

Interreg



CENTRAL EUROPE

European Union
European Regional
Development Fund

eCentral

TAKING
COOPERATION
FORWARD



Final Conference
23 February 2021



Energy Efficient Public Buildings in Central Europe - eCentral project



REGEA | EAST | Energiaklub

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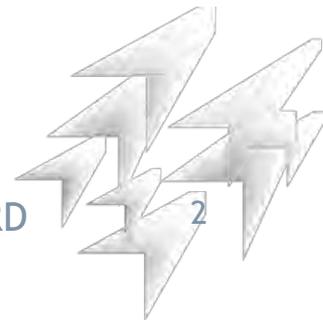
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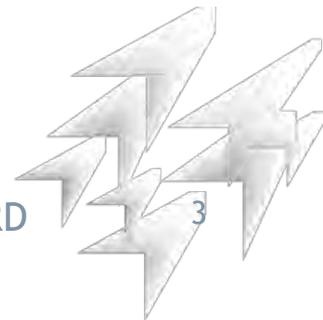
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eCentral project - ID card

- Full name - Energy Efficient Public Buildings in Central Europe
- Funded by the INTERREG Central Europe programme - Priority: Low carbon cities and regions
- Key issue: buildings represent almost 40% of the EU final energy consumption
- Project addressed both Energy Efficiency Directive - EED and Energy Performance Building Directive - EPBD
- Project duration: 1.9.2017. - 28.2.2021.

..Back in 2017



KICK OFF MEETING



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FT Series **Brexit: in or out**

Show articles



The U.S. Is the Biggest Carbon Polluter in History. It Just Walked Away From the Paris Climate Deal.

By JUSTIN GILLIS and NADJA POPOVICH JUNE 1, 2017

2017

United States

8 billion metric tons CO₂



European Union

29 countries, including Britain



7 other developed countries

Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland



China

8 billion metric tons CO₂

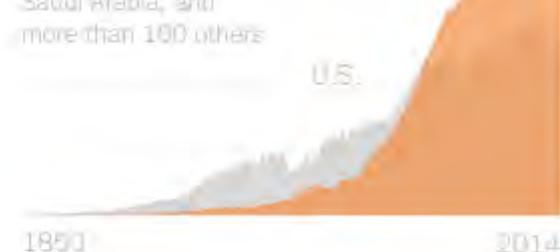


India



All other countries

Including Russia, U.S.S.R., Brazil, Saudi Arabia, and more than 100 others



Developed economies Other countries

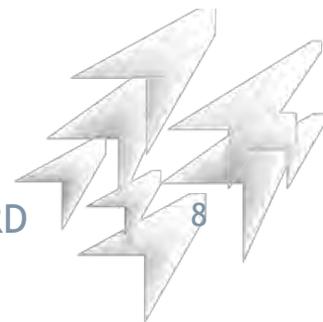
- The World constantly seems to be in energy and climate crisis but is equally dedicated to resilience and finding solutions to these challenges with EU and its public authorities as the leaders
- **eCentral** was conceived based on the idea that energy renovation targets are not ambitious enough - nearly zero energy building standard was made just for construction of new building
- **Question: what about existing buildings? Can they reach nZEB standards?**
- Being ahead of time and unpopular: today, the Renovation Wave is the centerpiece of both the Green Deal and the Recovery Plan for Europe
- Let's see what we have accomplished in these three years..



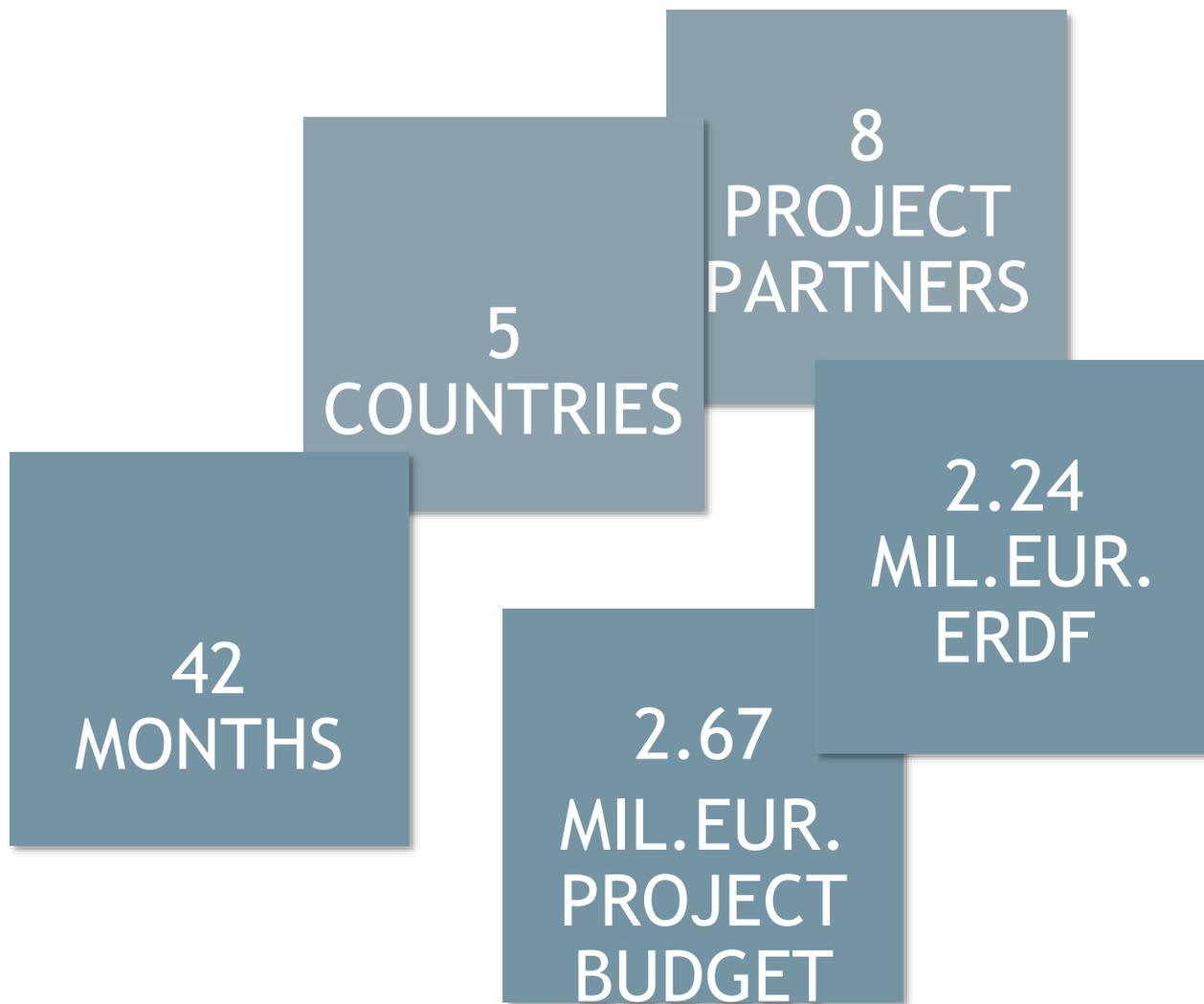
Yet another soft EU project.. 

eCentral success indicators:

- Pilot actions created **1,7 mil EUR** of direct investments
- Developed project documentation for investments in public buildings worth **19 mil EUR**
- **38** Feasibility studies created a pipeline of energy renovation projects worth **20,5 mil EUR** with estimated primary energy savings of **9.843 MWh** and **1.447 t/a** of avoided **CO2** emissions
- **15** strategic local and regional documents for sustainable energy planning



