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BOOSTEE-CE

**Boosting Energy Efficiency in Central European Cities through
Smart Energy Management**

Fabio Remondino - FBK, Trento, Italy

The Online Energy Platform - OnePlace

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<https://oneplace.fbk.eu>

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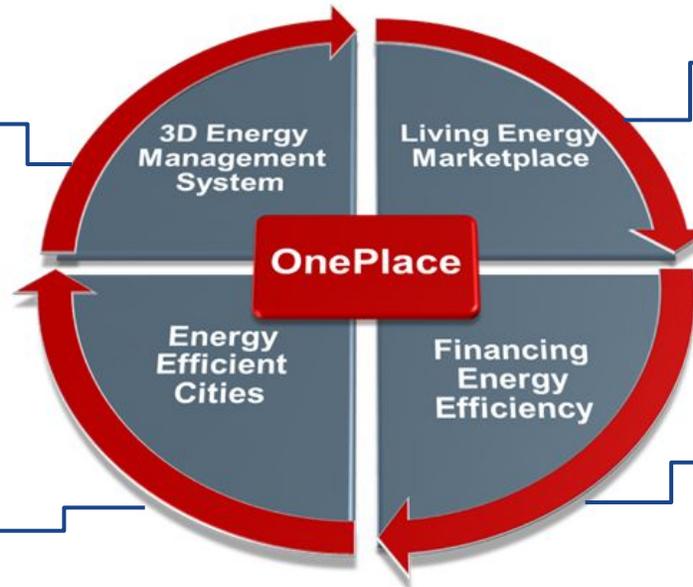
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La **piattaforma web** (in inglese, al momento) include 4 moduli interconnessi arricchiti con contenuti legati all'energia (best practices, database di dispositivi, certificati energetici, mappe fotovoltaiche, ecc.) liberamente accessibili a policy makers, pianificatori energetici e cittadini al fine di migliorare la governance e la comprensione dell'efficienza energetica.

Un visualizzatore **webGIS** per dare accesso ad info energetiche (consumi, certificati energetici, mappe PV, ecc.) attraverso **modelli 3D di città'**



Una collezione di **esperienze nazionali, buone pratiche e linee guida** sul tema dell'efficienza energetica per PA e cittadini



Database di apparecchi elettronici ed esperti a livello nazionale e EU utili per l'efficienza energetica

Strategie e piani finanziari, buone pratiche, fonti di finanziamento nazionali e EU



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OnePlace - Living Energy Marketplace

Living Energy Marketplace

Living Energy Marketplace aims to connect customers interested in energy efficiency projects to qualified contractors (architects, engineers, auditors, craftsmen, technicians and installers, energy agencies etc.) in order to scale up investments in energy efficiency and to reduce information barriers. It also contains links and information covering the electronic & electric appliances to empower potential investors to make energy-wise decisions.



Device database

Here you can find links to databases or are considering buying this kind of product.

[View more](#)



Experts Database

Contains database of links to experts in the field of architecture and energy efficiency, serving as a connection point between customers interested in energy efficiency projects and qualified professionals.

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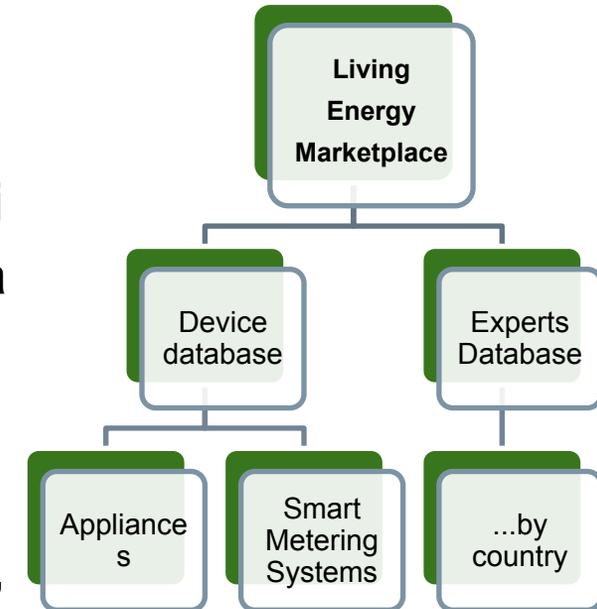
Living Energy Marketplace vuole collegare i clienti interessati ai progetti di efficienza energetica a imprenditori qualificati (architetti, ingegneri, revisori, artigiani, tecnici e installatori, agenzie energetiche ecc.) al fine di aumentare gli investimenti nell'efficienza energetica e ridurre le barriere informative.



OnePlace - Living Energy Marketplace

Il modulo contiene:

- ❑ link e informazioni riguardanti gli **apparecchi elettronici ed elettrici** per consentire ai potenziali investitori di prendere migliori decisioni sul tema energetico.
- ❑ database di collegamenti ad **esperti** nel campo dell'architettura, ingegneria, efficienza energetica, fonti rinnovabile, ecc. Il database serve come punto di collegamento tra i clienti interessati a progetti di efficienza energetica e appaltatori qualificati.



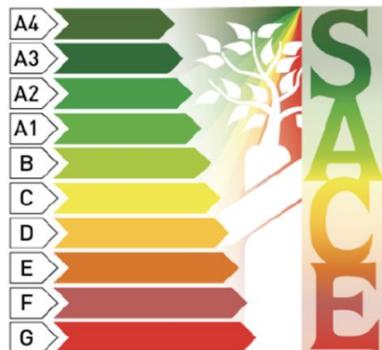
È un **database** di dispositivi ed esperti per consentire ai potenziali investitori di prendere decisioni sagge in termini di energia.



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Italy

SACE



Sistema Accreditamento Certificazione Energetica



La Regione Emilia-Romagna sostiene e disciplina la riqualificazione energetica degli edifici, promuovendo programmi per l'uso razionale dell'energia, il ricorso alle fonti rinnovabili, la riduzione delle emissioni di gas serra. In questi ambiti, SACE costituisce la

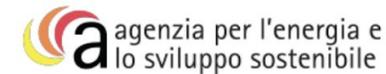
ClustER Build



Il Clust-ER Build è una associazione privata di imprese, centri di ricerca, enti di formazione che condividono competenze, idee e risorse per sostenere la competitività del settore dell'edilizia e costruzioni, con l'obiettivo di favorire la competitività e la sostenibilità del sistema economico regionale, oltre che la qualità della vita sul territorio, attraverso:

- la riqualificazione del patrimonio edilizio esistente nel rispetto della sostenibilità ambientale, energetica, economica, conferendo a edifici e città la capacità di adattarsi ai cambiamenti climatici;
- l'integrazione degli obiettivi della

AESS



L'Agenzia per l'Energia e lo Sviluppo Sostenibile (AESS) è una associazione legalmente riconosciuta e senza scopo di lucro per lo sviluppo energetico sostenibile del territorio. AESS è certificata secondo la Norma UNI CEI 11352 quale Società di servizi energetici (ESCO). Attualmente la compagine dei soci AESS è integralmente costituita da enti facenti parte della Pubblica Amministrazione.

