



GODINA

energetske izvrsnosti

Predefined project – "Establishment of the National Training Center for Nearly Zero Energy Buildings (nZEB)"

Closing Conference of the "Energy and Climate Change" Programme, 13th November 2024, Rovinj



Iceland
Liechtenstein
Norway grants



REPUBLIC OF CROATIA
Ministry of Regional
Development and EU Funds



Main info about PDP-nZEB

- Project Title: Establishment of the national training center for nearly Zero Energy Buildings (nZEB)
- Programme area: Energy and Climate Change (ECC) Programme
- Project Promoter: Energy Institute Hrvoje Požar (EIHP)
- Project Partner: Faculty of Civil Engineering, University of Zagreb (GF)
- Implementing period: 05/2021 - 04/2024
- Funding: 1.6 M€ (100%)

PDP-nZEB objectives

To **enhance knowledge** of the professionals dealing with buildings and raise the awareness among other respective stakeholders regarding all the aspects of the **building retrofit** by adopting innovative technical solutions fitted to the **nZEB** requirements.

Deep energy renovation of the EIHP office building fitting the nZEB standard

Local partnership to enhance knowledge and raise awareness on the nZEB and ZEN retrofit

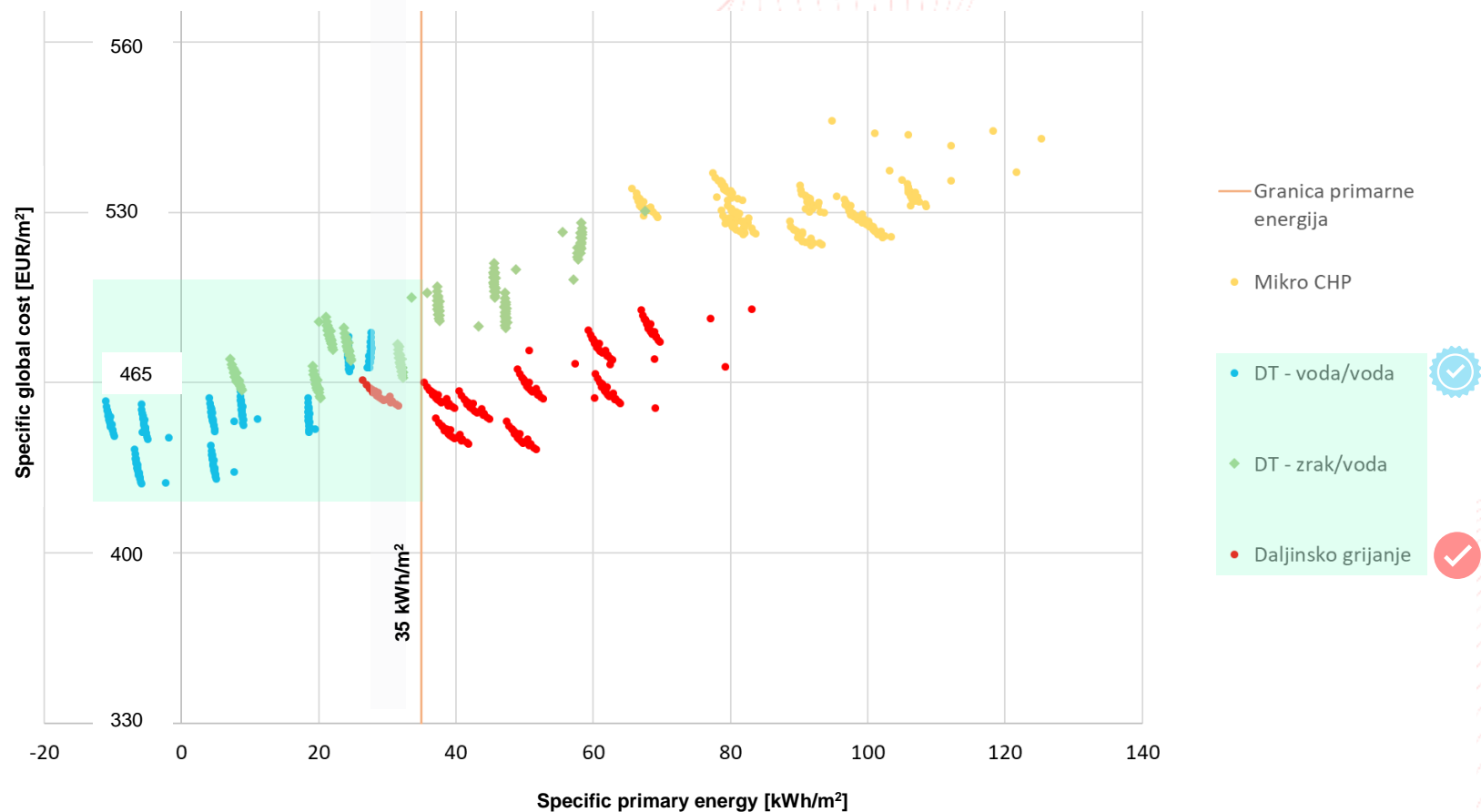


nova
Znanja za
Energiju
Budućnosti

Strengthened the **cooperation** between research institutions in the Republic of Croatia and the Kingdom of Norway

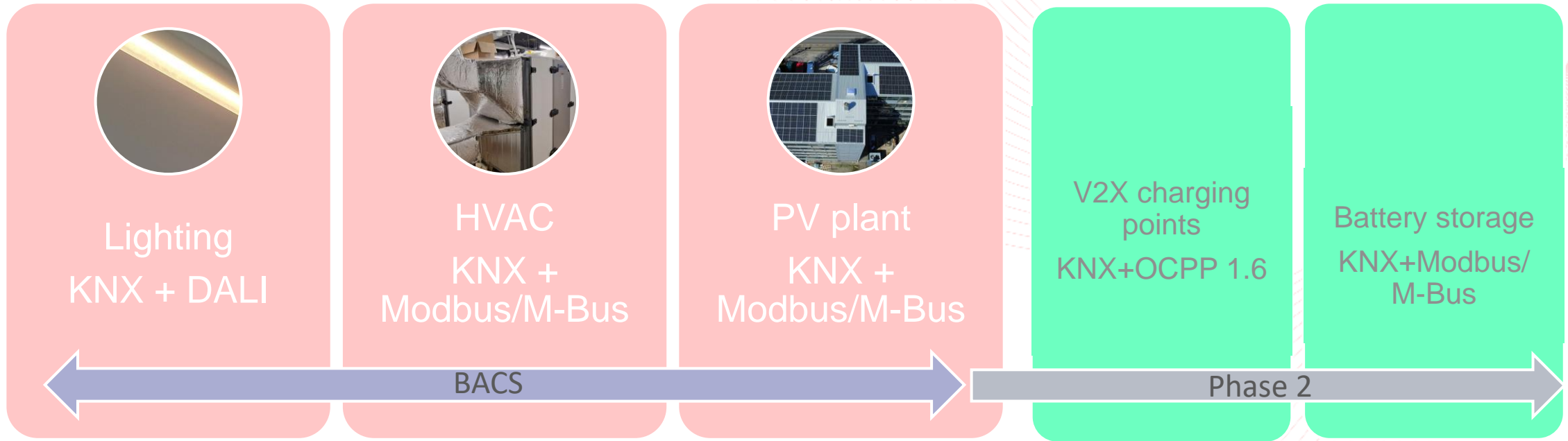
Selection of technical solution for nZEB renovation