FACTS & FIGURES



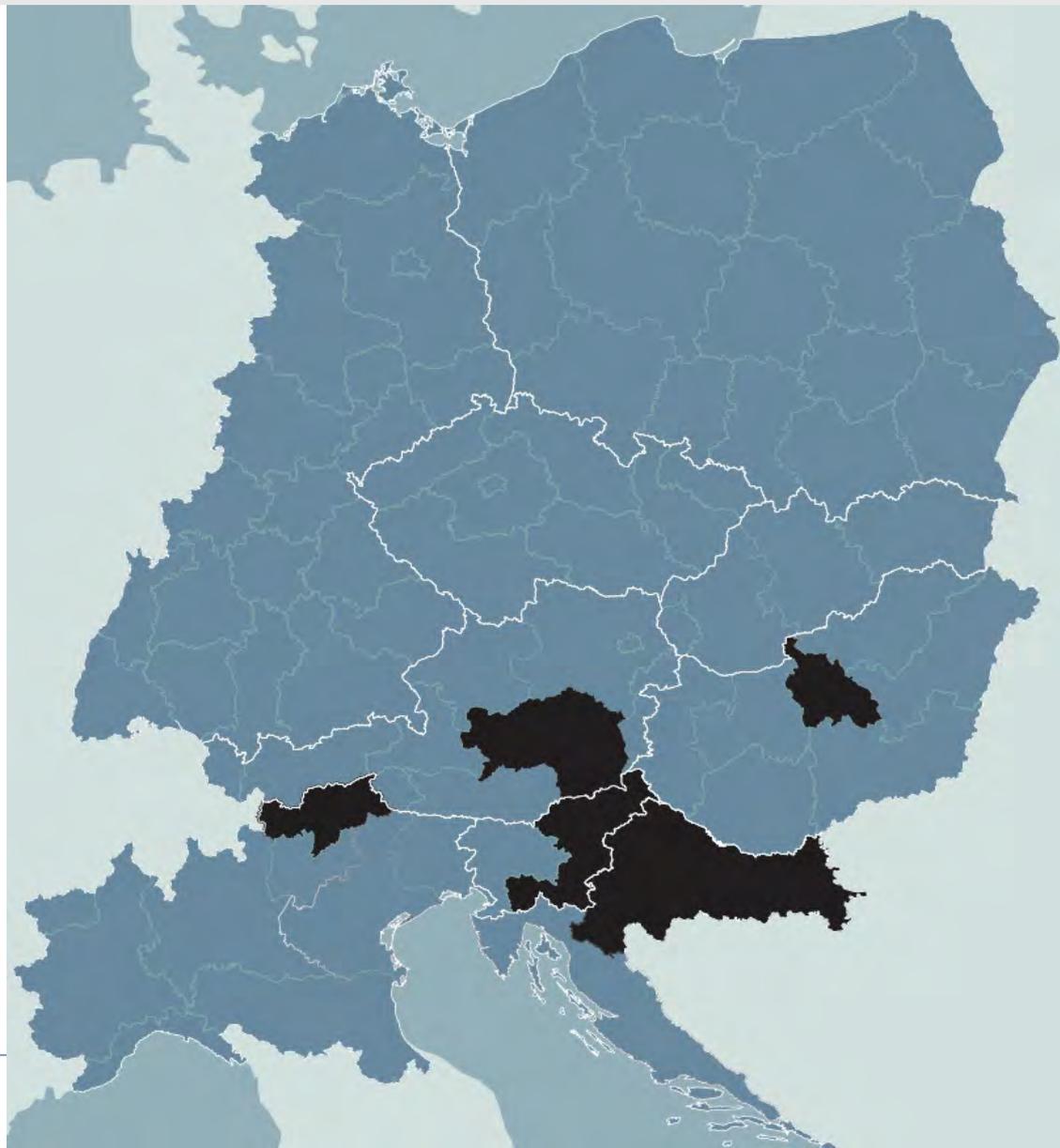
PROJECT PARTNERSHIP

Lead partner:

- North-West Croatia Regional Energy Agency (REGEA) - CRO

Project partners:

- Energy Agency of Savinjska, Šaleška and Koroška Region (KSSENA) - SI
- Energy Agency of Styria (EASSt) - AT
- Energiaklub Climate Policy Institute applied Communication (Energiaklub) - HU
- City of Sveta Nedelja (Sveta Nedelja) - CRO
- Municipality of Velenje (MOV) - SI
- Municipality of 18th district of Budapest (BP18) - HU
- European Academy of Bolzano (EURAC Research) - IT



- Focus on two key elements:
- Motivating public authorities to aim for more ambitious energy renovation standards of buildings - nearly zero energy buildings
- Innovative financing models - energy renovation rates have to increase and public funding is insufficient for reaching of these targets.
- Project tested applicability of three innovative financing models in pilot regions:
 - Public-Private Partnership - Croatia
 - Energy Performance Contracting - Hungary
 - Crowdfunding - Slovenia



OBJECTIVES & TARGET GROUPS

Main objective

To encourage and raise capacity of public authorities for developing nearly zero energy buildings projects and strategic planning documents for renovation of public buildings

Specific objectives



To provide innovative tools, financing schemes and guidelines for developing deep renovation projects and strategies



To create a pipeline of future energy renovation projects in targeted countries



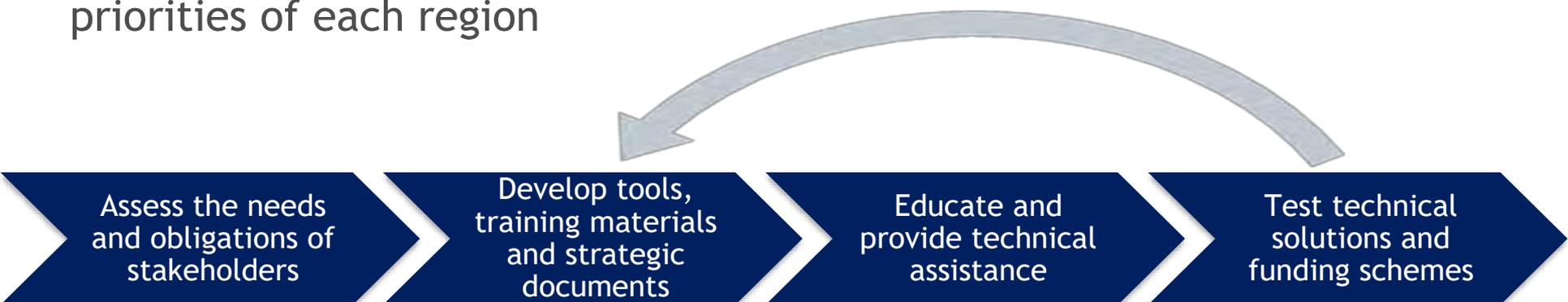
To increase the visibility and demonstrate the cost-effectiveness of nearly zero energy public buildings

Target groups
Local, regional & national public authorities, sectoral agencies, utility companies, universities, faculties, institutes, interest groups incl. NGOs, financial institutions, EE/RES equipment manufacturers, ESCOs, citizens, energy cooperatives, crowdfunding platform operators



eCentral's innovative approach

- The nearly Zero-Energy Building standard required a new philosophy that focuses more on the energy flows in the building and required a more dynamic and holistic approach in all topics
- Activities were designed according to a user-driven model, meaning they were adapted to the target groups capacity and knowledge levels and took into consideration specific legal, administrative, financial barriers and priorities of each region



OUTPUTS AND RESULTS

5 Tools

- Two Living EPC managing tools
- Step by step DST for nZEB renovation with innovative financing schemes
- Step by step tool on how to turn public buildings into nZEB
- nZEB Training curriculum

12 Trainings

- Training programmes for local/regional authorities will be performed by Regional Working Groups in three target countries (CRO, HU, SI)

4 Strategies and action plans

- Three Regional and Local energy renovation roadmaps until 2030
- Joint strategy for wider implementation of innovative financing schemes in Central Europe

3 Pilot actions

- Piloting of three different financial models for (re)construction of public buildings according to nZEB

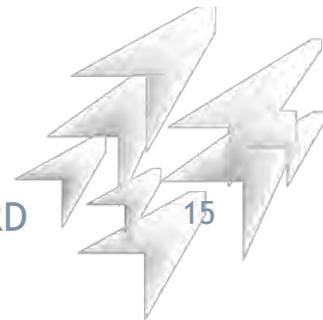


EPC tool and
database
(online)

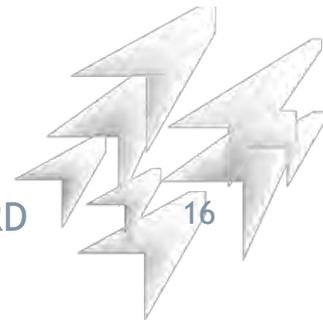
nZEB living lab
(online)

Step-by-Step-
Guide on how
to turn public
buildings into
nZEBs

Decision
support tool
about nZEB
renovation
with innovative
financing



- A complex **interactive web based tool** that offers different combinations of cost-optimal measures for **reaching nZEB requirements**
- Target group: **public authorities in partner regions Croatia, Hungary and Slovenia** - available in national languages and **national nZEB standard**
- To be used for **creating a pipeline of nZEB projects** beyond eCentral project duration
- enables a better insight into state of local/regional building stock and renovation potentials