AESS è stata fondata nel 1999, con il supporto del programma della Commissione Europea SAVE II, su iniziativa di Comune e Provincia di Modena, insieme ad altri tre soci fondatori (Camera di Commercio di Modena, l'allora multiutility locale META e l'allora azienda pubblica per il trasporto locale ATCM). AESS fa parte della rete europea delle agenzie per l'energia ManagEnergy e della rete italiana delle agenzie per l'energia RENAEL.



Contatori Energetici Intelligenti (Smart Meters) offrono a consumatori, fornitori, operatori di rete, generatori e regolatori un'ampia gamma di strumenti e servizi utili che consentono una gestione energetica più intelligente. Forniscono ai clienti molte più informazioni su come utilizzano l'energia e consentono a tali clienti di ridurre i consumi.

Vantaggi dell'utilizzo di SM per i consumatori:

- raccolta dati a distanza e in tempo reale sui costi energetici e sulle emissioni di CO₂,
- visualizzare consumi di energia, gas domestico, apparecchiature elettriche o idriche su smartphone / computer,
- possibile riduzione dei costi vedendo i consumi (in tempo reale) e impiegando l'energia durante i periodi tariffari meno costosi.



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Smart metering system in kindergarten Optica

Koprivnica, Koprivnicko - krizevacka County, Croatia

The whole process of SM system implementation in kindergarten Optica started with the first month of 2018 when the needs have been defined. Current state of the building was analysed. After that, market research was conducted in March 2018 to explore possibilities of available SM systems. In April, tech guys... [Read More](#)



Low energy reconstruction and repurpose of existing building in former military complex

Koprivnica, Koprivnicko, Croatia

The subject of this project was the reconstruction and repurpose of existing building in the former "ban Krsto Frankopan" military complex in Koprivnica for the purpose of forming a study space for the Media University - journalism studies, media design studies and business and management studies in media. Former military... [Read More](#)

Il modulo **Energy Efficient Cities** è una piattaforma di scambio di **esperienze e buone pratiche** nel settore dell'efficienza energetica per pubbliche amministrazioni e altri utenti pubblici.

Include una gamma di approcci e soluzioni che varie città Europee hanno usato per intraprendere miglioramenti dell'efficienza energetica e quindi puo' essere di aiuto nella progettazione di politiche e programmi di efficienza energetica urbana.



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Contiene:

- ❑ **20+ Best Practices da 7 paesi CE** che racconto di efficientamento energetico e smart meters in edifici pubblici.
- ❑ Ciascuna best practice contiene informazioni di base, tipo: caratteristiche del sistema, fonti finanziarie e dettagli di finanziamento, benefici per l'attuazione del progetto, ecc.



OnePlace - Energy Efficient Cities

Energy Efficient Cities » Energy Efficient Cities » Energy renovation of 7 buildings of Kindergarten Ptuj with the co-financing share of 85% from the Eu



Reducing greenhouse gas emissions through the energy conversion of social housing

Reggio Emilia, Emilia-Romagna, Italy

The building was built in 1936 and consists of 51 social housing dwellings, representing a great condominium with a series of issues to be dealt with. The presence of low income tenants has driven many common goods into misuse and sent the building into degradation and vandalism. The thermal dispersions of the building envelope are high due to the obsolete and inefficient type of windows and the opaque non-thermally insulated structures with deteriorated plasters. The tenants started to face energy bill related problems, due to the lack of ordinary maintenance and knowledge of how to save energy.

In addition, the building is seismically obsolete and situated in a very seismic active area (thinking of the 2016 earthquake).

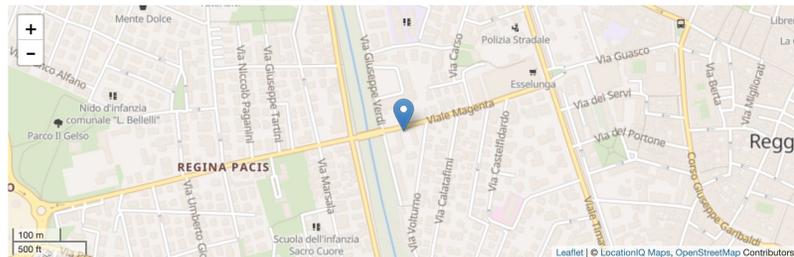
Benefits

The intervention on the structures allows the reduction of the need for heating, with direct economic benefit. The new envelope will guarantee a better quality of life to the economically weak tenants, together with the addition of an improved aesthetic view of one of the main streets of the city.

The seismic upgrade, done together with the energy efficiency intervention, will guarantee the safety of the inhabitants and of the structure with a cost 17% higher than applying energy efficiency alone.

The experimentation of the Horizon Project Lemon has provided training and

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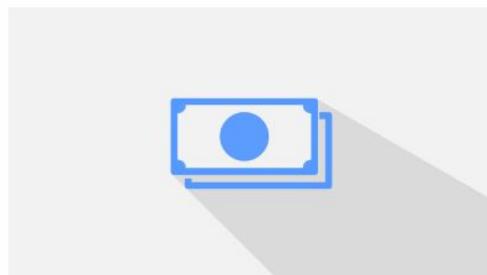
Financing Energy Efficiency

The Financing Energy Efficiency module is the visual presentation of the transnational strategy outcomes, financial road maps, examples of the best practices and practical steps how to use the national & EU-level resources.



Comparative analysis

[View more](#)



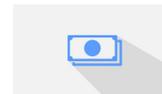
Transnational EE financing strategy

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Comparative analysis

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Transnational EE financing strategy

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Transnational EE financing strategy

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EE financing roadmaps

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Best practices and investments return models

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Energy efficiency financing project calculator

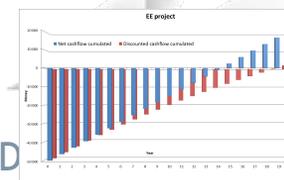
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Il modulo **Financing Energy Efficiency** presenta i risultati della strategia transnazionale sul tema efficientamento energetico, con tabelle finanziarie, best practice e esempi su come utilizzare le risorse nazionali e dell'UE.