Cost-optimal analysis of 782 combinations of measures



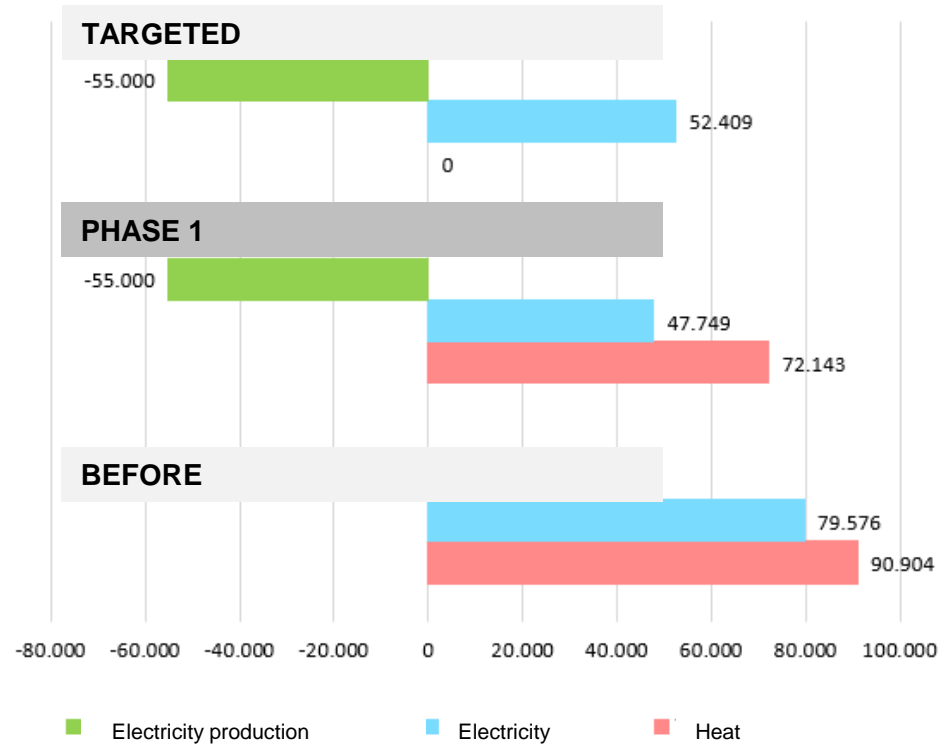
Technical solution for nZEB renovation

Before renovation	After renovation (as designed) – Phase 1	Optimal nZEB solution
$Q_{H,nd}$ 38,66 kWh/m ² a ⇒ B E_{prim} 156,14 kWh/m ² a ⇒ F	$Q_{H,nd}$ 26,27 kWh/m ² a ⇒ B E_{prim} 22,30 kWh/m ² a ⇒ A+	$Q_{H,nd}$ 12,86 kWh/m ² a ⇒ A+ E_{prim} -29,09 kWh/m ² a ⇒ A+