Living EPC Tool





Energieausweis für Nicht-Wohngebäude

OIB
OIB-Richtlinie 6
 Ausgabe März 2015



BEZEICHNUNG

Gebäude (Teil) Baujahr
 Nutzungsprofil Letzte Veränderung
 Straße Katastralgemeinde
 PLZ, Ort KG-Nummer
 Grundstücksnummer Seehöhe

SPEZIFISCHER STANDORT-REFERENZ-HEIZWÄRMEBEDARF, STANDORT-PRIMÄRENERGIEBEDARF, STANDORT-KOHLENDIOXIDEMISSIONEN UND GESAMTENERGIEEFFIZIENZ-FAKTOR

| | HWB _{Ref,SK} | PEB _{SK} | CO _{2,SK} | f _{GER} |
|-----|-----------------------|-------------------|--------------------|------------------|
| A++ | | | | |
| A+ | | | | |
| A | | | | |
| B | | | | |
| C | | | | |
| D | | | | |
| E | | | | |
| F | | | | |
| G | | | | |

HWB_{Ref,SK} Der Referenz-Heizwärmebedarf ist jene Wärmemenge, die in den Räumen bereitgestellt werden muss, um diese auf eine Energie geläufige Raumtemperatur, ohne Berücksichtigung möglicher Einflüsse aus Wärmegewinnung, zu halten.

PEB_{SK} Der Referenz-Primärenergiebedarf ist die für die Erzeugung der Heizwärme benötigte Primärenergie, die unter Berücksichtigung der Wärmegewinnung, der Wärmeverluste und der Wärmegewinnung aus anderen Anlagen (z.B. Solarthermie) zu ermitteln ist.

CO_{2,SK} Der Referenz-Kohlendioxidemissionsfaktor ist die Menge an Kohlendioxid, die bei der Erzeugung der Heizwärme freigesetzt wird.

f_{GER} Der Energieeffizienzfaktor ist die Differenz aus dem Referenz-Primärenergiebedarf und dem Referenz-Heizwärmebedarf (Anforderungen 2010).

HWB_{SK} Der Heizwärmebedarf ist jene Wärmemenge, die in den Räumen bereitgestellt werden muss, um diese auf eine Energie geläufige Raumtemperatur, ohne Berücksichtigung möglicher Einflüsse aus Wärmegewinnung, zu halten.

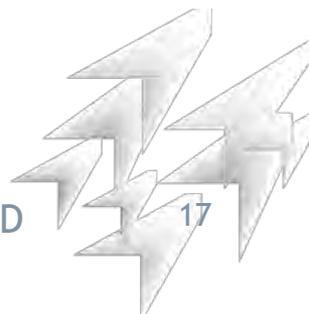
PEB_{SK} Der Primärenergiebedarf ist die für die Erzeugung der Heizwärme benötigte Primärenergie, die unter Berücksichtigung der Wärmegewinnung, der Wärmeverluste und der Wärmegewinnung aus anderen Anlagen (z.B. Solarthermie) zu ermitteln ist.

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f_{GER} Der Energieeffizienzfaktor ist die Differenz aus dem Referenz-Primärenergiebedarf und dem Referenz-Heizwärmebedarf (Anforderungen 2010).

Alle Werte gehen unter der Annahme eines normierten Baubestandwertes ein. Sie geben den Jahresbedarf pro Quadratmeter Scheitel-Stufe-Grundfläche an.

- Background-calculation methodology based on seasonal method of ISO 13790
- Input data for the tool = info on **energy performance certificates (EPC)** and accompanying report (help users to adequately read/interpret the information on EPCs)
- For unknown parameters: set of predefined values available
- Accuracy of results depends on accuracy of input data!



EPC Tool Facts (02/2021)

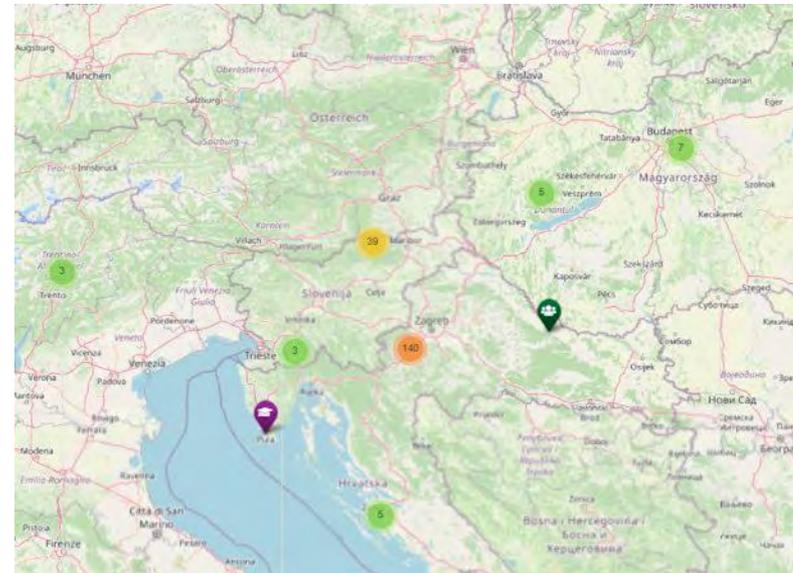
□ 72 users 

□ 179 buildings 

□ >65 municipalities 

□ 274.000 m² net heated area 

□ 17 200 MWh calculated potential energy savings per year 



EPC tool Tour

Start page



Press the “**Register button**” to create a new account or “**Login button**” if you already have an account

A link to eCentral website



Project co-financed by the European
Regional Development Fund

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Graphics designed by Freepik



EPC tool tour

Front page - Map

Your buildings can be seen in the map – basic information with different icons is shown

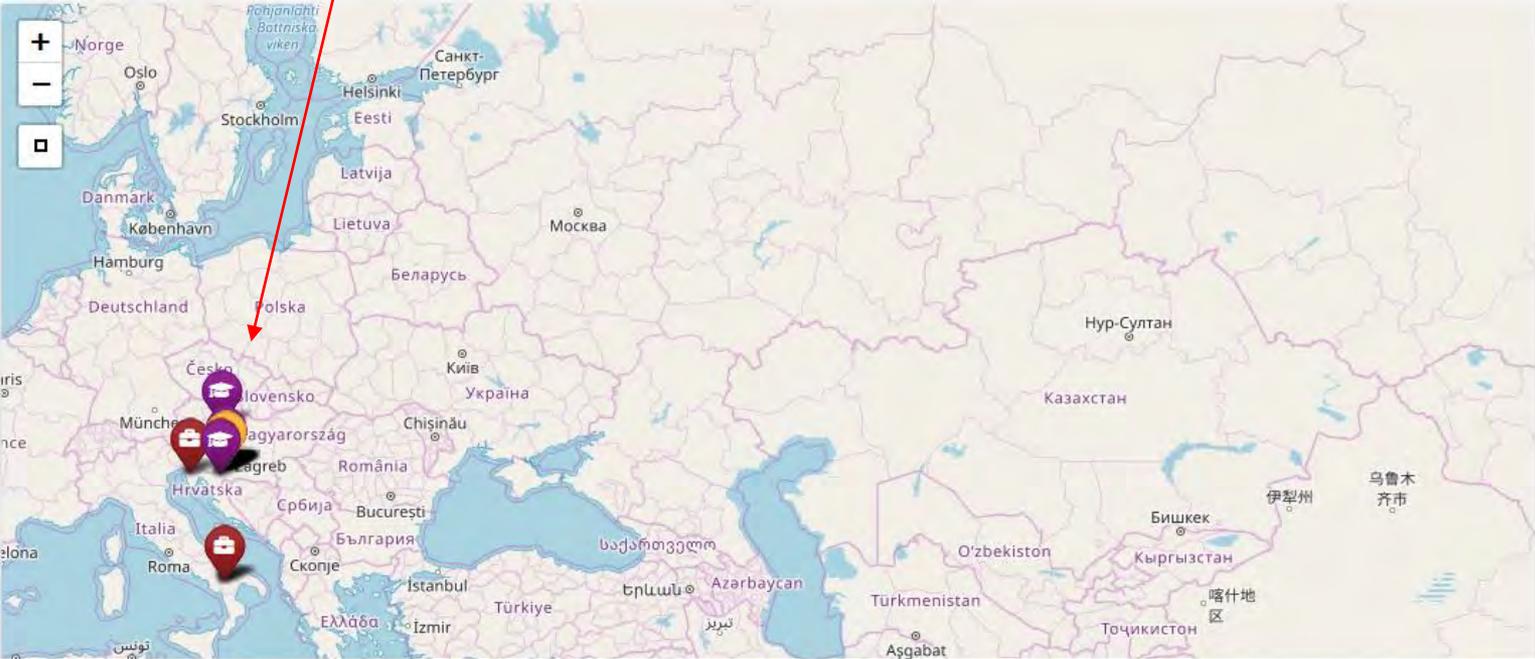
English (en) ▾

REGEA 👤 ▾

- MAP
- BUILDINGS
- BENCHMARKING

Map

Click to select a language



EPC tool structure

BASIC INFO BASIC INFO EC ENERGY CONSUMPTION BUILDING PARTS VENTILATION TERMOTECHNICAL SYSTEMS LIGHTING CURRENT BUILDING STATE CALCULATION OPTIONS
NOTES NZEB

