Project co-financed by the European Regional Development Fund

Pilot Idea:

Enlarging Integrated Management Support Tool for Energy efficiency in PUblic buiLdings based in IMPULSE project

Sustainable Buildings Partnership

Brussels, January 2018

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Valencian Region Ministry of Housing and Urban Planning

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ABOUT US

IVE is a public interest incorporated foundation subjected to private law, constituted in 1986 and promoted by *Conselleria de Vivienda, Obras Públicas y Vertebración del Territorio* (Ministry of Housing, Public Works and Integration of the National Torritory).

It is directed by a Board Committee which binds together a collective of professionals involved in the building and urban process: the Administration, professional bodies, manufacturers associations, promoters, builders, users and formation plus technologic centres.

Interreg Mediterranean
IMPULSE

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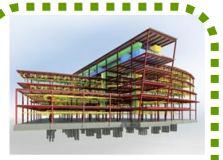
GENERALITAT VALENCIANA
CONSELLERIA DE VIVIENDA, OBRAS PÚBLICAS Y VERTEBRACIÓN DEL TERRITORIO

IVE
INSTITUTO VALENCIANO de la EDIFICACIÓN

Interre Mediterran

Todos | Ciudades Resilientes e Innovativas / Resilient & Innovative cities | Edificios de Bajo Consumo / Low carbon & NZE Buildings | Formación / Training | Plataformas / Platforms



BIMmplement
Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences
Edificios de Bajo Consumo / Low carbon & NZE Buildings, Formación / Training

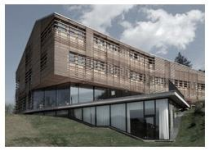
SHERPA
SHared knowledge for Energy Renovation in buildings by Public Administrations
Edificios de Bajo Consumo / Low carbon & NZE Buildings

IMPULSE
Integrated Management Support for Energy efficiency in Mediterranean PUblic buiLdings
Ciudades Resilientes e Innovativas / Resilient & Innovative cities, Edificios de Bajo Consumo / Low carbon & NZE Buildings

ALTER ECO
ECO Alternative tourist strategies to enhance the local sustainable development of tourism by promoting Mediterranean Identity
Ciudades Resilientes e Innovativas / Resilient & Innovative cities, Edificios de Bajo Consumo / Low carbon & NZE Buildings, Formación / Training

CoSuDS
Collaborative transition towards sustainable urban drainage: making it happen at district scale (PATHFINDER PROJECT)
Ciudades Resilientes e Innovativas / Resilient & Innovative cities

ENERFUND
An ENErgy Retrofit FUNDing rating tool
Ciudades Resilientes e Innovativas / Resilient & Innovative cities, Edificios de Bajo Consumo / Low carbon & NZE Buildings



PROF-TRAC
PROFessional multi-disciplinary TRAining and Continuing development in skills for NZEB principles
Edificios de Bajo Consumo / Low carbon & NZE Buildings, Formación / Training

BTA
Acelerador de las tecnologías en los edificios
Plataformas / Platforms

SSO
Smart and Sustainable Offices
Edificios de Bajo Consumo / Low carbon & NZE Buildings

VCS
Adoption of a voluntary common European Union certification (VCS) for the energy performance of non-residential buildings
Edificios de Bajo Consumo / Low carbon & NZE Buildings

ACCENT
Accompany the Cities in Energy Strategy
Ciudades Resilientes e Innovativas / Resilient & Innovative cities, Edificios de Bajo Consumo / Low carbon & NZE Buildings

GREEN SKILLS
Connecting people for green skills
Formación / Training

EPISCOPE
Energy Performance Indicator Tracking Schemes for the Continuous Optimisation of Refurbishment Processes in European Housing Stocks
Edificios de Bajo Consumo / Low carbon & NZE Buildings

SSR AGORA
Smart and Sustainable Restaurants
Edificios de Bajo Consumo / Low carbon & NZE Buildings

PhD
Summer School
Formación / Training

RETROKIT
Market Research Scan of "Retrofit it yourself" products
Formación / Training

H2020
INTERREG MED
ENI CBC MED
INTELLIGENT ENERGY
CLIMATE KIC

Sustainable Building Alliance
Common metrics for key issues

http://www.five.es/proyectos-internacionales/

ENTREPRENEURSHIP AND EMPLOYMENT
INNOVATIVE CONSTRUCTION SYSTEMS
ENERGY EFFICIENCY IN BUILDINGS
URBAN HEAT ISLAND EFFECT AND INNOVATIVE CITIES
SUSTAINABLE TOURISM

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IMPULSE

Integrated Management Support for Energy efficiency in Mediterranean PUblic buiLdings

NEWS

IMPULSE

MED Efficient Buildings Community First...

