

POWERBIM

DIGITAL TWIN PLATFORM BIM BASED FOR ASSET LIFECYCLE PERFORMANCE
SMART BUILDINGS INTEGRATED IN SMART CITIES

powerbim.com



CYBERPHISICAL DATA VALUE CHAIN ECOSYSTEM
FOR SMARTER AND MORE SUSTAINABLE ASSETS



FERNANDO MORALES TOSAR
CEO & Digital Innovation Manager. POWERBIM / BIM6D

- Architect / Bim Manager ACP excellence
- Expert in Sustainability and Energy Efficiency
- +15 years of experience in AECO sector
- +5 years of experience in DIGITALTWINs – POWERBIM product



**AUTODESK
FORGE®**
Certified Systems
Integrator

POWERBIM

DIGITALTWIN PLATFORM COMPANY FOR LIFECCYLE ASSET MANAGEMENT – 10 PEOPLE

POWERBIM IS A CLOUD SCALABLE DIGITALTWIN PLATFORM FOR BUILDINGS AND CITIES BASED IN BIM + DATA ANALYTICS
BIM6D IS THE DIGITALIZATION SERVICES COMPANY ABLE TO COMPLEMENT POWERBIM WHEN NEEDED

KEY POWERBIM TEAM MEMBERS:



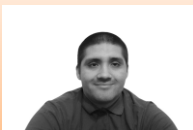
Juan. CTO
-Infrastructure
-Full Stack Developer



Gonzalo.
-Product Manager
-Architect. VR spec.