Divided into 11 tabs:

- Σ {
- (1) Basic info (name, address,)
 - (2) Basic info EC (energy class, m², net heated area, users....)
 - (3) Energy consumption (not a compulsory data to enter)
 - (4) Building parts (walls, windows, roofs..)
 - (5) Ventilation (if available, heat recovery, ...)
 - (6) Thermotechnical systems (heating, domestic hot water, cooling,...)
 - (7) Lighting (energy demand, type of bulbs, ...)
-
- (8) **Current building state** (overview on entered data)
 - + (9) *Calculation options* (Place for editing subsidies, prices of renovation measures, etc.)
 - (10) *Notes*
-
- (11) **nZEB calculation results**

Unknown data
are suggested
by tool



NZEB compliant measures

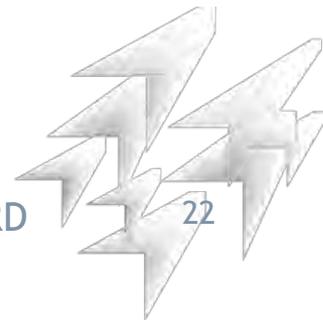
- (1) Here, all possible combination of measures for achieving the nZEB standard in accordance with the current legislation are presented
- (2) Results are presented through financial and energy savings perspective

NZEB compliant measures

Show 10 entries

| Measures | Financial results | | | | Energy savings results | | | | | | | Permitted values | | | |
|--|----------------------|------------------------------|-------------------------------------|---|------------------------|-----------------------|------------------------|-------------------------|--------------------------------------|---------------------------------------|----------------------|--|--|---|--|
| | Total investment [€] | Simple payback period [year] | Total investment with subsidies [€] | Simple payback period with subsidies [year] | New E_{prim} [kWh] | New $Q_{H,ind}$ [kWh] | E_{prim} Savings [%] | $Q_{H,ind}$ Savings [%] | New E_{prim} [kWh/m ²] | New $Q_{H,ind}$ [kWh/m ²] | Renewable energy [%] | CO ₂ emissions reduction [t/year] | E_{prim} permitted [kWh/m ²] | $Q_{H,ind}$ permitted [kWh/m ²] | Needed renewable energy percentage [%] |
| <div style="border: 2px solid green; padding: 5px; display: inline-block;">NZEB compliant measures</div> | | | | | | | | | | | | | | | |

- Possible nZEB measures:
 - Thermal insulation of wall, change of windows and doors
 - Change of heating system
 - Installation of renewable energies on-site, etc.



NZEB non-compliant measures

If the tool cannot estimate nZEB potential- user will receive information about renovation measures which is possible to implement in order to achieve certain level of energy savings

NZEB non-compliant measures

Show 10 entries

| Measures | Financial results | | | | Energy savings results | | | | | | | |
|----------|----------------------|------------------------------|-------------------------------------|---|------------------------|----------------------|------------------------|------------------------|--------------------------------------|--------------------------------------|----------------------|--|
| | Total investment [€] | Simple payback period [year] | Total investment with subsidies [€] | Simple payback period with subsidies [year] | New E_{prim} [kWh] | New $Q_{H,nd}$ [kWh] | E_{prim} Savings [%] | $Q_{H,nd}$ Savings [%] | New E_{prim} [kWh/m ²] | New $Q_{H,nd}$ [kWh/m ²] | Renewable energy [%] | CO ₂ emissions reduction [t/year] |
| | | | | | | | | | | | | |

Disclaimer: the estimations made by this tool are based on a simplified seasonal method for heating energy needs and therefore the results are just general guides for renovation. For more accurate and realistic results you should consult an architect and/or mechanical engineer.



Benchmarking

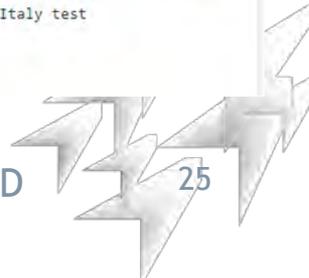
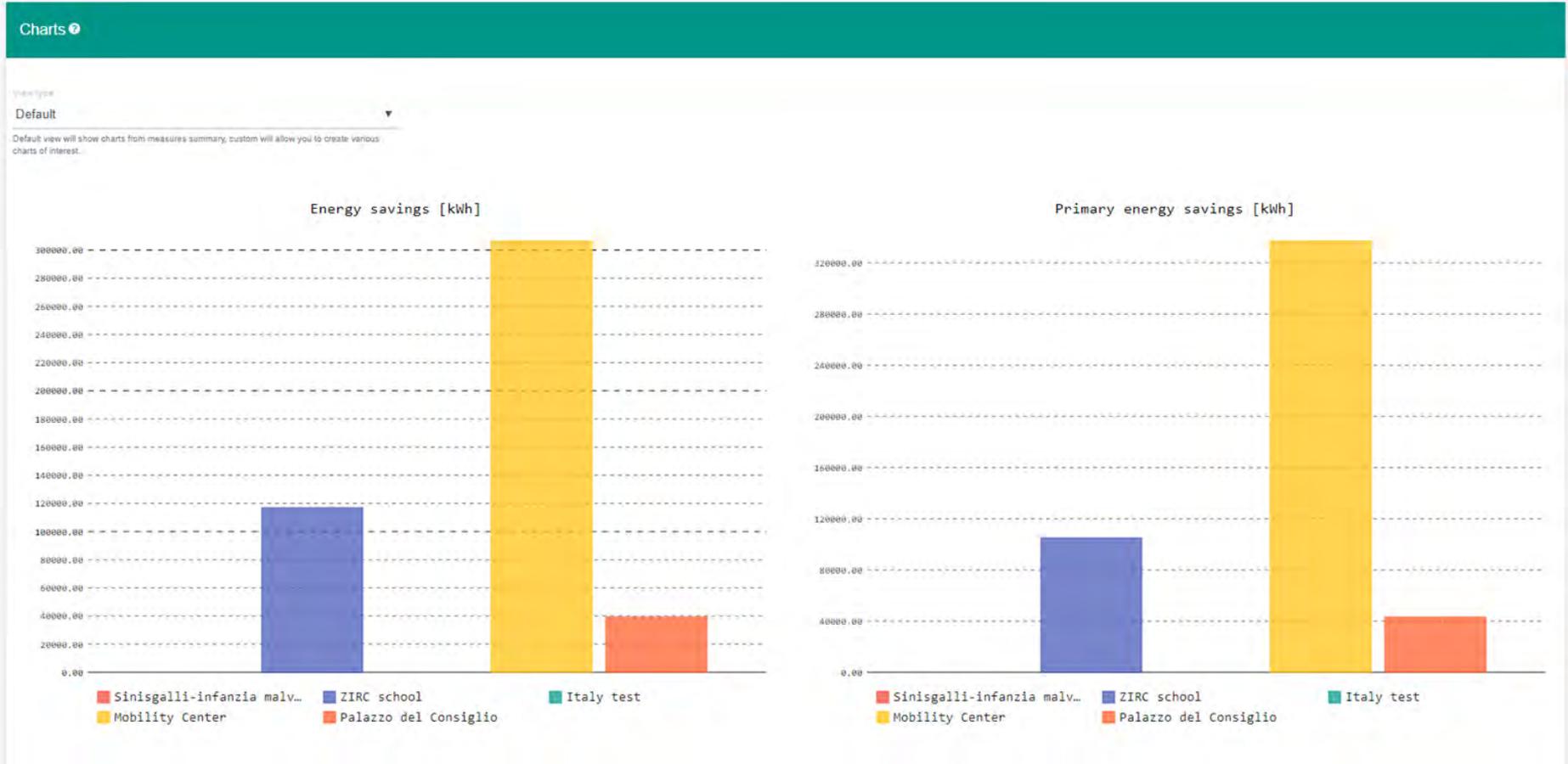
- Comparison of multiple selected buildings
- Extracting a report for selected buildings