NICE, 4-6 OCTOBER 2017

04/10/2017

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Main objective

- **General objective**: Introduce an **integrated management support system** for planning reliable and affordable energy renovation projects for public buildings. The approach builds on the **testing (M2 project) of previous methods and protocols in 6 MED Cities**.

- **Specific objectives**:
  - **A library of public-buildings typologies** in each pilot City.
  - **A GIS-based information system**: Mapping of typologies and corresponding energy-performance indicators; Results of "what-if" renovation scenarios and demonstration of cost-optimal interventions; Showcase roadmaps and financial plans for gradual energy transition.
  - **Pilot small-scale renovation projects** in one building in each pilot City: Renovation; Impact monitoring; Real-time recording of energy indicators.
  - **IMPULSE system applications for SEAP development**.
  - **Transferring:** Training sessions; **Engaging other local authorities** to use the IMPULSE system; **Policy meetings**.

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Partners and intervention areas

Greece
CRES: LP, Technical Partner (TPP)
Heraklion: PP1, Authority Partner (APP)
Ass. partners: RDFC-PP10
Pilot City: Heraklion

Spain
IVE: PP2, Technical Partner (TPP)
Elche: PP3, Authority Partner (APP)
Ass. partners: Alicante Energia-PP11, GV-PP12
Pilot City: Elche

France
EnvirobatBDM: PP4, Technical Partner (TPP)
AREA PACA: PP5, Authority Partner (APP)
Ass. partners: Cannes-PP13
Pilot City: Cannes

Italy
Ravenna: PP6, Authority Partner (APP)
Ass. partners: -
Pilot City: Ravenna

Bosnia-Herzegovina
Mostar: PP9, Authority Partner (APP)
Pilot City: Mostar

Croatia
EIHP: PP7, Technical Partner (TPP)
Osijek: PP8, Authority Partner (APP)
Ass. partners: DOOR-PP14, RDA SiB-PP15
Pilot City: Osijek

Expected outcomes

- **Result 1**: **1 library of municipal building typologies** in each pilot City (6 libraries in total).
- **Result 2**: **1 Management Support Information System** (comprised of GIS maps for each pilot City).
- **Result 3**: In total, **at least 50 (+6 for pilot Cities) completed SEAPs'** (new / revised) public-buildings' sections.
- **Result 4**: **1 small-scale renovation project in one public building** in each pilot City (6 renovation projects in total).
- **Result 5**: In total 12 Memorandum of Understanding among the project and key representatives of political intervention in local/ regional/ national level.

1. Selecting one ambassador building representing each of the typologies. **Between 10 – 15 ambassador buildings.**
2. Collecting **exhaustive information of these ambassador buildings** according to template provided by IVE.

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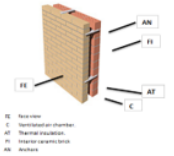
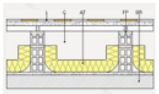
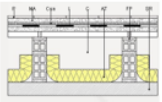
Ambassador Building of Public Building Typology:	PBT1

GENERAL INFORMATION	
Building Name	IVE headquarters
Owner	Elche City Council
Tenant	Valencian Institute of Buildings
Building address	Carrer de les Tres Forques, 98, 46018 Valencia (Spain)
Building use	Open-plan offices with some cellular offices and meeting rooms
Construction year	1990
Refurbishment year/scope (if applicable)	2010 - upgrade of heating system (new gas boiler installed), 2012 - photovoltaics installed on the roof
N° of floors	4 floors
Average floor height (m)	Semi-underground: 3m, ground floor: 4m, first/second/third floor: 3m
Gross floor area (m^2)	16,399 m^2
Area breakdown (m^2) per floor	Semi-underground: 4,400m^2, ground/first floor: 5,353m^2, third floor: 1,048m^2, fourth (top) floor: 245m^2
Area breakdown (m^2) per building system	Total heated area: 15,000m^2 (all areas except non-heated basement and storage rooms)
	Total cooled area: 13,000m^2 (all office areas and meeting rooms)
	Total area with mechanical ventilation: 4,000m^2 (only internal office areas and meeting rooms)
Number of occupants	120
Schedule of occupation	Occupied: 261 days per year, Monday to Friday 09:00-18:00
	Not-occupied: During weekends (Sat/Sun)
Photographs	 