Roman.
-Software Developer
-System Analyst



Brandon. CTO
-Data Science
-Full Stack Developer

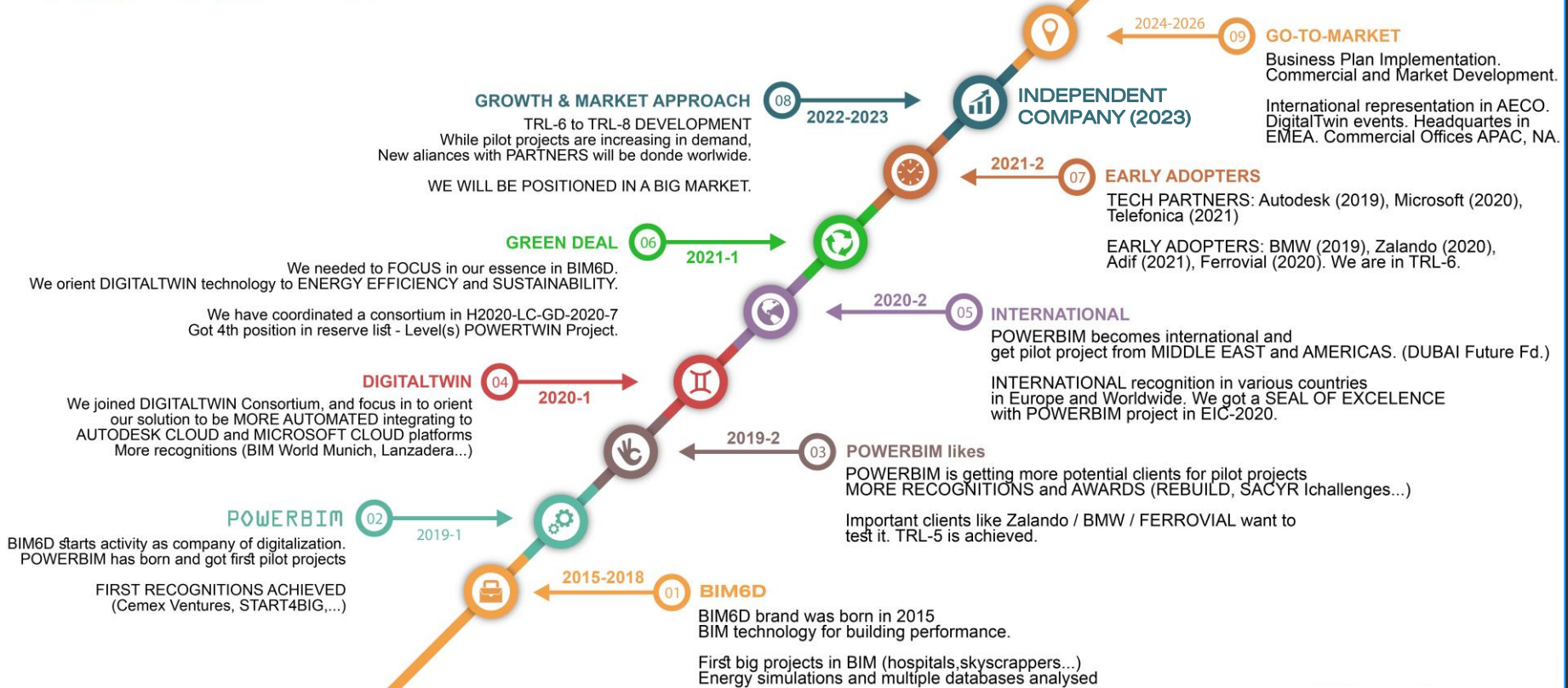


Pablo.
-BIM developer
-BIM Manager



Renzo.
-BIM developer
-BIM Manager

POWERBIM[®] TIMELINE



TIMELINE WITH A SUMMARY OF PAST, PRESENT AND FUTURE