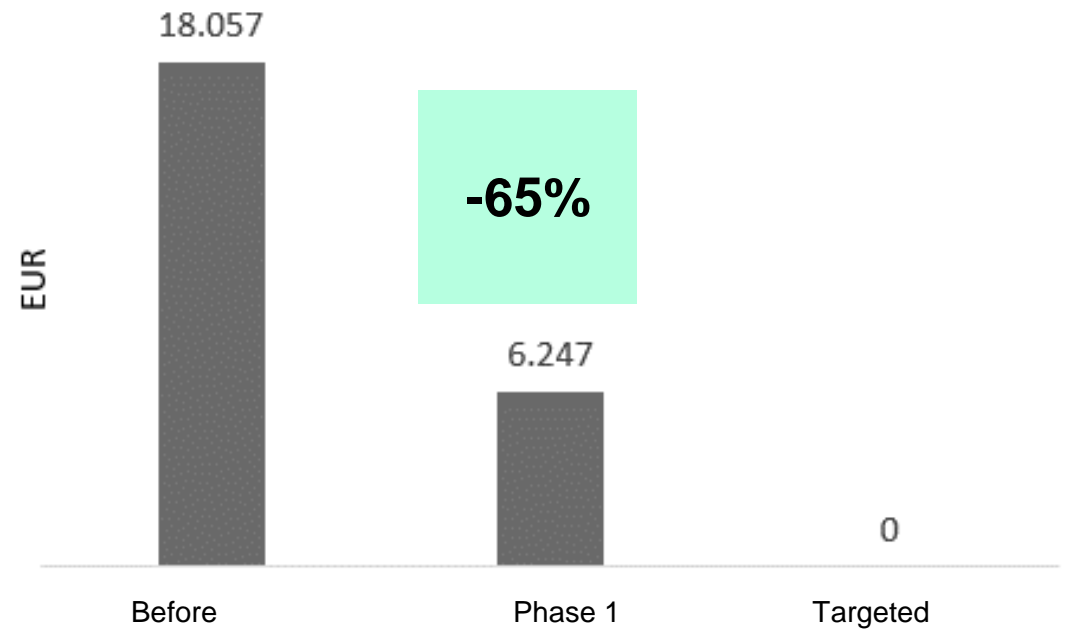


Energy and cost savings

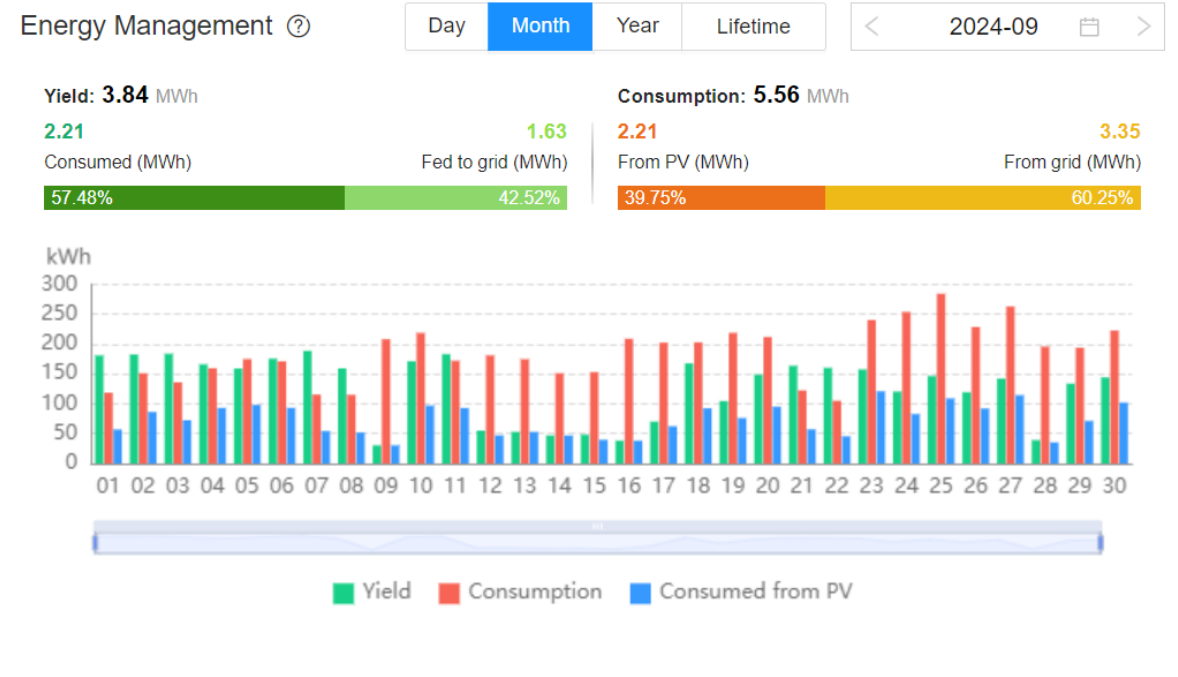