The screenshot shows the 'Benchmarking' section of the Interreg eCentral platform. It includes a sidebar with navigation options (MAP, BUILDINGS, BENCHMARKING), a search bar, and a table of building data. The table is divided into columns for 'Basic info', 'Measures summary', and 'Benchmarking (before renovation)'. A 'Filters' section is visible at the top, and a 'Get report for selected buildings' button is at the bottom right of the table area.

| Basic info | | | Measures summary | | | | | | Benchmarking (before renovation) | | | | | | |
|--------------------------|-----------------------|---|------------------|------------------------------|---|-------------|----------------|------------------------------|--|---|---|---------------------------------------|------------------------------------|------------------------------|--|
| Name | Building typology | Total net heated area [m ²] | Savings [kWh] | Primary energy savings [kWh] | CO ₂ emission reduction [t/year] | Savings [€] | investment [€] | Simple payback period [year] | Thermal energy consumption [kWh/m ²] | Electricity consumption [kWh/m ²] | Water consumption [m ³ /m ²] | Thermal energy consumption [kWh/user] | Electricity consumption [kWh/user] | Water consumption [kWh/user] | Thermal energy consumption [kWh/m ²] |
| Novo agrade | Sports Facilities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| New building | Swimming Pools | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| New building | Swimming Pools | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Elementary school Svarca | Educational Buildings | 3,000.00 | 325,116.38 | 50,087.92 | 13.77 | 15,419.61 | 425,000.00 | 27.66 | 96.00 | 0.00 | 0.05 | 795.58 | 0.00 | 0.41 | 27.37 |
| New building | Swimming Pools | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| New building | Swimming Pools | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| New building | Swimming Pools | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



Benchmarking - Charts for selected buildings

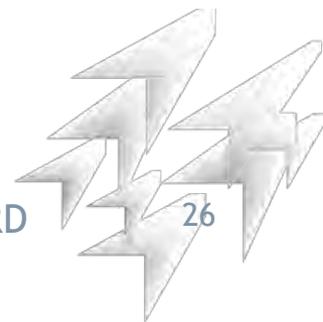


EPC tool and
database
(online)

nZEB living lab
(online)

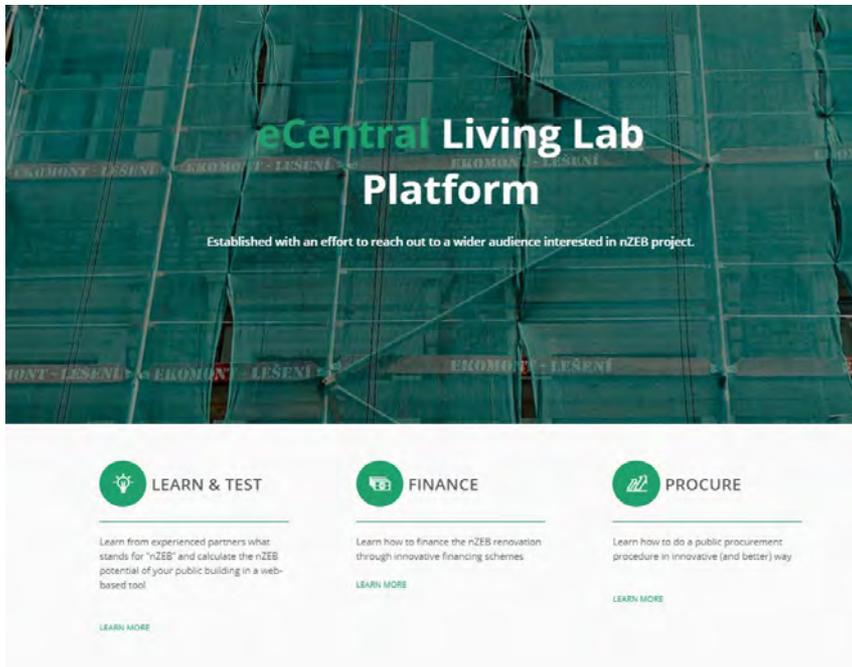
Step-by-Step-
Guide on how
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Decision
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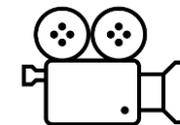
NZEB living lab (online)

User-centred, web-based knowledge sharing platform



- Integrated research on nZEB standard, innovative financing and legislation
- Integrates the EPC tool
- enables networking activities through a virtual forum
- direct insight into experiences gained from our concrete **pilot actions and project videos**

Pilot Actions



eCentral nZEB living lab
<http://nzeb.subant.com/>

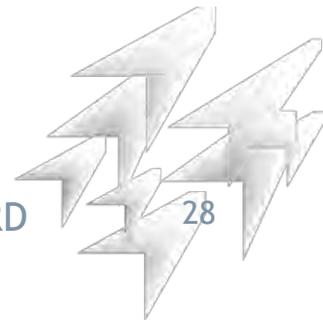


EPC tool and
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(online)

nZEB living lab
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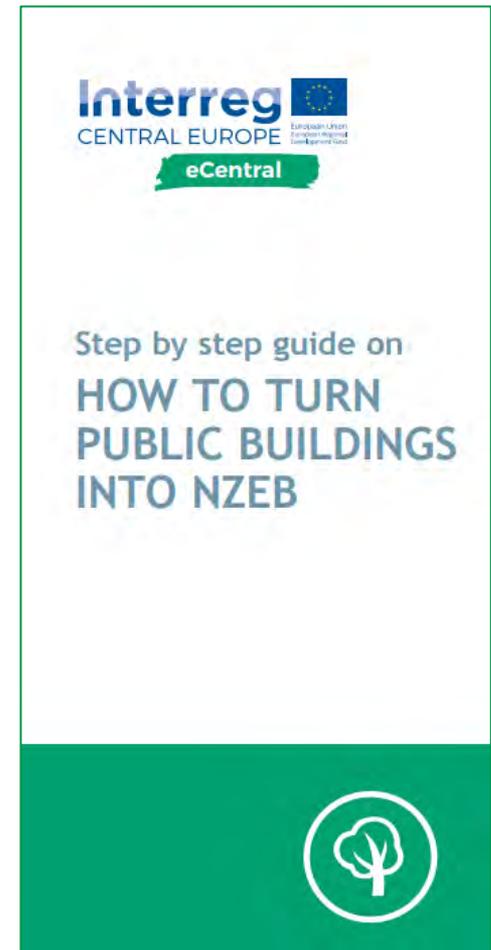
Step-by-Step-
Guide on how
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Decision
support tool
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financing



Step by stepy guide

- 5 national step-by-step guides + English version on how to turn public buildings into nZEBs     
- Objectives:
 - support important phases of renovation process 
 - Information about national nZEB targets and innovative financing schemes and regulation on tender processes
 - Boost application of standardized processes managed by public know-how