40%

OF ENERGY CONSUMPTION BY
BUILDINGS

93%

OF EUROPEANS CONSIDER
CLIMATE CHANGE IS A
SERIOUS PROBLEM

EACH HOME IN EUROPE
PRODUCES

10tn of CO₂

AND DEMAND

75Kwh/m²

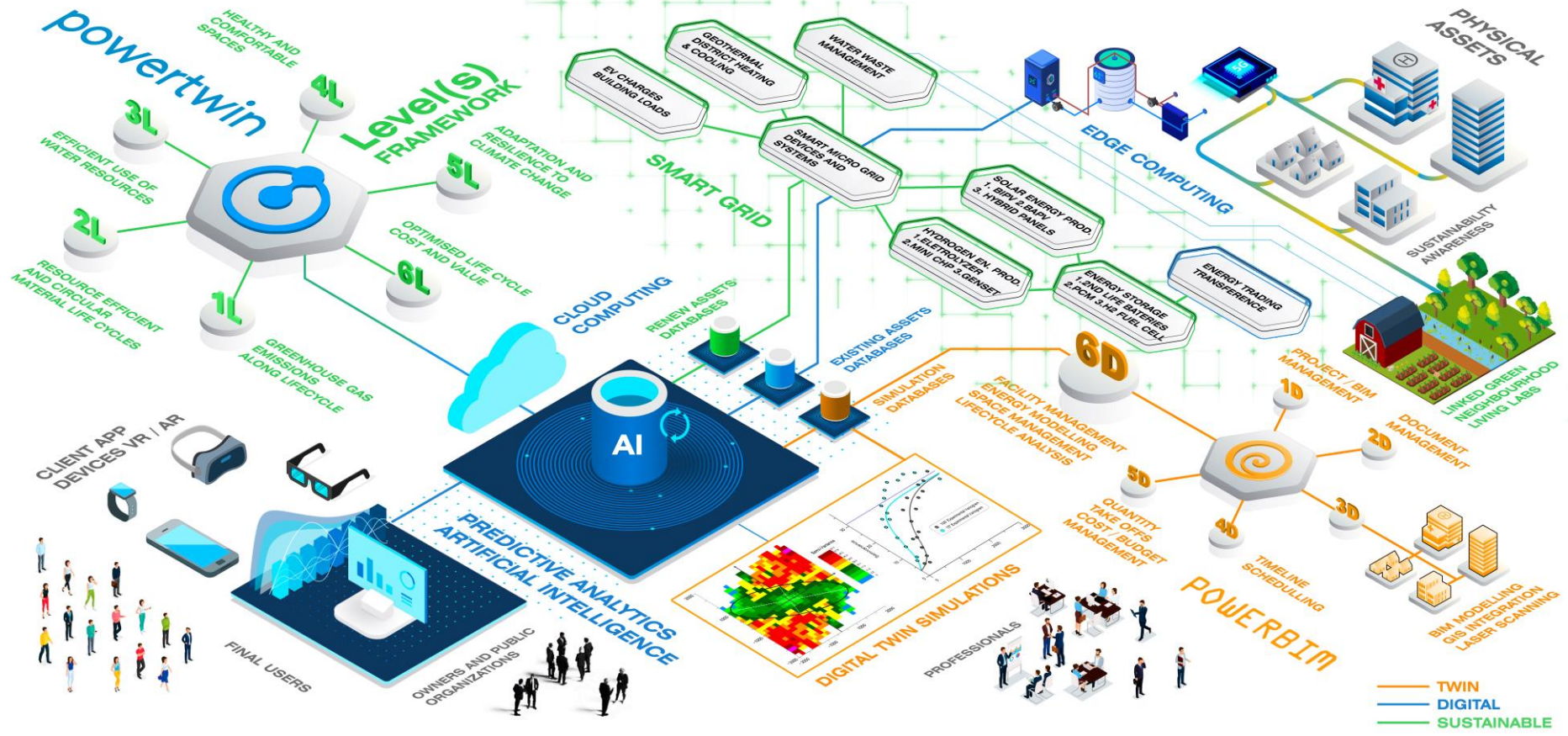
OF PRIMARY ENERGY WHEN
GOAL IS TO ACHIEVE