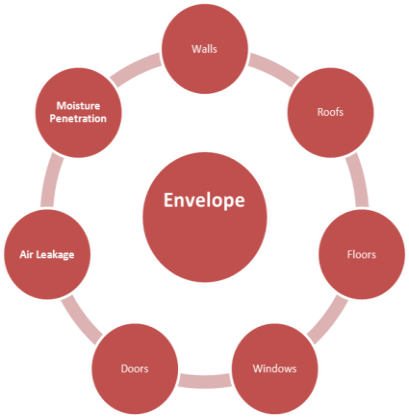
External walls	Type 1	Type 2
Short description of building element (key material layers /thicknesses)	Ceramic brickwork cavity wall with insulation, plastered on both sides, in total 30cm thick	
Area of the building where it is met	All external walls	
Orientation (°) / Tilt (°)	O: East (90°) / T: 90°	
Area (m^2)	1500	
Thermal transmittance - U-value (W/m^2K)	0.58	
Other technical characteristics (optional) (manufacturer/product details, detailed description of material layers, other thermal/optical properties e.g. solar reflectance; emissivity etc.)	Formed by ceramic brick of 25 x 12 x 5 cm. with sore 4mm sitting at face side with mortar M-40, a foot thick English rigging (rope-tailing), plastered with mortar inner face 2 cm 1/3 thick polyurethane insulation projected 3 cm air chamber 30 cm thick brick partition double hollow (25 x 12 x	
Photograph of construction element		

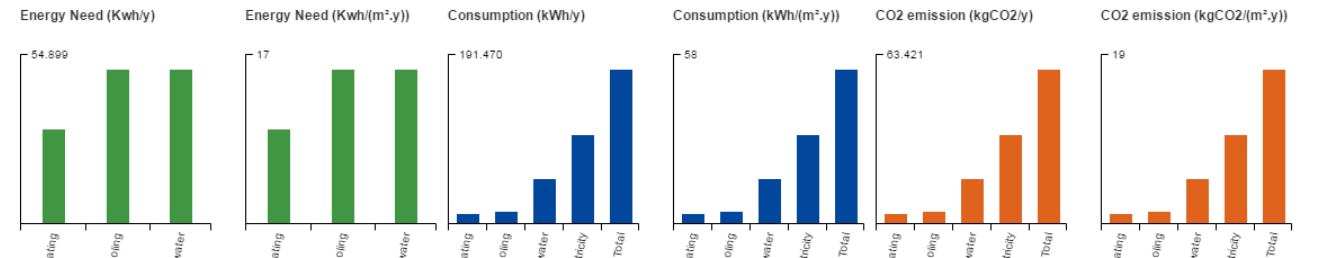
Roof	Type 1	Type 2
Short description of building element (key material layers /thicknesses)	Inverted roof - reinforced concrete slab 20cm with 6cm XPS insulation, gravel finish on top	Sloped concrete roof: Reinforced concrete slab 20cm with 8cm mineral wool insulation, ceramic tiles finish on top
Area of the building where it is met	All roof areas in third and fourth floor except conference	Fourth floor conference room
Orientation (°) / Tilt (°)	O: Horizontal (0°) / T: 0°	O: South (180°) / T: 25°
Area (m^2)	1247	260
Thermal transmittance - U-value (W/m^2K)	0.44	0.36
Other technical characteristics (optional) (manufacturer/product details, detailed description of material layers, other thermal/optical properties e.g. solar reflectance; emissivity etc.)	The construction consists of the following elements: - Reinforced concrete slab 20 cm. - Training 3% slope with lightweight concrete. - Leveling layer of mortar M-160a 3 cm thick placed in hardened concrete lightened. - Belkin waterproofing felt or waterproofing layer. - Geo textile sheet 250 gr. - Expanded polystyrene XPS 6 cm Carbon dioxide. - Finishing top 10 cm with gravel.	The construction consists of the following elements: - Reinforced concrete slab 20 cm. - Capa 10 cm. of lightweight concrete. - Belkin waterproofing felt or waterproofing layer. - Mineral wool insulation 8 cm. - Cement or lime mortar for masonry 4 cm. - Finish top with ceramic tile 2 cm.
Photograph of construction element (optional)		

3. Energy simulations of ambassador buildings representing the 10-15 municipal buildings' typologies.

4. Assessment of the building energy performance as well as various intervention scenarios.

BES (Building Energy Simulation)TOOL	Comments
CALENER 1	The official tool for energy certification in Spain is CALENER. In the case that the building has obligation to dispose of certificate.
ENERGY PLUS	EnergyPlus is a software package which "models heating, cooling, lighting, ventilating, and other energy flows as well as water in buildings.EnergyPlus is a stand-alone simulation program without a 'user friendly' graphical interface. EnergyPlus reads input and writes output as text files. A number of graphical interfaces are available or under development. One such graphical interface is the OpenStudio Google SketchUp plug-in. In the case that the building has the certificate, or there are many sources to invest in the design of the audit and simulations.





5. Analysis of costs scenarios and their impact for each typology.
6. Selection of least-cost scenarios with highest energy saving for each typology.

No cost
Medium Cost
High cost

- Description of the measure
- Technical Feasibility
- Cost estimates
- Energy savings evaluation
- Cost saving estimates
- Reduction of CO2 -emissions

7. CITY PLAN: Gradual renovation and financial planning for cost-optimal solutions

Public-buildings' typologies Different colour for each Typology.