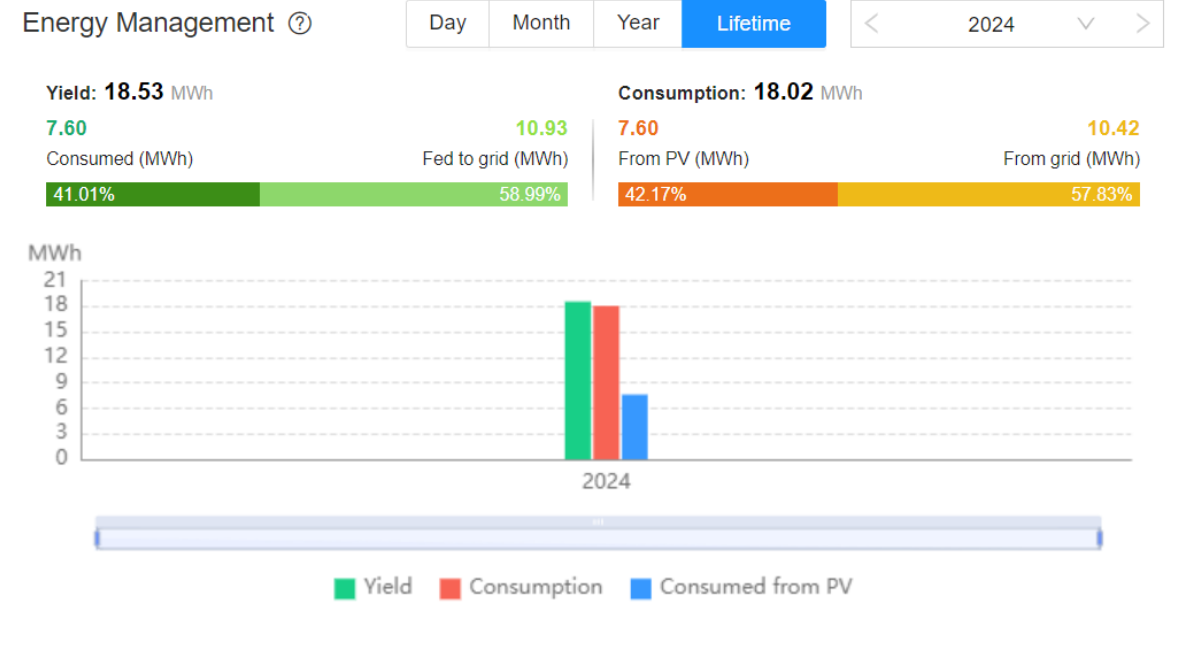
ENERGY CONSUMPTION for heating and cooling