OnePlace - Financing Energy Efficiency

Contiene:

- ❑ Analisi comparative di schemi finanziari nei paesi EU
- ❑ Strategia di finanziamento transnazionale per efficienza energetica
- ❑ Metodologia per lo sviluppo di soluzioni di EE
- ❑ Best practice e modelli di investimenti per l'efficienza energetica
- ❑ Calcolatore per progetti di finanziamento sul tema dell'efficienza energetica

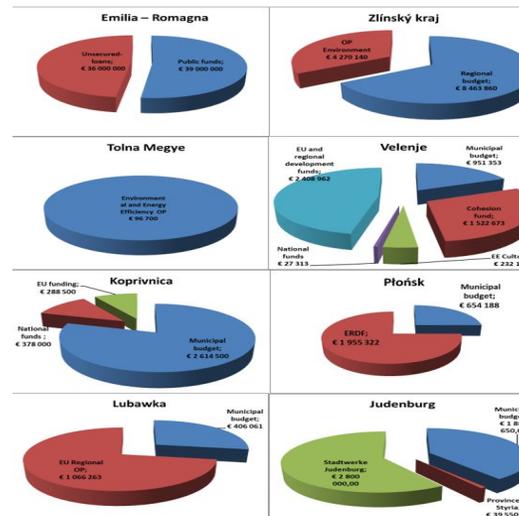
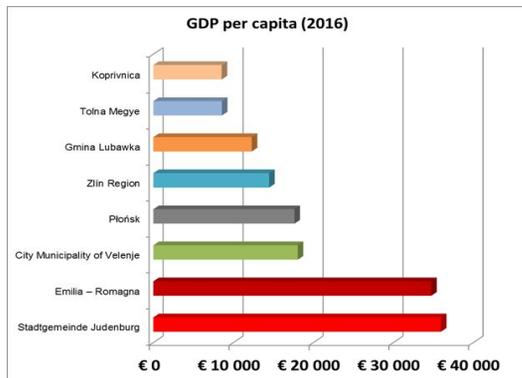


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Esempi, soluzioni e best practices in 8 aree:

- Zlín Region, Czech Republic
- Regione Emilia – Romagna, Italy
- Mestna občina Velenje, Slovenia
- Tolna Megye, Hungary
- Grad Koprivnica, Croatia
- Stadtgemeinde Judenburg, Austria
- Lubawka, Poland
- Płońsk, Poland



OnePlace - Financing Energy Efficiency



Le best practices sono raccolte con delle factsheets

- BP #1 - Zlín Region, Czech Republic
- BP #2 - Emilia-Romagna, Italy
- BP #3 Tolna County, Hungary
- BP #4 – Loški Potok, Slovenia
- BP #5 - Koprivnica, Croatia
- BP #6 - Płock , Poland
- BP #7 - Płońsk, Poland
- BP #8 - Jelenia Góra, Poland
- BP #9 - Judenburg, Austria
- BP #10 - Judenburg, Austria

The collage features several factsheets from different regions:

- PŁOCK**: Includes a 'FINANCING' section with investment costs (Own sources, Subsidies, Loan, Commercial loan) and 'KEY RESULTS' such as 'Reduction production with biomass'.
- JELEŃIA GÓRA**: Lists 'BARRIERS ENCOUNTERED' like 'Insufficient funding program' and 'KEY RESULTS' including 'Reduction of CO2 emissions'.
- JUDENBURG**: Shows 'BARRIERS ENCOUNTERED' such as 'Some stakeholders and decision makers are not easy to convince' and 'Economic questions, because the project has to be competitive with low prices for heating oil and natural gas'.
- ZLÍN REGION**: Features a 'FINANCING' section for a waste incinerator project, including a table of financial indicators:

Financial indicators		
Net present value	NPV	68 618 603,40 CZK
Internal rate return	IRR	14,27%
Payback period - simple		7 years
Payback period - discount		8 years
Evaluation year		2018
Lifetime period		20 years
Discount		3,00 %
- Jessica loan**: A factsheet detailing loan terms like 'NPD reference rate', 'Social Indicator 80%', and 'Grace period for principal install 30/04/2020'.

Other elements include photos of industrial sites, residential buildings, and a bar chart showing 'Estimated waste incineration' over time.



Project Calculator

- Il calcolatore di progetti di efficienza energetica offre all'utente un'idea indicativa della redditività e dell'opportunità dell'investimento in un progetto di efficienza energetica
- Considera solo fonti interne, senza considerare sussidi o prestiti che potrebbero modificare i valori previsti
- C'è la possibilità di includere eventuali sussidi, tasso di sconto, periodo di rimborso, ecc.
- Presenta i risultati con figure e flussi

Cost category - click on the cell for closer specification	Fill in yellow marked cells, the rest will be calculated automatically
Capital costs	50 000
Annual Energy Savings	2 500
Annual Revenues	3 500
Operational Costs	1 000
Other Costs per year	1 500
Discount Rate	3,0%
Indicator - click on the cell for closer specification	
	Value
Net Present Value(20 years)	2 071
Internal Rate Ratio	0,43%
Simple Payback Period	15
Discounted Payback Period	19

Energy efficiency financing project calculator

This is the simple web based energy efficiency project calculator which gives to the user a basic indicative idea of profitability and advisability of the investment into an energy efficiency or RES project. It counts just with own sources, not considering for instance grants and subsidies on one side or loans on the other side which both can significantly change foreseen values.

If grants and subsidies are involved, the NPV and IRR are increasing and payback periods are shortening, on the other hand, loans affect the investment the opposite way, i.e. when you are co-financing the investment project with a loan, the NPV and IRR are decreasing and payback periods are extending.

You can check also graphical illustration of cash flow and discounted cash flow on a separate sheet.

For concrete investment calculations it is highly advisable to carry out a proper financial analysis by a financial specialist!

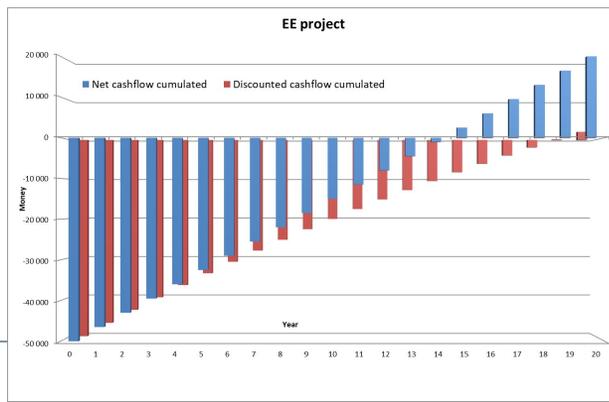
You can find instruction on how to use the calculator [here](#).

Capital costs

Capital costs are fixed, one-time expenses incurred on the purchase of land, buildings, construction, and equipment. The sum of the different type of costs related to the considered investment, for example the capital costs of building refurbishment, new EE and RES installations, infrastructure reconstruction etc.

Annual Energy Savings

Annual sum of money savings generated by the investment, for instance costs saved for heating, hot water preparation, electricity etc.