35Kwh/m²



*CLIMATE CHANGE IS THE BIG PROBLEM TO SOLVE
BUILDINGS ARE RESPONSIBLE OF 40% OF CARBON EMISSIONS
TECHNOLOGIES AND STAKEHOLDERS NEED TO BE INTEGRATED TROUGH DATA*

POWERBIM



WE DELIVER A DIGITALTWIN SOLUTION FOR RETROFITTING AND NEW CONSTRUCTION BUILDINGS, SIMULATING BIM MODELS AND ENERGY GENERATION, SUSTAINABILITY INDICATORS AND ARTIFICIAL INTELLIGENCE.

POWERBIM

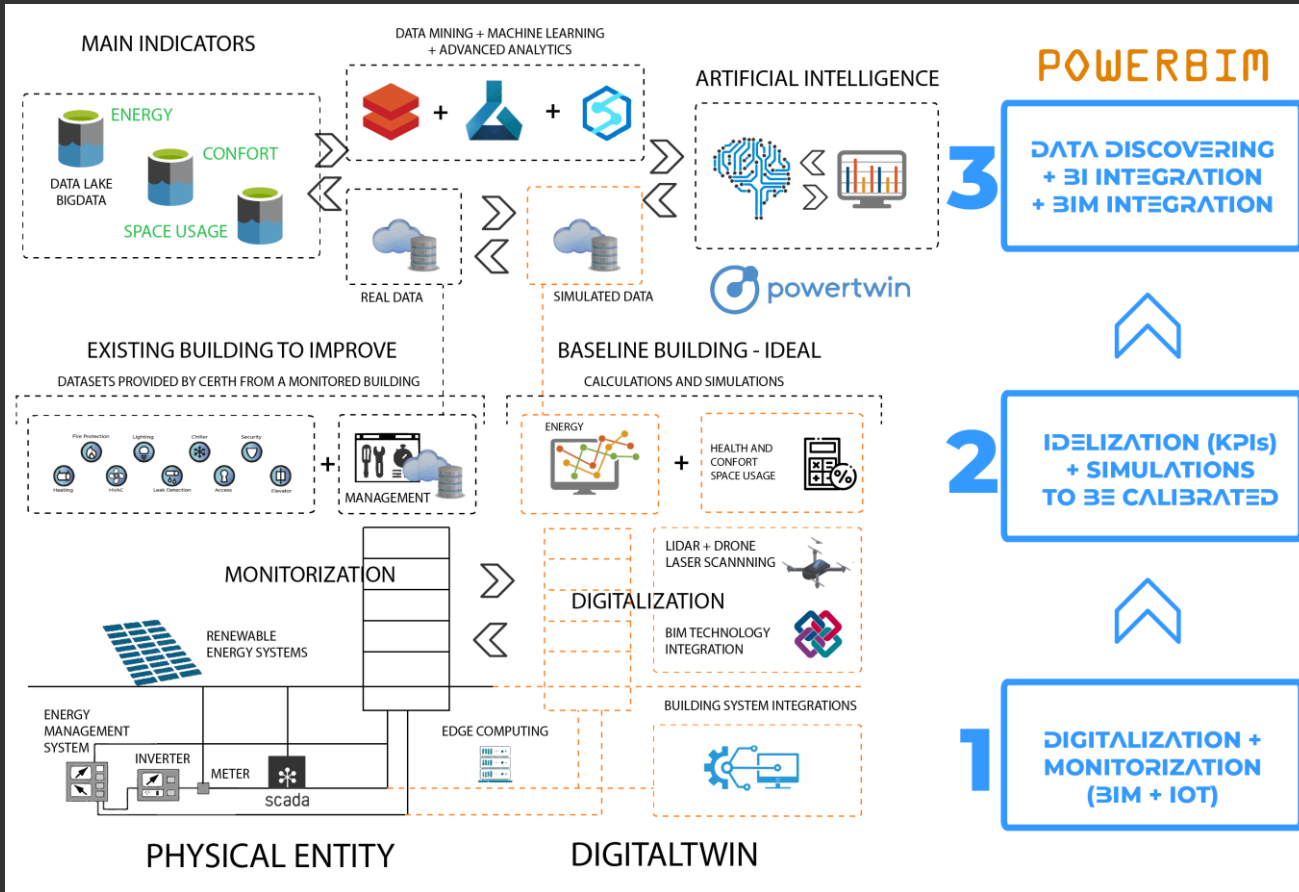
20Kwh/m2
FOR PRIMARY ENERGY

30%
CO2 REDUCTION

30%
WASTE REDUCTION IN
CONSTRUCTION

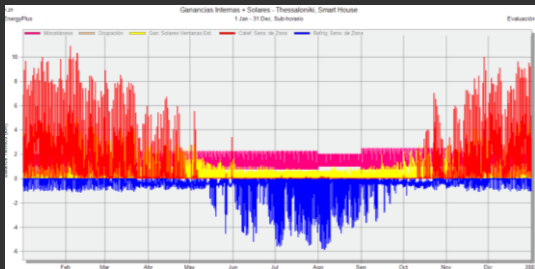
30%
COST REDUCTION

30%
IMPROVEMENT
OPERATIONAL
PROCESSES

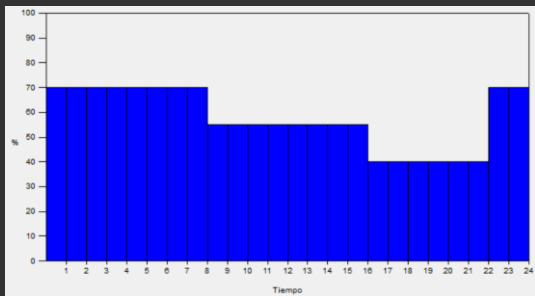


WE INTEGRATE DIGITALTWIN SOLUTION TO RETROFITTING AND NEW CONSTRUCTION BUILDINGS, SIMULATING BIM MODELS AND ENERGY GENERATION, SUSTAINABILITY INDICATORS AND ARTIFICIAL INTELLIGENCE.