ENERGY COSTS for heating and cooling



On-site electricity production – PV plant 50kW_p

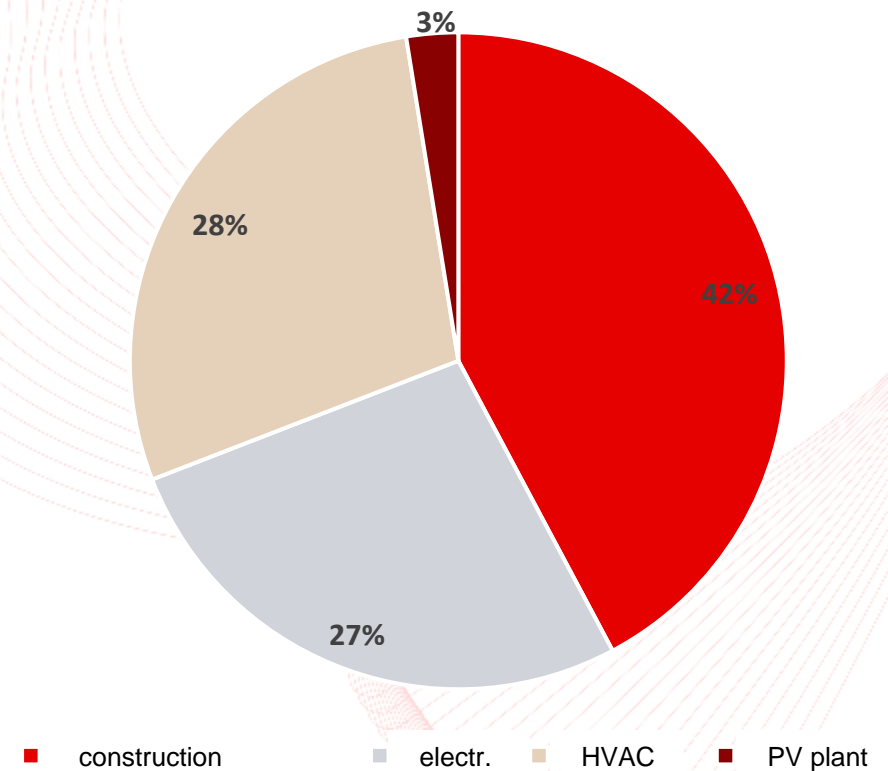


Overview of nZEB renovation costs

Type of works	Contracted €	Additional €	Total €
Construction	397.124,41	414.009,65	811.134,06
Electrical	442.576,88	74.220,15	516.797,03
HVAC	542.147,00	2.324,00	544.471,00
PV plant	48.955,00		
Total	1.430.803,29	438.853,00	1.895.868,44
EEA grant			1.200.000,00
Own funding 37%			695.868,94