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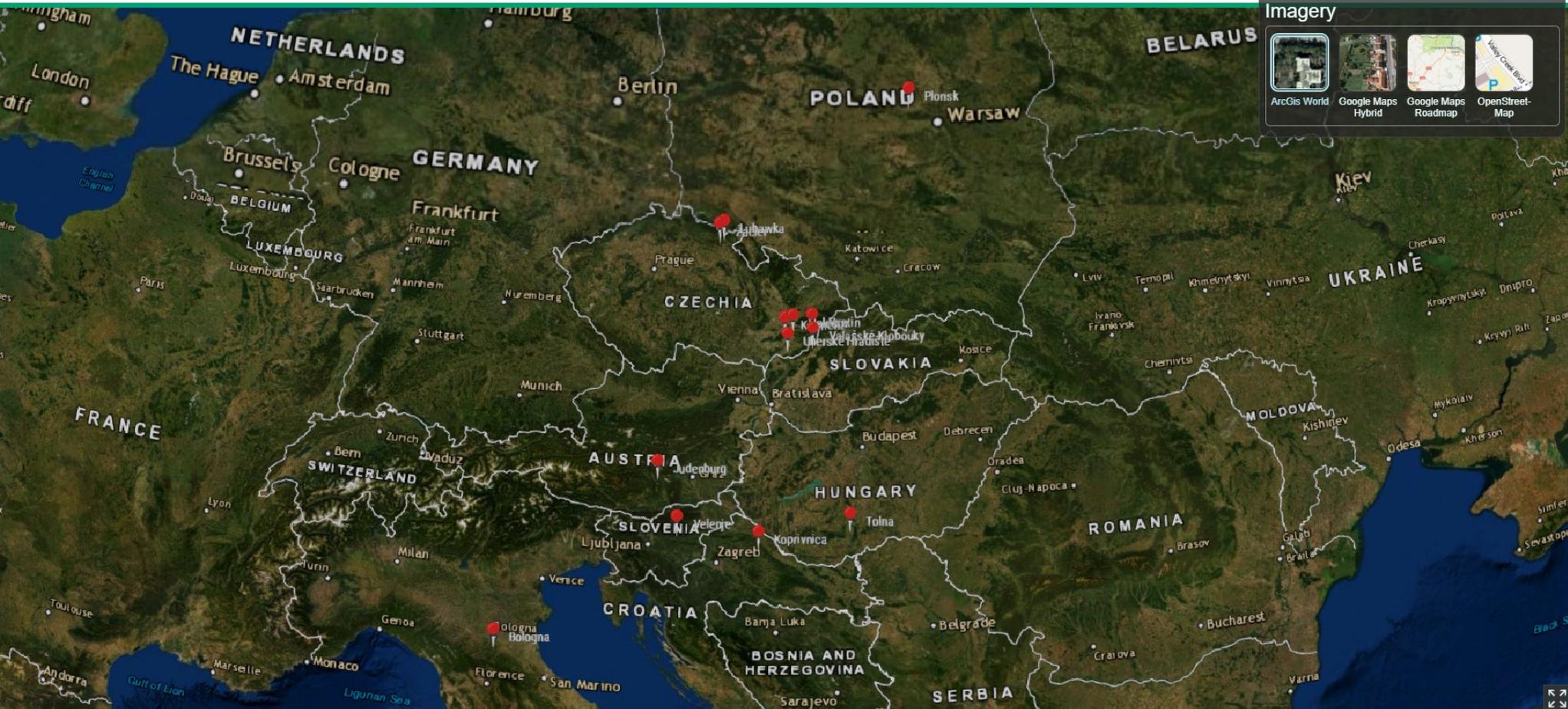
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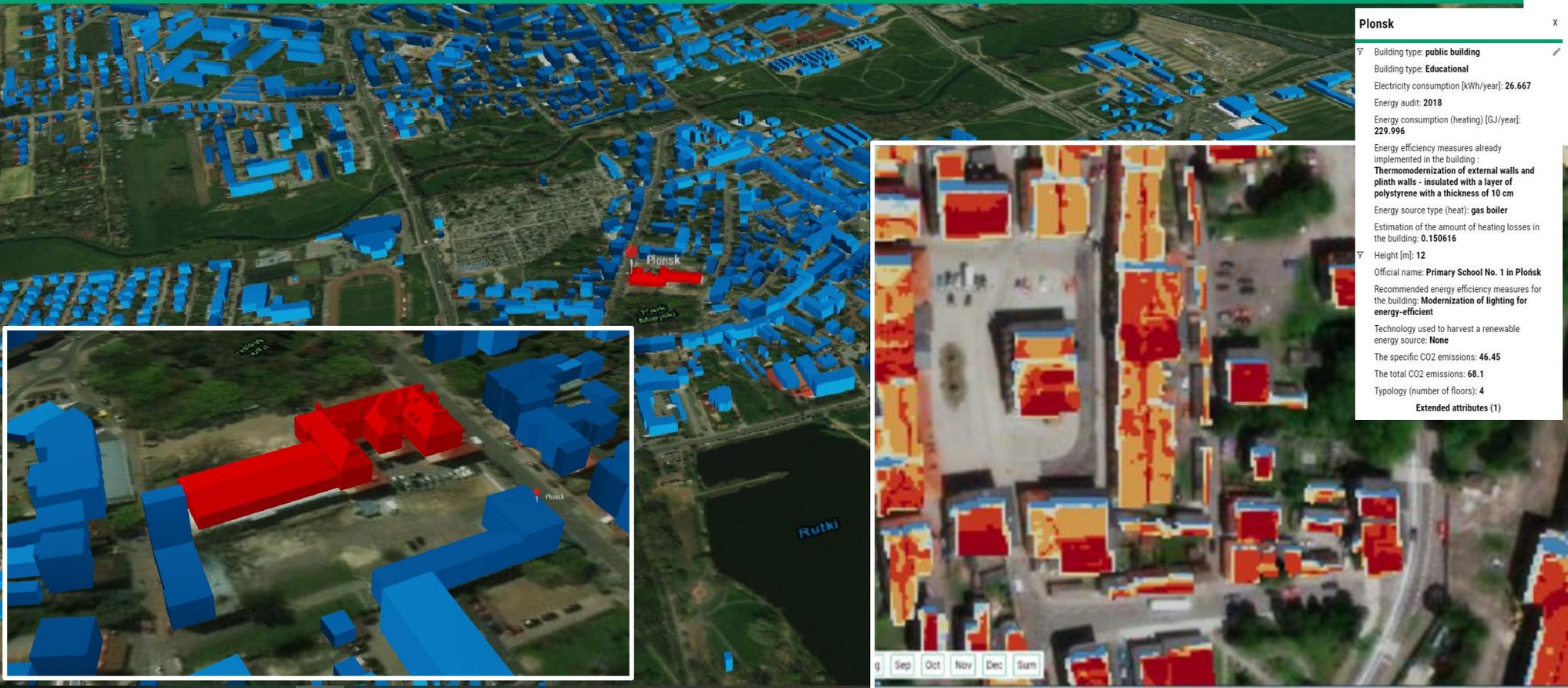
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3D Energy Management System (3DEMS) e' un modulo ICT (**WebGIS**) per visualizzare, analizzare e confrontare informazioni legate all'energia degli edifici (certificati, PV, consumi, dispersioni, CO2 emessa, ecc.) attraverso modelli 3D del costruito.