Energy indicators depicted on typologies => Distribution of energy performance for the base-case and alternative scenarios.

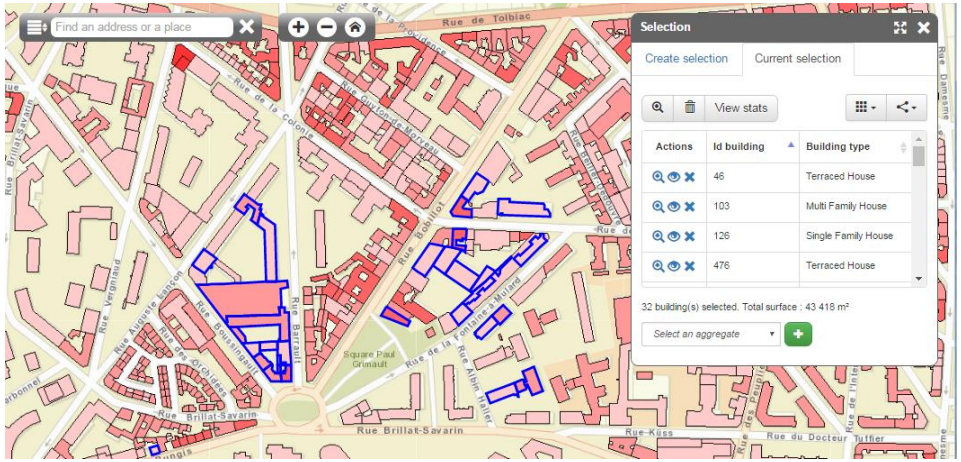
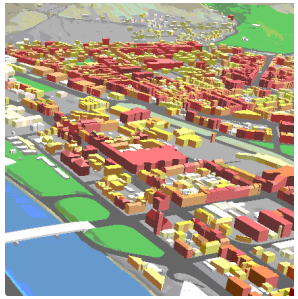
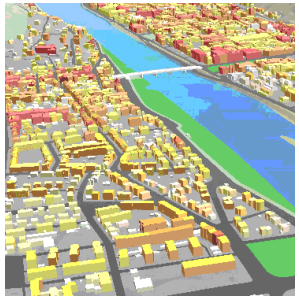


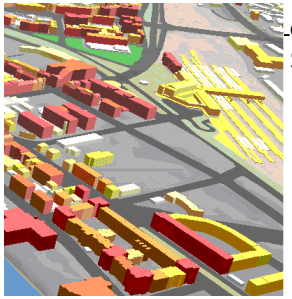
Fig. 36. Broken down results Scenario 1 HIGH for Non-Residential Sector.

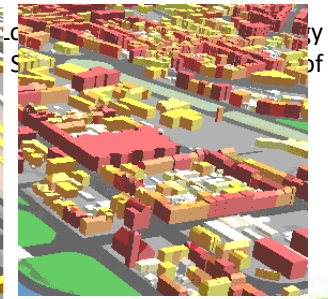
SCENARIO 1. HIGH. Cumulative savings by 2020: 20%.									
Savings HYPOTHESIS									
LOW									
	ktoe consumption	Buildings % annual	% saving	2015	2016	2017	2018	2019	2020
central administration	100	10%	45%	99	94	90	86	82	78
private offices	2 000	10%	45%	1 973	1 884	1 799	1 718	1,641	1,567
small businesses	4 800	10%	30%	4 757	4 614	4 476	4 341	4,211	4,085
shopping centres	1 000	10%	30%	991	961	932	904	877	851
hotels	1 000	10%	30%	991	961	932	904	877	851
sports centres	200	10%	30%	198	192	186	181	175	170
hospitals	500	10%	45%	493	471	450	430	410	392
education	400	10%	15%	398	392	386	381	375	369
total	10 000			9 900	9 571	9 253	8 946	8 650	8 364
				99%	96%	93%	89%	86%	84%
AVERAGE									
	ktoe consumption	Buildings % annual	% saving	2015	2016	2017	2018	2019	2020
central administration	100	7%	50%	97	93	90	86	83	79
private offices	2 000	7%	50%	1 930	1 862	1 792	1 722	1,652	1,582
small businesses	4 800	7%	40%	4 666	4 535	4 401	4 266	4,132	3,997
shopping centres	1 000	7%	30%	979	958	937	916	895	874
hotels	1 000	7%	30%	979	958	937	916	895	874
sports centres	200	7%	40%	194	189	183	178	172	167
hospitals	500	7%	50%	483	466	448	431	413	396
education	400	7%	25%	393	386	379	372	365	358
total	10 000			9 720	9 448	9 168	8 888	8 608	8 328
				97%	94%	92%	89%	86%	83%


Mostar


Osijek


Elche


Heraklion


Ravenna


City of Cannes

Potential synergies?

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Thank you very much!

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