POWERBIM

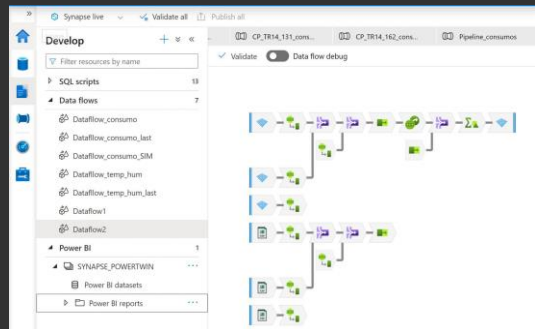


First, an IFC file of the smart house was provided, from where a lot of valuable information about the construction characteristics such as the dimensions, materials, orientation... could be extracted when developing the building energy model. The results have been CALIBRATED with the provided datasets.



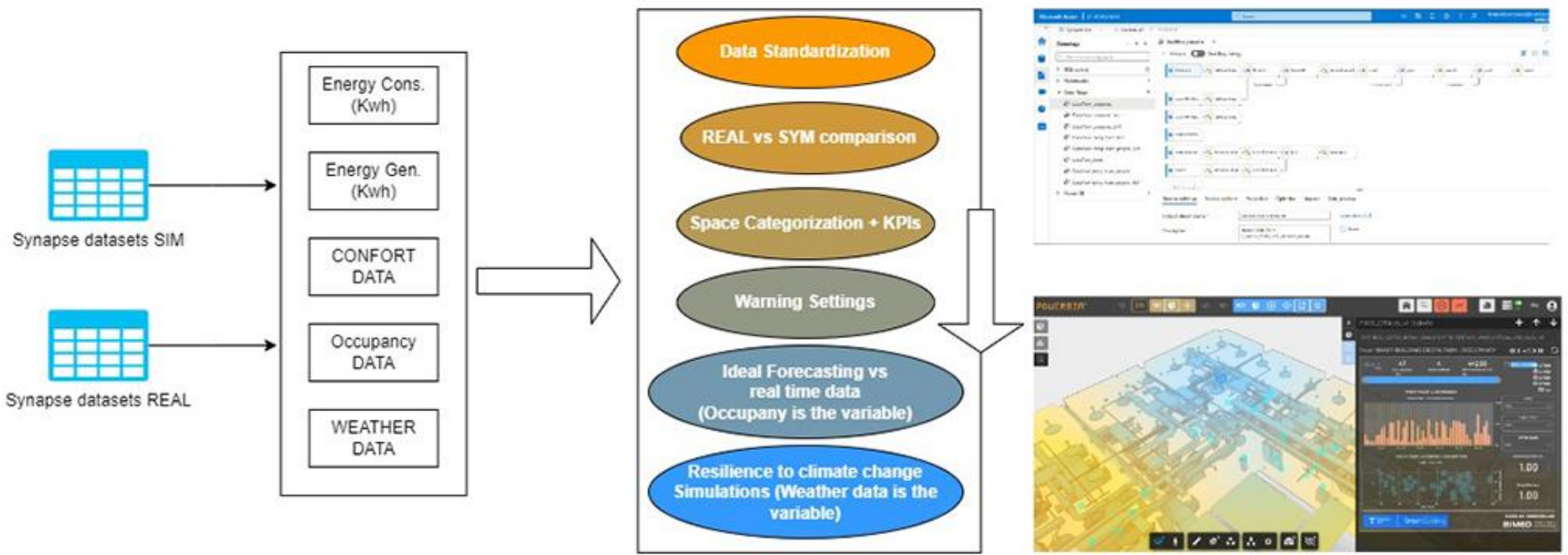
From datasets provided by CERTH (energy consumption, generation, battery charging, weather conditions, occupancy, etc.) we will construct a data model that will be used to compare different variables, and to find with data discovering techniques, a logical structuration of data based on computations performed by algorithms.

The idea is to compare these real data to ideal status of the building to help to improve these variables. By detecting differences between datasets (real vs ideal) our solution will help to understand where the main deviations are to consider to solve.