Specific costs: **758 €/m²**

DISTRIBUTION OF RENOVATION COSTS

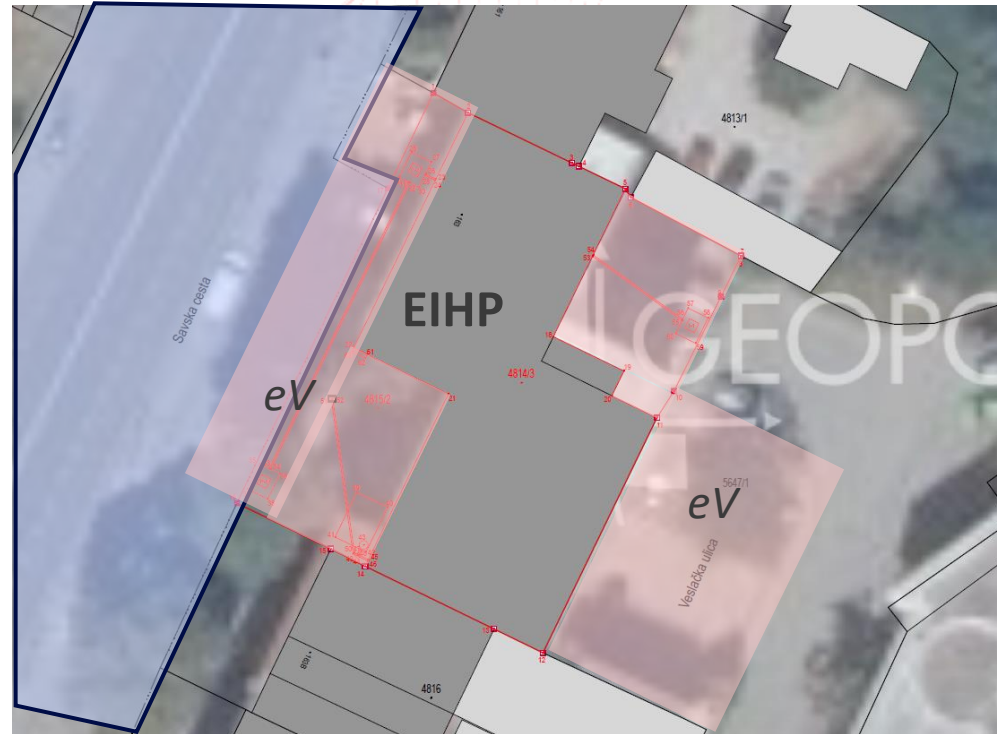


NEXT steps: towards zero emission standard

- Water-water heat pump



- V2G charging infrastructure



- Battery storage
200 kWh



Education and cooperation platform: nZEB training centre

Training programme



MODUL 1

Koncepti i strategije za nZEB



MODUL 4

Sustavi opskrbe energijom u nZEB-u

<https://www.nzebcentar.hr/trening-centar/>



MODUL 2

Kako postići nZEB - iskustva iz provedbe



MODUL 5

Ocjena otpornosti i ranjivosti zgrada



MODUL 7

Energetsko modeliranje zgrade



MODUL 3

Upotreba naprednih materijala



MODUL 6

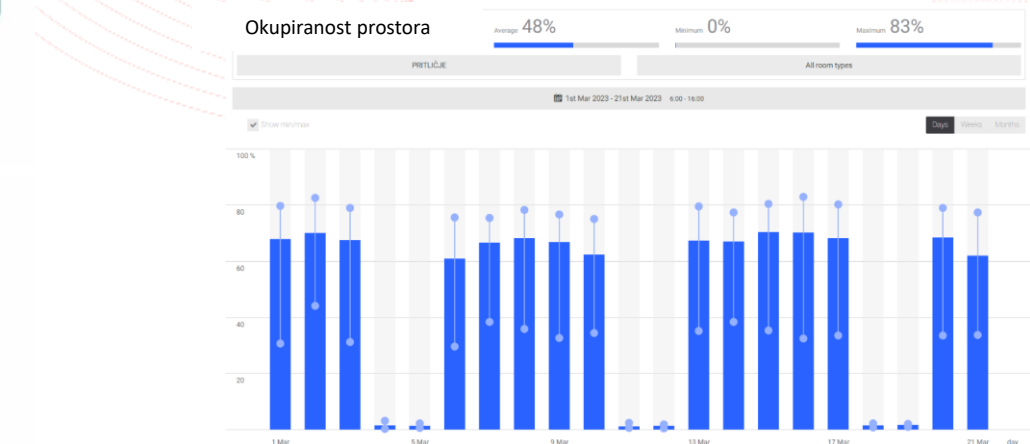
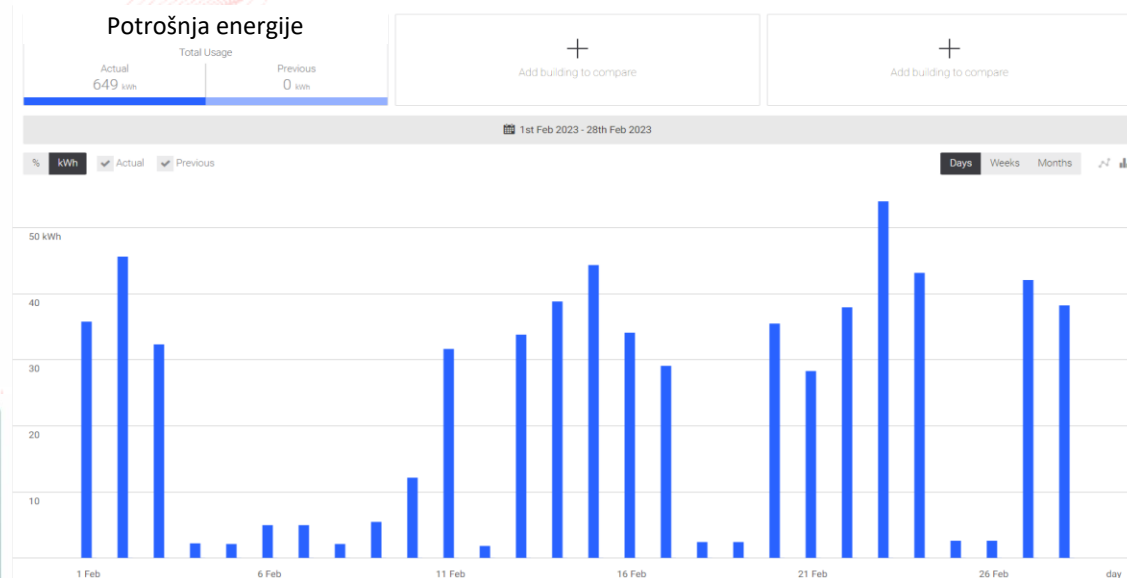
Kolaborativni BIM za postizanje nZEB-a



MODUL 8

nZEN - od zgrade do susjedstva

Living Lab



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Thank you for your attention!