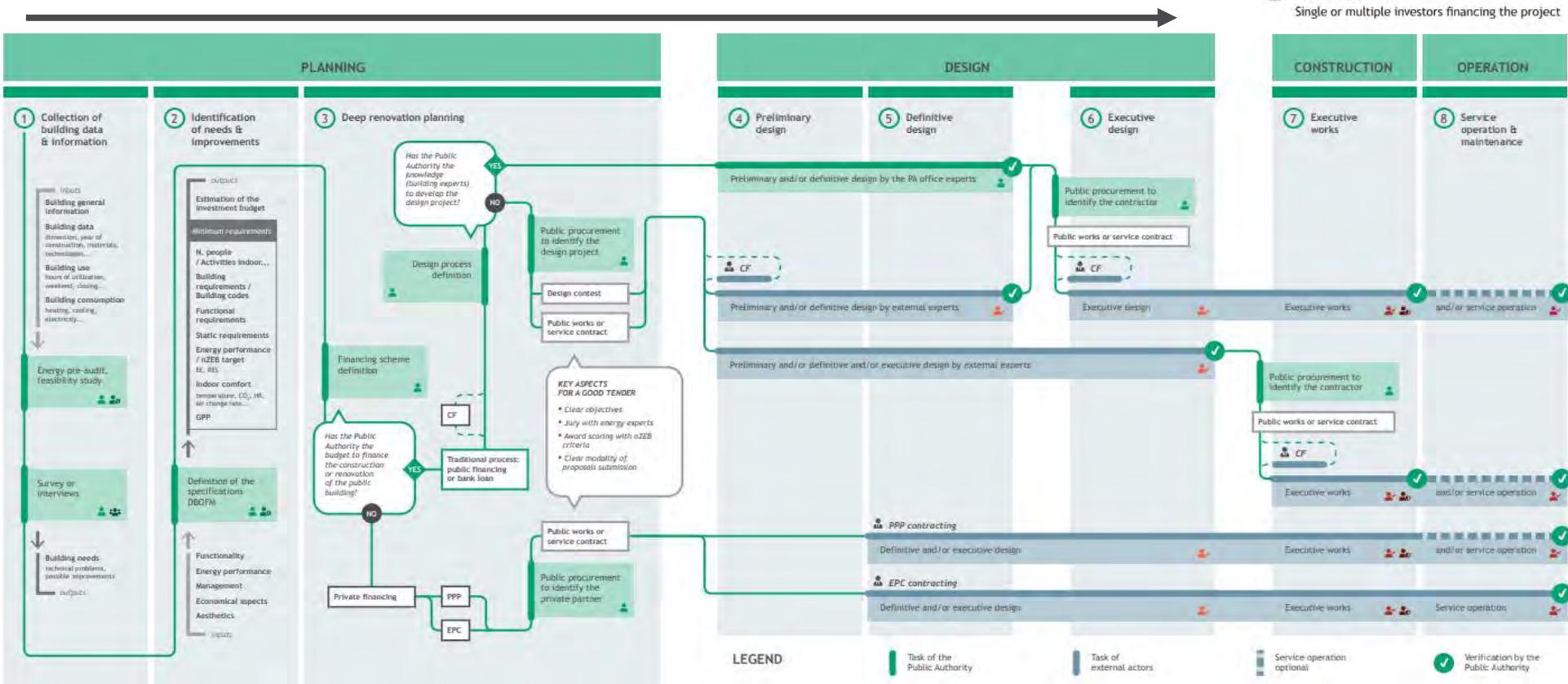
www.interreg-central.eu/Content.Node/eCentral.html



Step-by-step guide

- Content:
 - Overview on 4 phases of renovation process and necessary steps
 - Involved stakeholders in each step

-  **PUBLIC AUTHORITY**
Building owner
-  **BUILDING MANAGER**
Building facility manager
-  **USERS**
People who use the building
-  **BUILDING EXPERTS TEAM**
Architecture, Design & Engineering team
-  **CONTRACTOR**
Building construction or Operation contractor
-  **CONSTRUCTION SUPERVISOR**
Building construction works supervisor
-  **PRIVATE INVESTOR**
Single or multiple investors financing the project

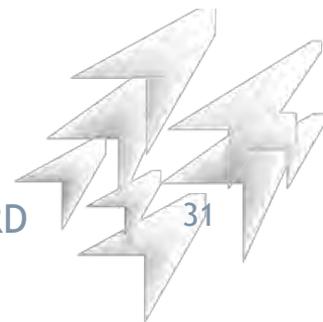


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nZEB living lab
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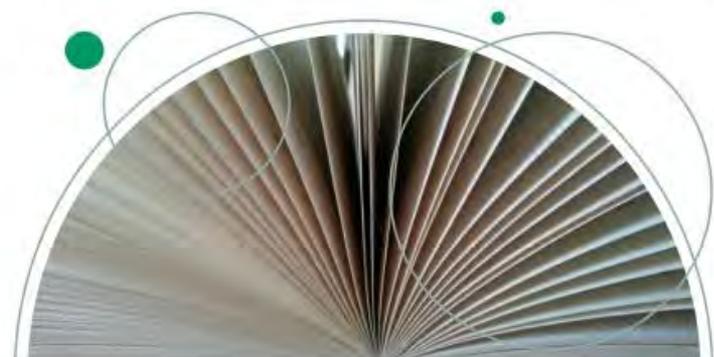


Decision support tool

- [English tool](#) on nZEB renovation with innovative financing schemes
- Supplements step-by-step-guide
- Objectives:
 - Provide understandable information about Public Private Partnership, Energy Performance Contracting and Crowdfunding
 - Support building renovation phases
 - Best practice examples



| CONTENT | |
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Decision support tool

BEST PRACTICE EXAMPLES

PUBLIC PRIVATE PARTNERSHIP (PPP)

The European PPP market is well documented. According to EPEC statistics, 1868 projects in different sectors with a total value of € 392.9 billion were closed in Europe since 1990. Some chosen best practice examples for PPP projects for public buildings are (partially in national languages):

- [Renovation of 48 public buildings in Ljubljana \(Slovenia\)](#)
- [Educational building Berresgasse, Vienna \(Austria\)](#)
- [Educational building Gertrude Fröhlich-Sandner, Vienna \(Austria\)](#)

ENERGY PERFORMANCE CONTRACTING (EPC)

EPC markets have also experienced a quite big growth in the past years. The causes are seen in the improvement of the legal situation, promotion and clarification of the definition. Some chosen best practice examples for EPC projects for public buildings are (in national languages):

- [Geological institute Munich \(Germany\)](#)
- [Nursing center Bad Radkersburg \(Austria\)](#)
- [9 buildings of municipality Hude \(Germany\)](#)

CROWDFUNDING (CF)

In Europe, CF gained more importance recently. From 2013 to 2017, the annual market volume increased from € 1.1 to € 10.4 billion. Some chosen best practice examples for CF for public infrastructure are (partially in national languages):

- [Civic crowdfunding supported by City of Milan \(Italy\)](#)
- [Luchtsingel bridge in Rotterdam \(The Netherlands\)](#)
- [Public energy park with PV and wind power in Gladbeck \(Germany\)](#)

More information on innovative financing schemes is available [here](#).



ECENTRAL PILOT ACTIONS - STATUS 2021

PPP in Sveta Nedelja (Croatia)



A large two-building kindergarten was planned to be implemented through PPP model (design-build-maintain concept, project volume approx. € 4 million) in Sveta Nedelja. Due to changed circumstances, the project was downsized, and the existing kindergarten was enlarged. The enlarged annex was built in line with the nZEB standard- using high-efficient building materials and implementing RES systems. The new project volume of € 1.6 million wasn't very attractive to PPP investors. However, two more feasibility studies for evaluating the PPP approach in cities of Marija Bistrica and Stupnik were created. Implementation is expected to take place in the upcoming years.

EPC in 18th district of Budapest (Hungary)



Goal was to renovate **Vackor Kindergarten** to nZEB standard (expected volume € 560 000). Necessary measures would have been insulation of walls, roof, and ceiling as well as replacement of windows, installation of ventilation with heat recovery and 37 kWp photovoltaic system. Additionally, there have been static problems in the building. However, low energy prices cause low savings of energy costs compared to the necessary nZEB renovation investment. Therefore, it was decided not to proceed with further development of this pilot action. For future projects it is recommended to bundle several buildings to create an attractive investment package for ESCOs.

CF in Velenje (Slovenia)



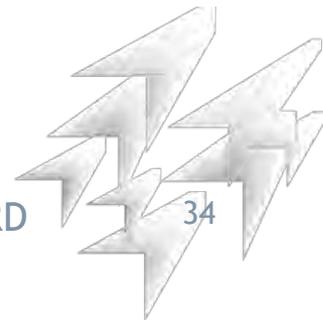
The goal was to renovate an **educational building** in the city center (project volume approx. € 113 000). Implemented measures have been the modernization of interior lightning, roof insulation and installation of solar power plant to reach nZEB standard. Despite a very well-prepared crowdfunding campaign, it failed to reach the pledged amount of money (€ 10 000) to be raised. The current lack of relevant legal framework poses several limits on crowdfunding. In Slovenia there is only one platform for crowdfunding available. Nevertheless, it was the very first project in Slovenia and it paved the way for upcoming projects.