Third, CERTH datasets have been loaded in our DATALAKEHOUSE together with simulated IDEAL DATA in order to perform ADVANCED DATA SCIENCE ANALYTICS: Time-series resampling / Data imputation / Anomaly detection / Time-series forecasting / LSTM (Long Short-Term Memory) / K-Means clustering

DIFFERENCE SIMULATED - REAL (%)	
MEAN DIFFERENCE	-1%
MEAN ABSOLUTE DIFFERENCE	54%
ANNUAL DIFFERENCE	-33%
DIFFERENCE SIMULATED - REAL (KWh/year)	
TOTAL REAL	23.293
TOTAL IDEAL	15.492
TOTAL DIFFERENCE	- 7.800





SmartHouse_v7.ifc



20230526_154230_PBIM_ENERGY_WEATHER

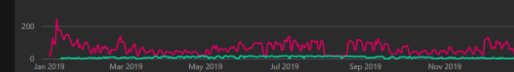
Page: REACH_ENERGY_BALANCE

<< 2/3 >>  

ENERGY BALANCE

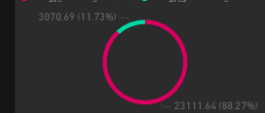
ENERGY CONSUMPTION VS GENERATION

● Energy_consum_real (kWh) ● Energy_generation_real (kWh)



ENERGY CONSUMPTION VS GENERATION

● Energy_consum_real (kWh) ● Energy_generation_real (kWh)



ENERGY CONSUMPTION

23,111....

Energy_consum_real (kWh)

ENERGY GENERATION

3,070.69

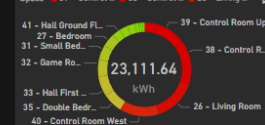
Energy_generation_real (kWh)

ENERGY BALANCE (kWh)

20,040.95

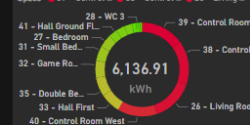
REAL ENERGY CONSUMPTION BY SPACE

Space ● 39 - Control ... ● 38 - Control ... ● 26 - Living ...



SIM ENERGY CONSUMPTION BY SPACE

Space ● 39 - Control ... ● 38 - Control ... ● 26 - Living ...



CONSUMPTIONS

ENERGY BALANCE

WEATHER

SPACES

- 26 - Living Room
- 27 - Bedroom
- 28 - WC 3
- 29 - WC 1
- 30 - WC 2
- 31 - Small Bedroom
- 32 - Game Room
- 33 - Hall First Floor
- 34 - Bathroom Up
- 35 - Double Bedroom
- 36 - Engine Room
- 38 - Control Room East
- 39 - Control Room Up
- 40 - Control Room West
- 41 - Hall Ground Floor
- 42 - Stairs

