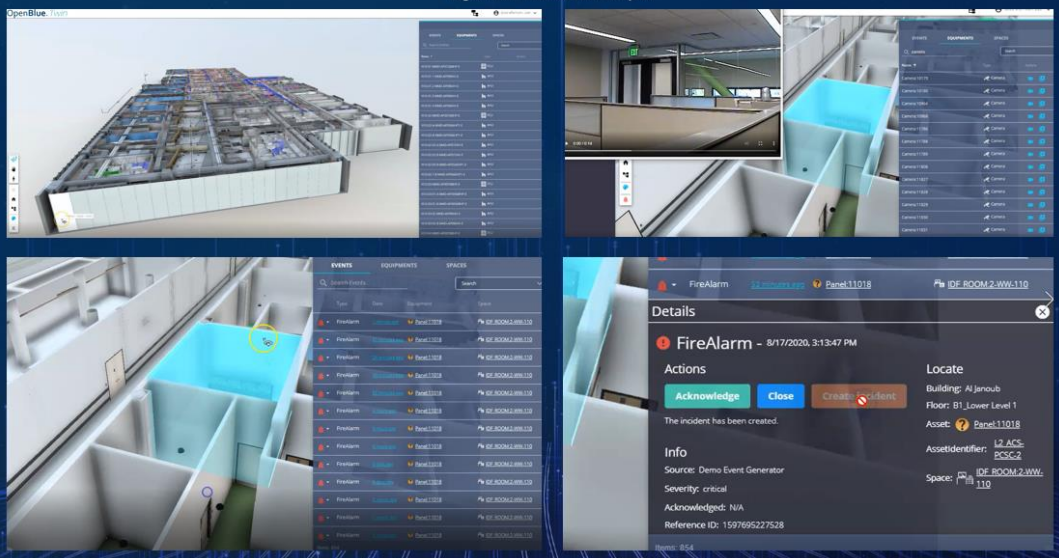
50

OpenBlue. Twin

Digital Twin Visualization Examples



51

Digital Twins currently in progress

- Bee'ah - UAE

- FIFA 2022 World Cup - Qatar

- Microsoft - Costa Rica

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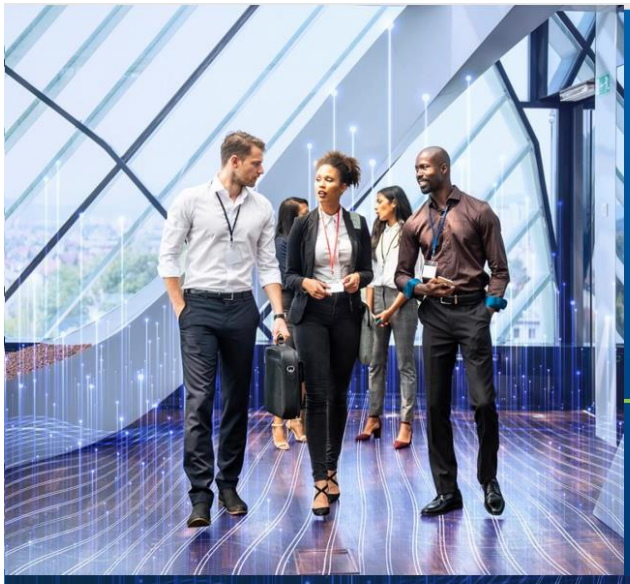
52



Thank you for your time and Healthy Building for the future

The power behind your mission

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53

Introduction to Debate

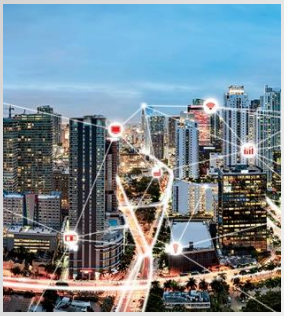
Julie Kjestrup
EuroACE President

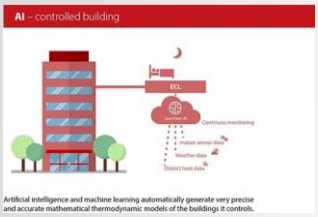
EuroACE
Energy Efficient Buildings

84

54

Leanheat: optimizing buildings and district energy





- Leanheat solution uses artificial intelligence to control and monitor centrally heated buildings
- Data from the building's central control room is combined with data collected from IoT sensors located in the individual apartments in the building
- AI processes the data and the central heating can be controlled in an optimal manner taking into consideration weather, ventilation and the living patterns of the inhabitants
- During a two-week teaching period after installation, Leanheat's machine-learning software creates a unique mathematical model for each building. The model takes into account the building's capacity to charge and discharge heating energy in different conditions
- Building owners could save 10-20% with smart heating control; district heating company can cut peak load by 20%; residents get better indoor climate and stable level of humidity

55

Smart Energy Systems: EnergyLab Nordhavn

BY&HAVN
HOFOR
Radius
CleanCharge
DTU
Danfoss
PowerLabDK
ABB
METRO THERM
GlenDimplex NORDIC
BALSLEV
EUDP
Energiteknologisk udvikling og demonstration

56

Q&A Session

Ray Pinto
DIGITALEUROPE

Clémence Arto
Autodesk

Christina von Westernhagen
Johnson Controls (JCI)

Moderator:
Julie Kjestrup
EuroACE President

EuroACE
Energy Efficient Buildings

50

57

Conclusions

Julie Kjestrup
EuroACE President

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84

58

Thank you!

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85

59