PILOT ACTIONS: CHECK OUT MORE DETAILS AND HIGH-QUALITY VIDEOS [HERE!](#)

Trainings and support for LPAs to generate nZEB projects

Renovation roadmaps and feasibility studies

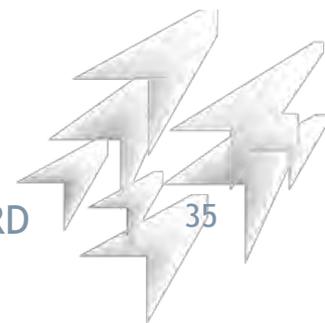
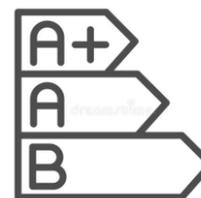
Pilot projects:
CR - PPP
HU - EPC
SL -
Crowdfunding



Covering 4 topics

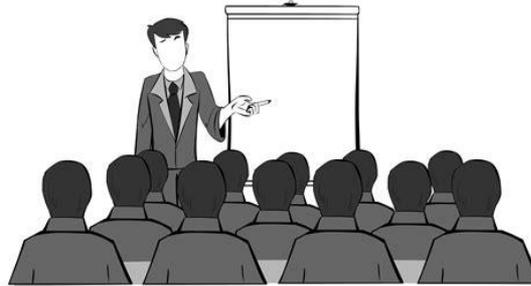
Targeting LPAs and energy agencies

- EE policies and nZEB regulation
- nZEB technologies
- Innovative financing schemes for nZEB refurbishments
- How to prepare nZEB tenders

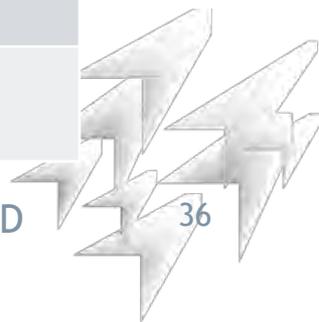


NZEB TRAINING FACTS (02/2021)

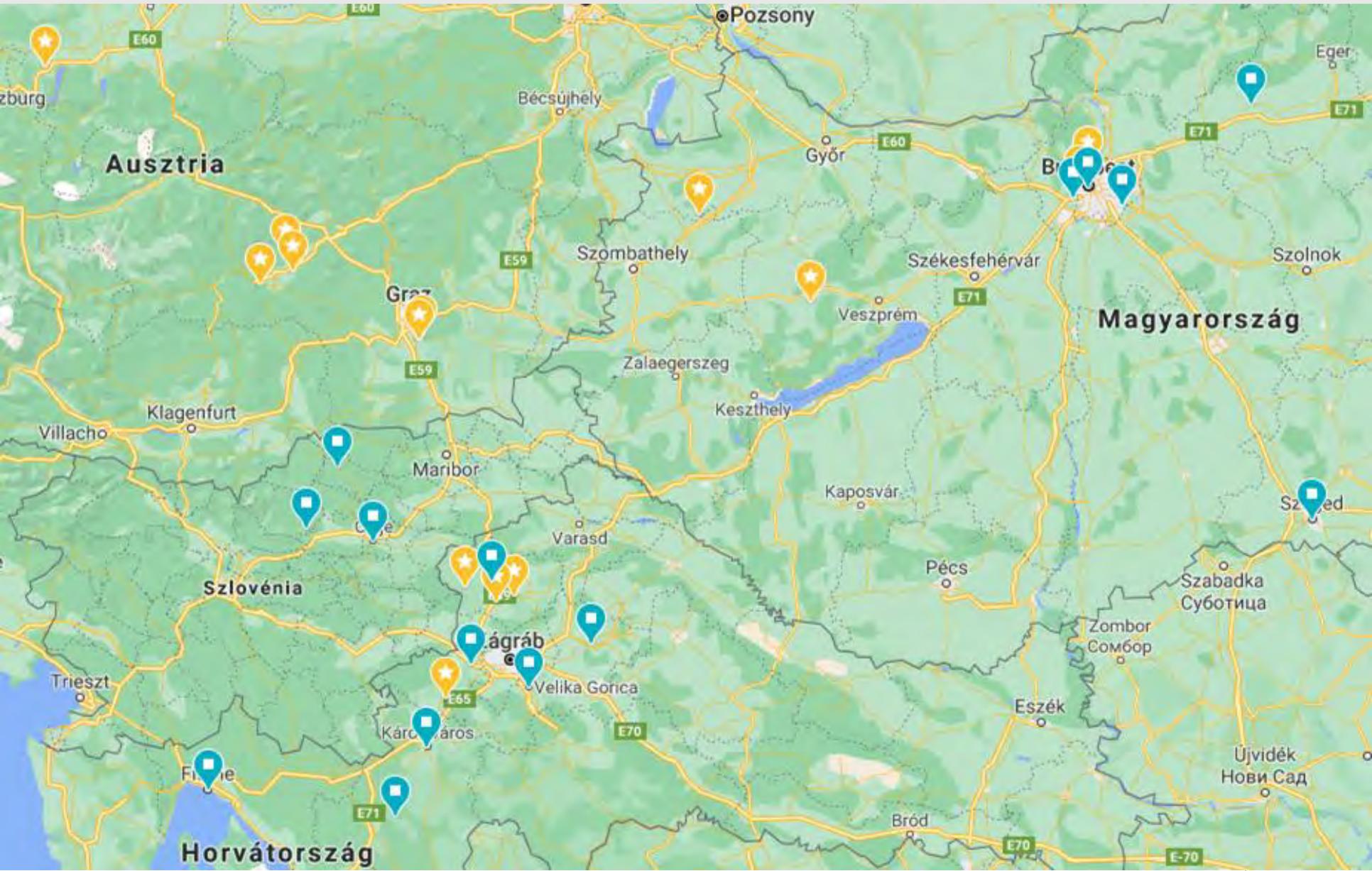
- 13 training events
- 118 participants



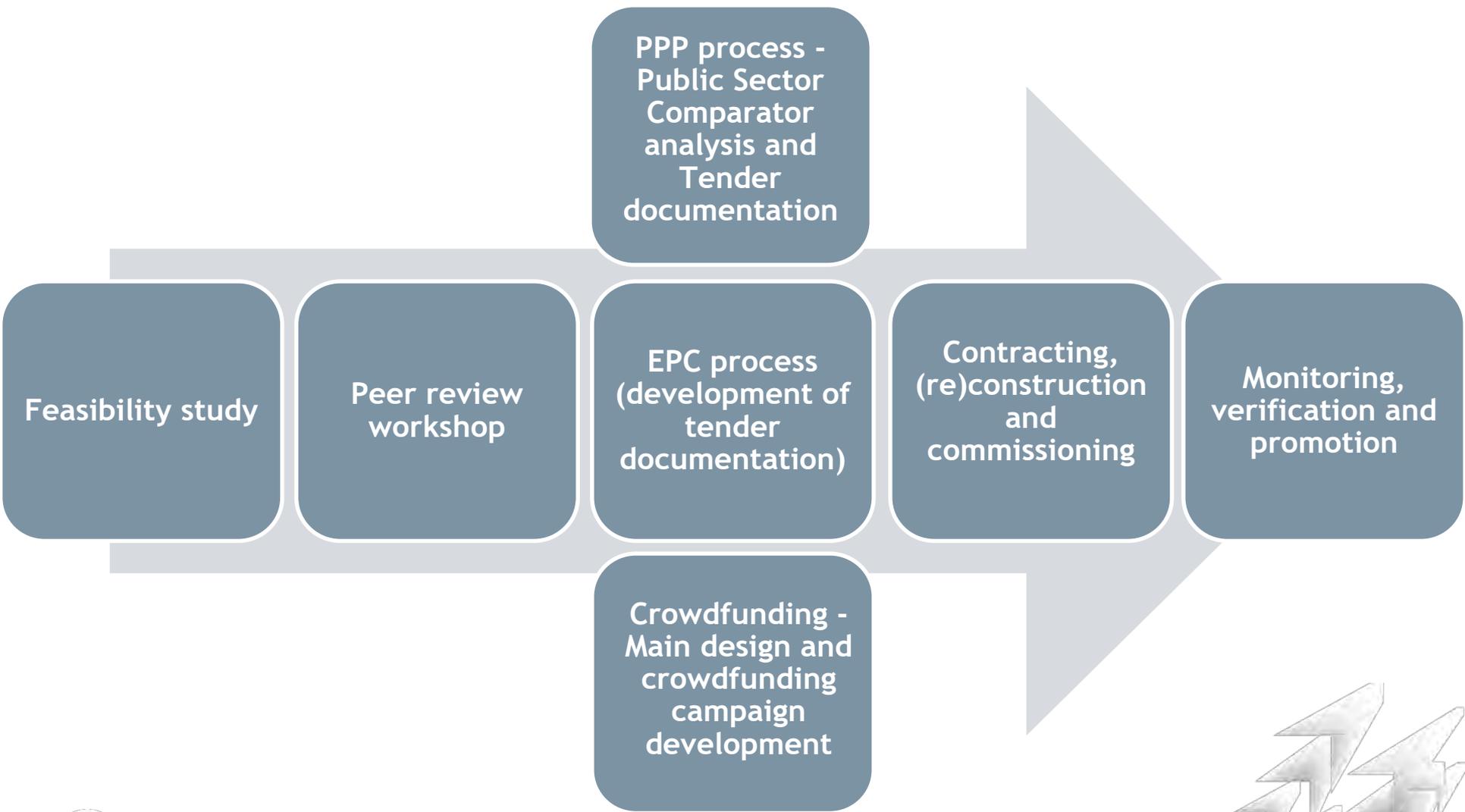
| Country | Nr. of performed trainings | Nr. of participants | Nr. of LPAs attended | Sectorial agencies attended |
|----------|----------------------------|---------------------|----------------------|-----------------------------|
| Croatia | 6 | 72 | 15 | 3 |
| Slovenia | 5 | 20 | 0 | 5 |
| Hungary | 2 | 26 | 20 | 1 |
| | 13 | 118 | 35 | 9 |