NUM. VALUES

34992

SPACES

20

SENSOR / DISPOSITIVO PRUEBA 3

temperature

29.00

energy

0.37

humidity

76.00

co2

72.00

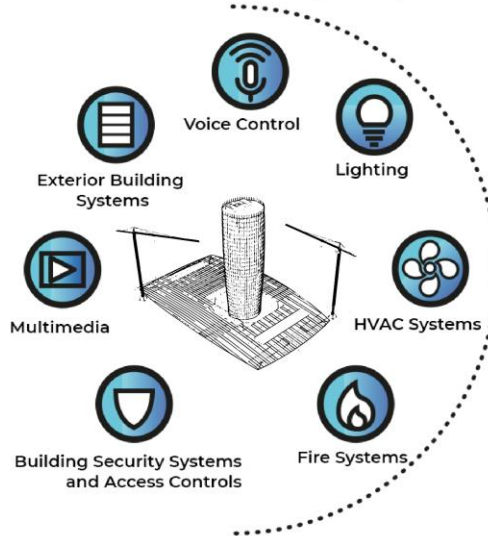
voc

271.00

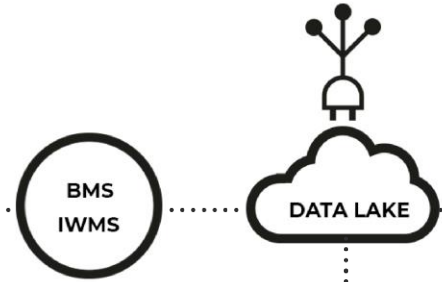
occupancy

3.00

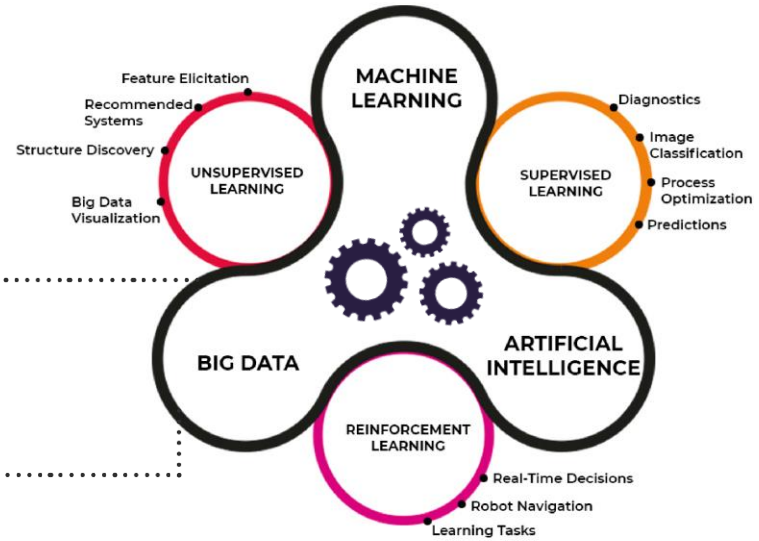
ALL THE REAL TIME INFORMATION IS GATHERED AND CONNECTED TO BIM MODELS - DEVICES / BMS / IWMS



MULTIPLE CONNECTIONS AND API INTEGRATIONS WILL BE AVAILABLE



PREDICTIVE ANALYTICS ALERT ISSUES BEFORE THEY OCCUR



POWERBIM



DEVICES



ALL DEVICES AND BMS SYSTEMS CAN BE PROVIDED AND INSTALLED BY BIM6D PARTNERS ON SITE

*POWERBIM is the integration to Physical Buildings and Infrastructures
POWERTWIN is the brain of POWERBIM – Artificial Intelligence*



POWERBIM™

412 - EU031 - Metabuilding - wellBIM_IFCA_2022_1R

20220713_210218_P81M_MENU_WELLBIM

Page: IAQ

IAQ INDEX

AIR QUALITY (IAQ_INDEX)	
Temperature	20.0
Humidity	35.00
Satisfaction	Index
CO2	400
PM2.5	100

WEB LINK
<https://bim6d.eu/portfolio/wellbim-metabuilding-project/>

metabuilding

Financiado por la Unión Europea NextGenerationEU

Plan de Recuperación, Transformación y Resiliencia

51C-M3-A-R2021-1R

20220727_155958_P81M_REPORT

Page: EQUIPOS

HOSPITALES 4.0

HOSPITALIZACION

HOSPITALIZACION

HOSPITALIZACION

48.14 %

WEB LINK
<https://bim6d.eu/portfolio/hospitales-4-0/>

POWERBIM™

22039_GAIA_UPC

20220509_150718_P81M_F_Powertwin

Page: CONSUMOS

CONSUMOS

CONSUMOS REAL VS ESTIMADO EN FUNCION DE LA OCUPACION

ESTRUCRUMENOS

WEB LINK
<https://bim6d.eu/portfolio/powertwin-aei-2023/>

Financiado por la Unión Europea NextGenerationEU

Plan de Recuperación, Transformación y Resiliencia

URJC

temperatura

NEW DEVICE

URJC

VIDEO LINK
<https://vimeo.com/1576750469>

MORE THAN 50 DIGITALTWIN PROJECTS RESEARCH AND DEVELOPMENT PROJECTS / UNIVERSITIES

POWERBIM

DIGITAL TWIN MARKET



TAM - 3 millions of companies in Europe

SAM - 2,000 big size companies adopting BIM

SOM - 500 companies in EMEA

\$30.1 BILLION

2018 2019 2020 2021 2022 2023 2024 2025

30% CAGR 2019-2025

<https://powerbim.com>

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THANK YOU !!