OnePlace - 3D Energy Management System

Nelle 8 aree pilota, modelli 3D degli edifici e database geospaziali sono stati creati ed integrati per permettere un migliore accesso e visualizzazione delle informazioni

3DEMS al momento e' sviluppato e testato sulle 8 aree pilota in funzione dei dati raccolti e delle esigenze locali



Le informazioni raccolte e visualizzate in 3DEMS sono state armonizzate e raccolte in 2 categorie: spaziali e non-spaziali:

a) dati spaziali

(i) mappe catastali / topografiche (2D vettoriali/raster)



(ii) nuvole di punti (2.5D e 3D)
derivate da voli fotogrammetrici
o LiDAR



Le informazioni raccolte e visualizzate in 3DEMS sono state armonizzate e raccolte in 2 categorie: spaziali e non-spaziali:

a) dati spaziali

(iii) mappe del potenziale fotovoltaico



(iv) modelli 3D di edifici LOD1 / LOD2



Le informazioni raccolte e visualizzate in 3DEMS sono state armonizzate e raccolte in 2 categorie: spaziali e non-spaziali:

a) dati non-spaziali

(i) Certificati energetici

- energy consumptions
- carbon dioxide emissions
- energy efficiency indexes
- etc.



(ii) Dati catastali

- official name
- typology
- building type
- etc.

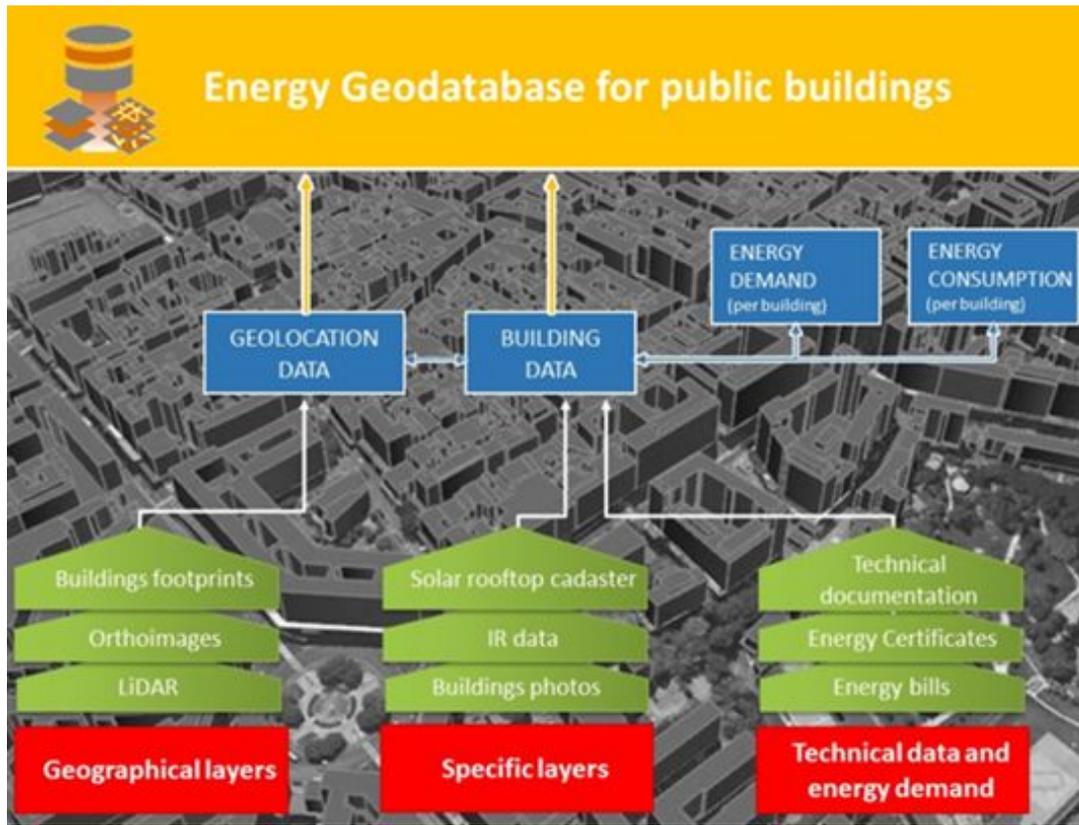
(iii) Dati statistici

- construction plans
- energy bills
- etc.



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Partendo dai dati colletti / prodotti / armonizzati, il tool **3DEMS** dentro OnePlace:



(i) navigare in una città in 3D e visualizzare il costruito a diversi livelli di dettaglio (**LOD1 e LOD2**)

(ii) **selezionare un edificio** e visualizzare le informazioni associate a questo edificio (energetiche e non)

(iii) **eseguire analisi** sui dati disponibili (emissioni, consumi, potenziale fotovoltaico, tipo di riscaldamento, ecc.)



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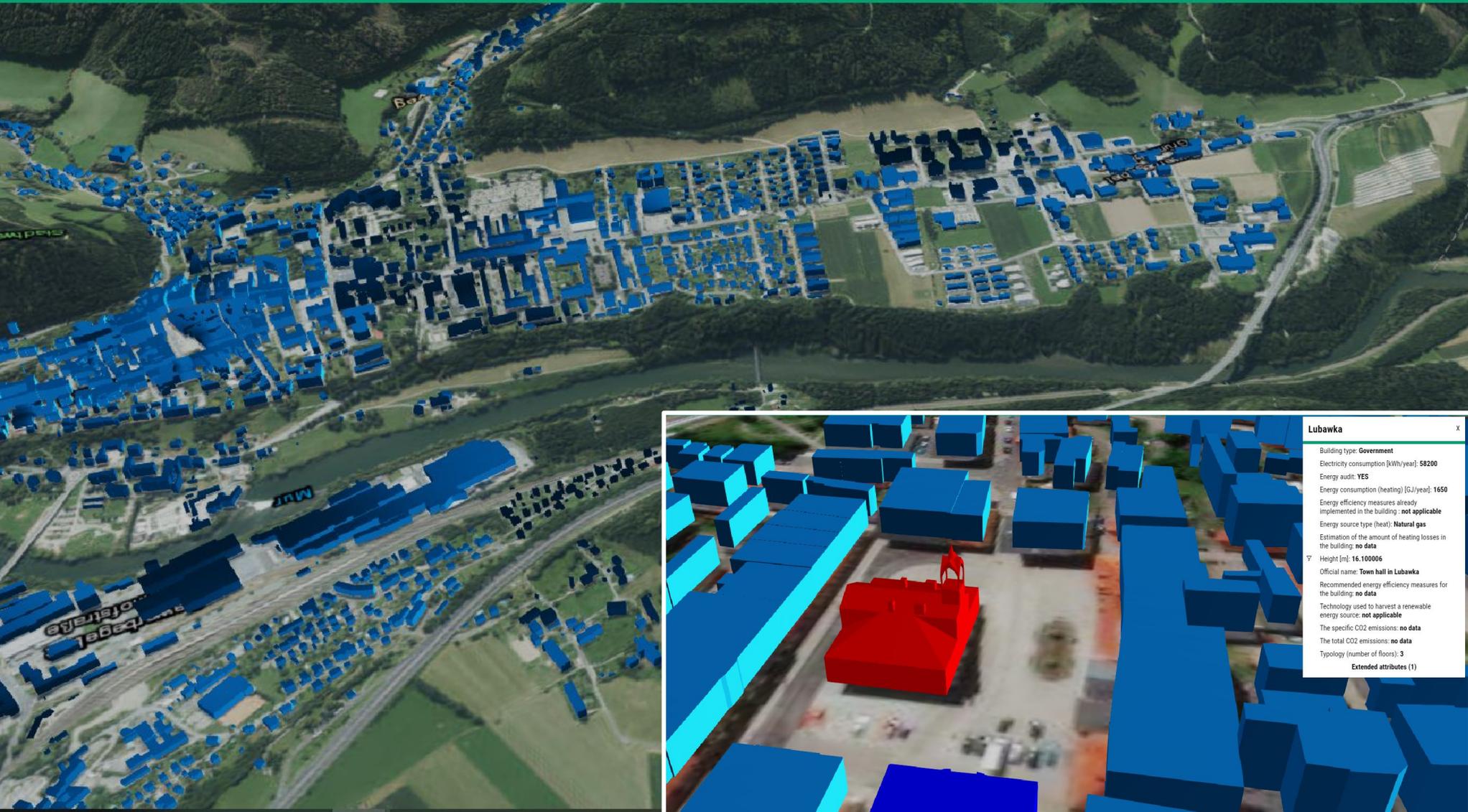
Esempi di LOD1/LOD2 di edifici 3D con associate info eteogenee