ROADMAPS AND FEASIBILITY STUDES



ROADMAP FOR PILOT ACTIONS



- Testing of PPP model for (re)construction of public buildings in accordance with nZEB standards
- Scope of pilot actions had to be expanded as investment was too small for application of any PPP model
- Three pilot buildings:
 - Construction of new kindergarten in Sveta Nedelja - to be completed in April 2021
 - PPP documentation for construction of schools in municipalities of Marija Bistrica and Stupnik:
 - Design-Build-Finance tender documentation was developed
 - Investments worth approximately 19 million EUR
 - Above nZEB standard: 55 kWh/m²/a and 100% RES supply



PILOT ACTIONS IN CROATIA



- Testing of EPC models for reconstruction of public buildings in accordance with nZEB standards
- Scope of pilot actions had to be expanded as investment was not seen as cost-feasible by ESCOs
- Three pilot buildings:
 - Renovation of Vackor kindergarten
 - Renovation of two swimming pool and sports centre
- Traditional model for realization was selected due to:
 - Underdeveloped ESCO market, prolonged negotiations with ESCOs and lack of experience with development of EPC documentation
 - Several months of downtime due to municipal elections



PILOT ACTIONS IN HUNGARY



- Testing of crowdfunding models for reconstruction of Life-Long Learning centre in accordance with nZEB standards
- Total investment: 120.000 EUR
- The idea of crowdfunding for energy renovation projects was a novelty for public authorities as well as for citizens
- Slovenia lacks proper legislation for crowdfunding and has only one professional crowdfunding platform
- Despite a very well-prepared campaign, the campaign has not reached the pledged amount of money (10.000 EUR) but reactions from citizens were very positive
- Investment was realized with additional funding from the municipal budget



RENOVATION OF THE LIFE-LONG LEARNING CENTER



CONCLUSIONS AND LESSONS LEARNED

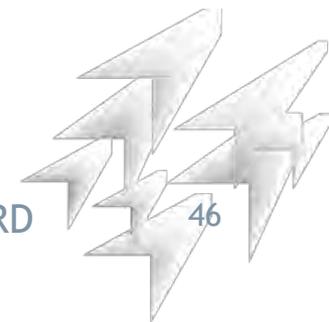
Tools and
feasibility
studies

Trainings

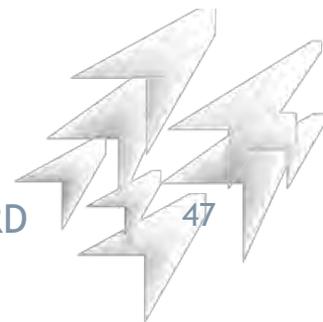
Piloting of
financing
models



- **Development of Tools and feasibility studies:**
 - EPC Tool had to be developed with its future users - checking their actual needs and how they can benefit from it was crucial
 - Central European countries have different nZEB calculation methodologies which makes development of a unified Tool difficult
 - Large number of public authorities do not possess energy certificates of their buildings or they are very obsolete - hard to make energy renovation roadmaps without good energy baselines - EPCs are missed investment opportunities
 - EPC Tool is an excellent starting point for making feasibility studies since nZEB can be reached with different combinations of EE/RES combinations for reaching nZEB

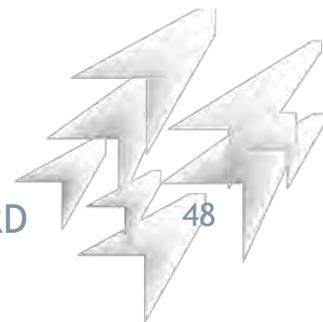


- Development of Tools and feasibility studies:
 - Renovation of existing buildings in accordance with nZEB has proved to be a complex task and more expensive than standard renovation
 - Long term economic benefits (CO2 reduction, increase of comfort, extension of building's lifespan) must be monetized with different calculation methodology (economic vs financial analyses)
 - **Key question:** how will we achieve carbon neutrality with such high costs of renovation and low financial viability?
nZEB/carbon neutrality cannot be reached for all buildings

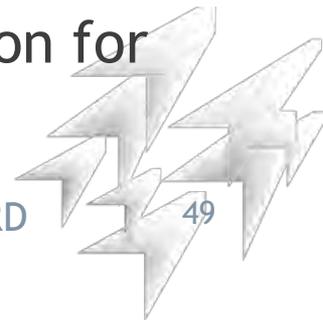


- Trainings:

- nZEB was a novelty in 2017 and to some extent still is for all major stakeholders dealing with (re)construction of buildings
- Architects and civil engineers often lacked capacity to develop technical documentation (feasibility studies and main designs) for reaching nZEB standard
- Lack of long term vision - Public authorities do not see the point of reaching for nZEB standard/going beyond minimum energy saving requirements
- Know-how about innovative financing models in all three pilot countries was quite low and with traditional financing available (primarily large grants), interest from project developers is expected to remain low



- Testing of financing model - Public-private partnership pilot action (PPP)
- PPP legislation in CE countries is mostly set but PPP projects are still missing even with solid track records in certain sectors
- Preparation of PPP is expensive, slow process and presents a huge risk for the public partner - potential sunk cost
- Strong political will from decision makers and general consensus among key stakeholders are needed
- Lack of standardized documentation and national financial support are major obstacles - national PPP programmes are necessary
- High minimum investment size makes PPP models suitable only for larger projects (+5 mil EUR) - bundling of smaller projects is needed
- eCentral's PPP documentation presents a good foundation for further development and replication of PPP models



- Testing of financing model - Energy Performance Contracting (EPC)
- nZEB is very hard to reach with EPC model - requires deep retrofitting which cannot be paid-back just from the energy savings - grant support is needed
- Similar to PPP models, ESCOs are only interested in larger, bundled investments in order to make investments more cost-effective
- Good energy baseline information and info about general condition of building is needed - usually missing due to poor quality of EnPCs
- Low costs of energy are an issue for ESCOs in most Central European countries
- Good examples of national programmes and financial instruments for EPC models exist in certain CE countries (Italy, Slovenia, Austria) and should be replicated



- Testing of financing model - Crowdfunding (CF)
- Extreme differences with market maturity between Central European countries
- Legal framework mostly prohibits public authorities from using crowdinvesting models, even though the interest for civic crowdfunding exists in all countries - a missed opportunity for establishment of participating democratic culture!
- Very low awareness levels of public authorities about crowdfunding in general or lack of trust/scepticism prevails
- Crowdfunding requires a different approach to project development process: involvement of citizens and complete transparency
- Sustainable energy projects show great potential for crowdinvesting models as they generate financial returns and have positive socio-environmental effects



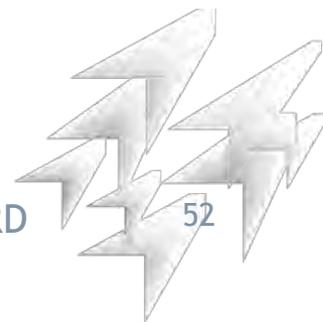
Not yet another soft EU project!



Lasting legacy of the eCentral project:

- **1,7 mil EUR** of direct investments
- **19 mil EUR** worth investments for realization with PPP model
- **20,5 mil EUR** worth pipeline of energy renovation projects

eCentral = a different kind of a soft project, but different in a good way





Thank you for your attention!

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