Piu' di 10,000 edifici ricostruiti in 3D e visualizzati in ambiente 3D

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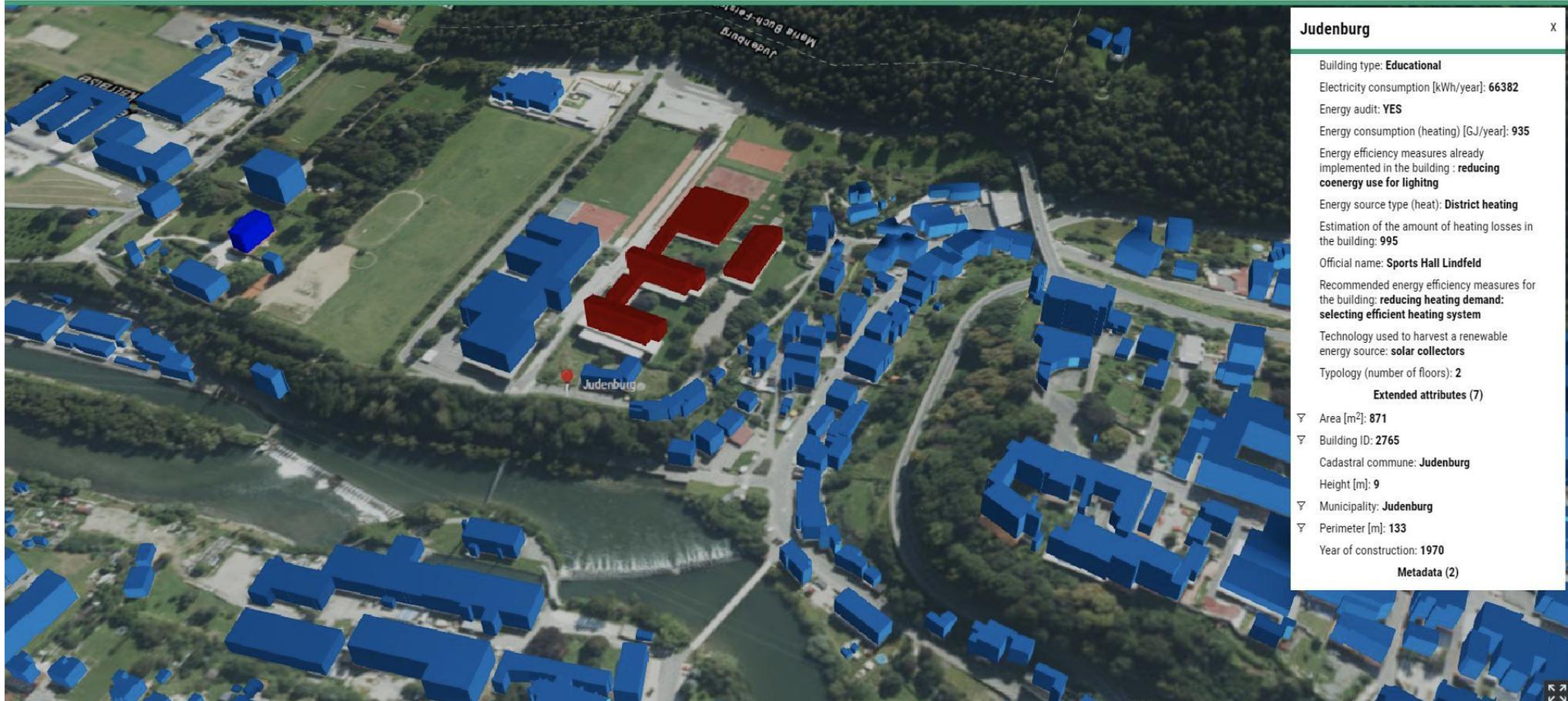
LOD1 vs LOD2



Lubawka	
Building type:	Government
Electricity consumption [kWh/year]:	58200
Energy audit:	YES
Energy consumption (heating) [GJ/year]:	1650
Energy efficiency measures already implemented in the building:	not applicable
Energy source type (heat):	Natural gas
Estimation of the amount of heating losses in the building:	no data
Height [m]:	16.100006
Official name:	Town hall in Lubawka
Recommended energy efficiency measures for the building:	no data
Technology used to harvest a renewable energy source:	not applicable
The specific CO2 emissions:	no data
The total CO2 emissions:	no data
Typology (number of floors):	3
Extended attributes (1)	

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LOD1 vs LOD2



Judenburg

Building type: **Educational**

Electricity consumption [kWh/year]: **66382**

Energy audit: **YES**

Energy consumption (heating) [GJ/year]: **935**

Energy efficiency measures already implemented in the building : **reducing coenergy use for lighting**

Energy source type (heat): **District heating**

Estimation of the amount of heating losses in the building: **995**

Official name: **Sports Hall Lindfeld**

Recommended energy efficiency measures for the building: **reducing heating demand; selecting efficient heating system**

Technology used to harvest a renewable energy source: **solar collectors**

Typology (number of floors): **2**

Extended attributes (7)

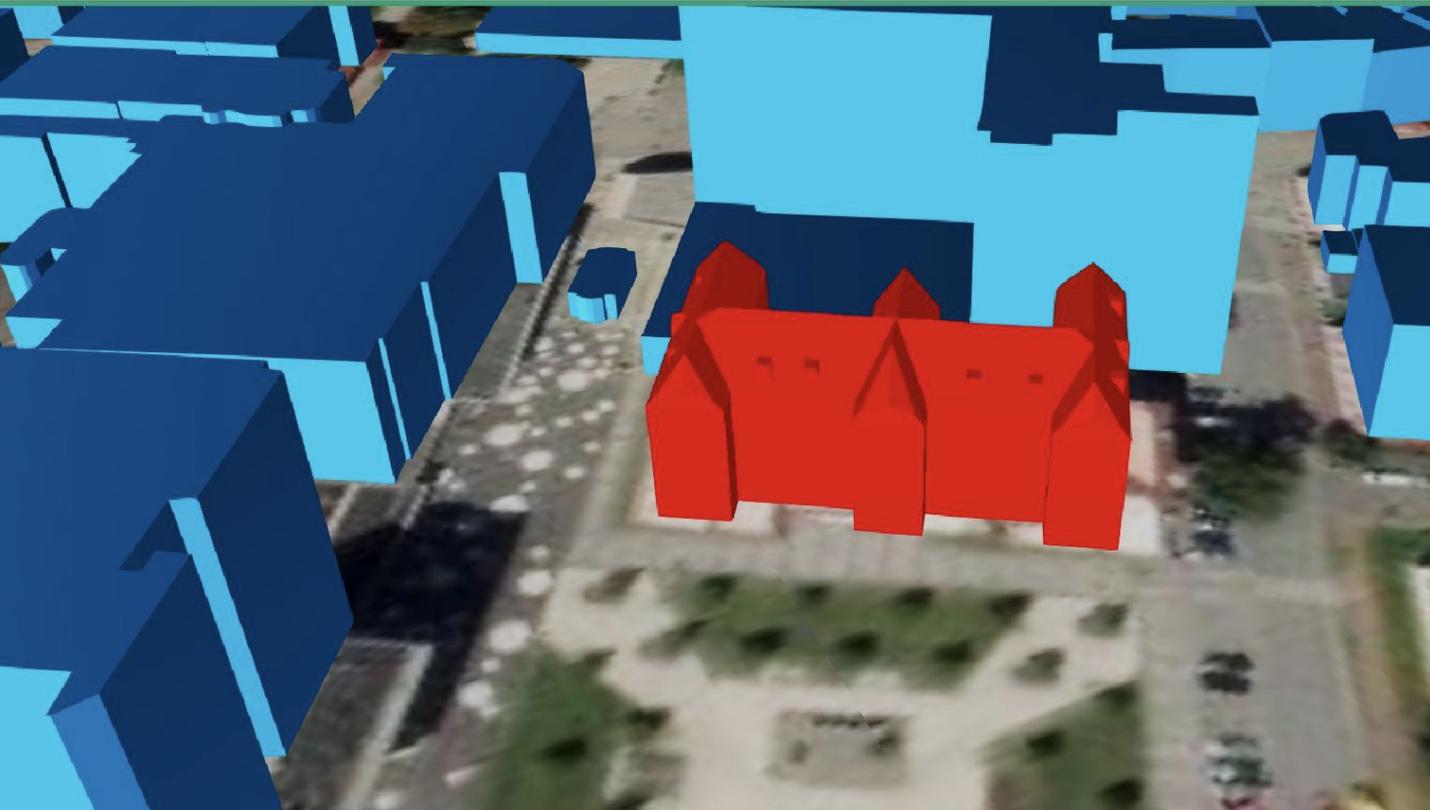
- Area [m²]: **871**
- Building ID: **2765**
- Cadastral commune: **Judenburg**
- Height [m]: **9**
- Municipality: **Judenburg**
- Perimeter [m]: **133**
- Year of construction: **1970**

Metadata (2)



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LOD1 vs LOD2



Zlin Region X

Building type: Building of civil equipment

Zlin Region X

Building type: **Building of civil equipment**

Building type: **Educational**

Electricity consumption [kWh/year]: **59.7**

Energy audit: **YES**

Energy consumption (heating) [GJ/year]: **791.3**

Energy efficiency measures already implemented in the building : **reducing heating demand: improving the insulation**

Energy source type (heat): **District heating**

Estimation of the amount of heating losses in the building: -

Official name: **Grammar school and secondary medical school Vsetin**

Recommended energy efficiency measures for the building: **not applicable**

Technology used to harvest a renewable energy source: **not applicable**

The specific CO2 emissions: -

The total CO2 emissions: **17.617**

Typology (number of floors): **3**

Extended attributes (10)



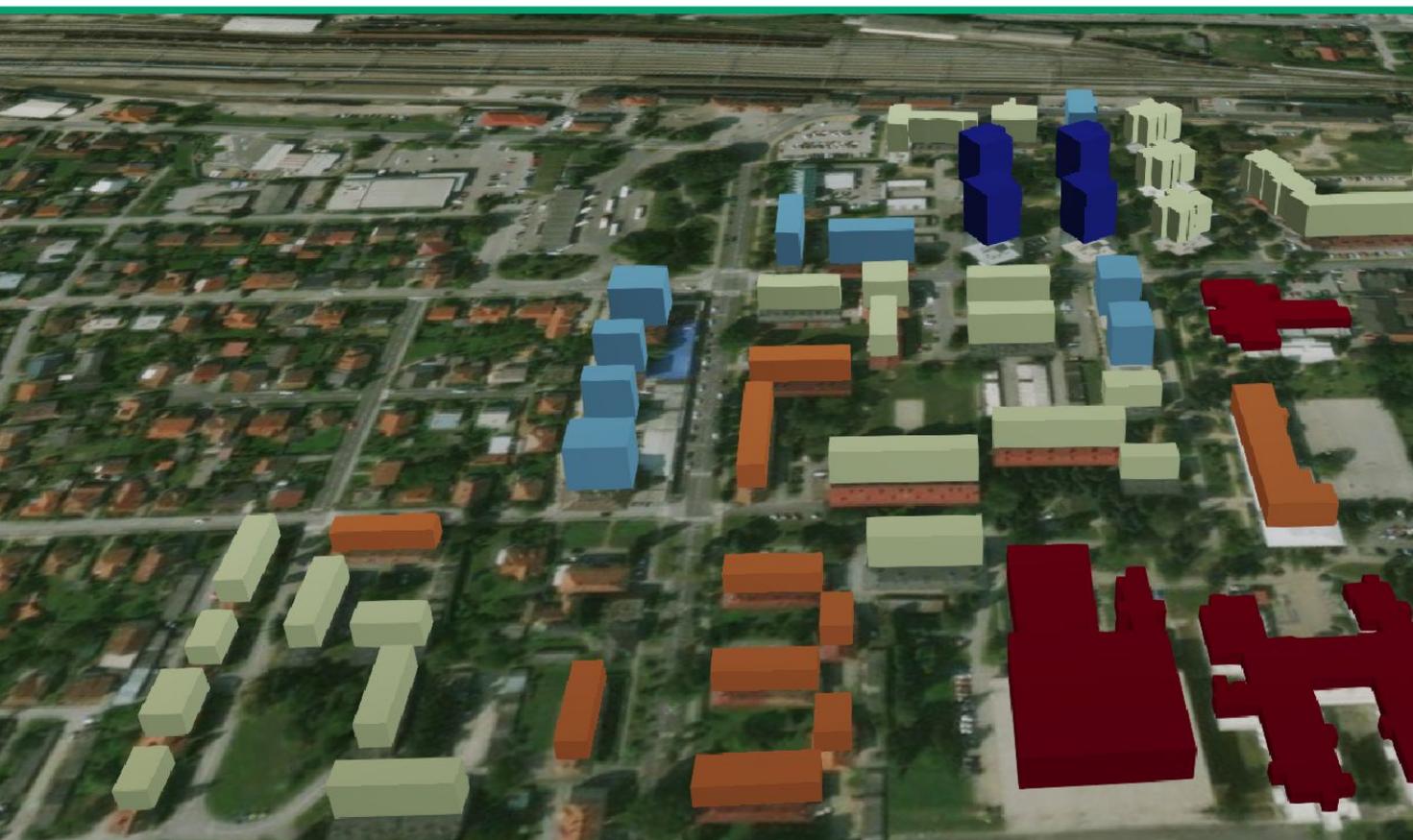
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Esempi di aggregazione di dati in 3DEMS:
viz delle fonti di energia usate per il riscaldamento degli edifici



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Esempi di aggregazione di dati in 3DEMS:
viz degli edifici in base al numero di piani



Koprivnica X

Building type: Residential building

▾ Height [m]: 15.5 ✎

Extended attributes (8)

▾ Area [m²]: 300 ✎

▾ Building ID: 17956 ✎

Building name: **Building 54**

▾ Number of floors: 7 ✎

Steps
Red, Yellow, Blue ▾

- 5 + Clear Apply

▾ Roof: 18.4 ✎

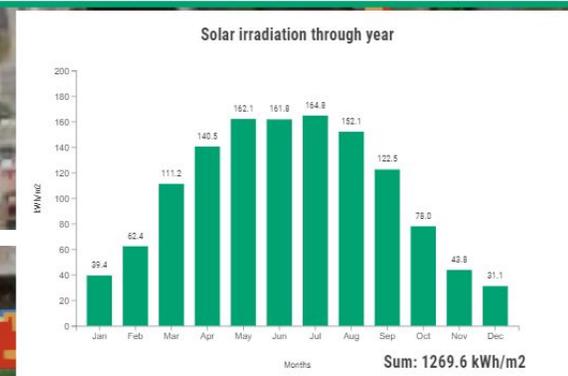
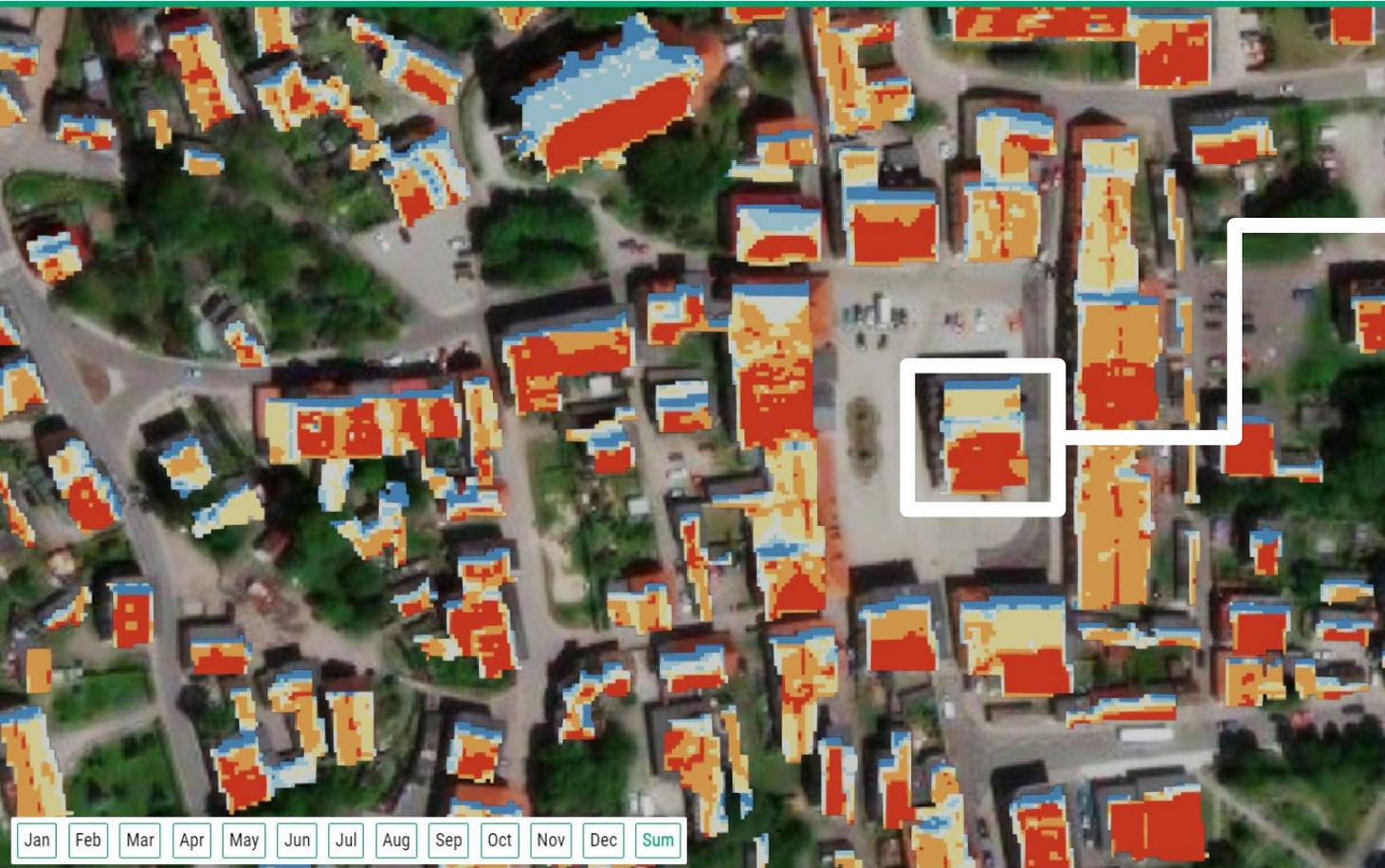
▾ Roof slope (angle in degrees): 45 / Gable ✎

Type of roof: **Gable**

Year of construction: 1993 ✎

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Esempi di aggregazione di dati in 3DEMS:
viz del potenziale fotovoltaico dei tetti delle case



The solar radiation chart applies to the building indicated on the map.

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Esempi di aggregazione di dati in 3DEMS:
viz degli edifici in funzione del materiale di costruzione

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Pilots and cities ▾ PA3 - Zlin_Kroměříž, Czech Republic

Zlin

- Building type: **Other building**
- Height [m]: **8.74**
- Extended attributes (11)
 - Area [m²]: **5043.16575**
 - Building ID: **20336**
 - House number: **1**
 - House number class: **Building with a house number**
 - Number of flats: **2**
 - Number of floors: **4**
 - Perimeter [m]: **573.48082**
 - Type of construction: **Combination of materials**
- Set of 11 Elements
Orange, Red
- Type of heating: **Other (or without heating)**

OnePlace - 3D Energy Management System

Esempi di aggregazione di dati in 3DEMS:
viz degli edifici in funzione del tipo (pubblico / privato)



The Online Energy Platform

OnePlace



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3D EMS

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