Webinar2
March 1^{st}, 2022
10 a.m. until 11:30 a.m.

Store4HUC Energy management Tools

Store4HUC

Agenda

10:00- 10:05 Welcome and Opening words
[Katja Karba, Development agency Sinergija]

10:05- 10:25 Autarky Rate Tool
[Robert Pratter, 4ward Energy Research Ldt.]

10:25- 10:45 Optimal Sizing Calculator
[Filip Rukavina, University of Zagreb]

10:45- 11:05 Optimal Heat Source Scheduler
[Filip Rukavina, University of Zagreb]

Agenda

11:05- 11:30 Pilot action results
[Andrea Dornhofer, Energy and Innovation Centre of Weiz]
[Martina Krizmanić Pećnik, North- West Croatia Energy Agency]
[Elisa Marino, City of Cuneo]
[Štefan Žohar, Development agency Sinergija]

Questions and Answers

Implementation of a thermal storage in the historical urban city of WEIZ

Store4HUC - PP3 – W.E.I.Z. - Energy and innovation Centre of Weiz

CITY OF WEIZ

Inhabitants:
2019: 11.701
(2017: 11.508)

Employed persons:
2017: 11.994

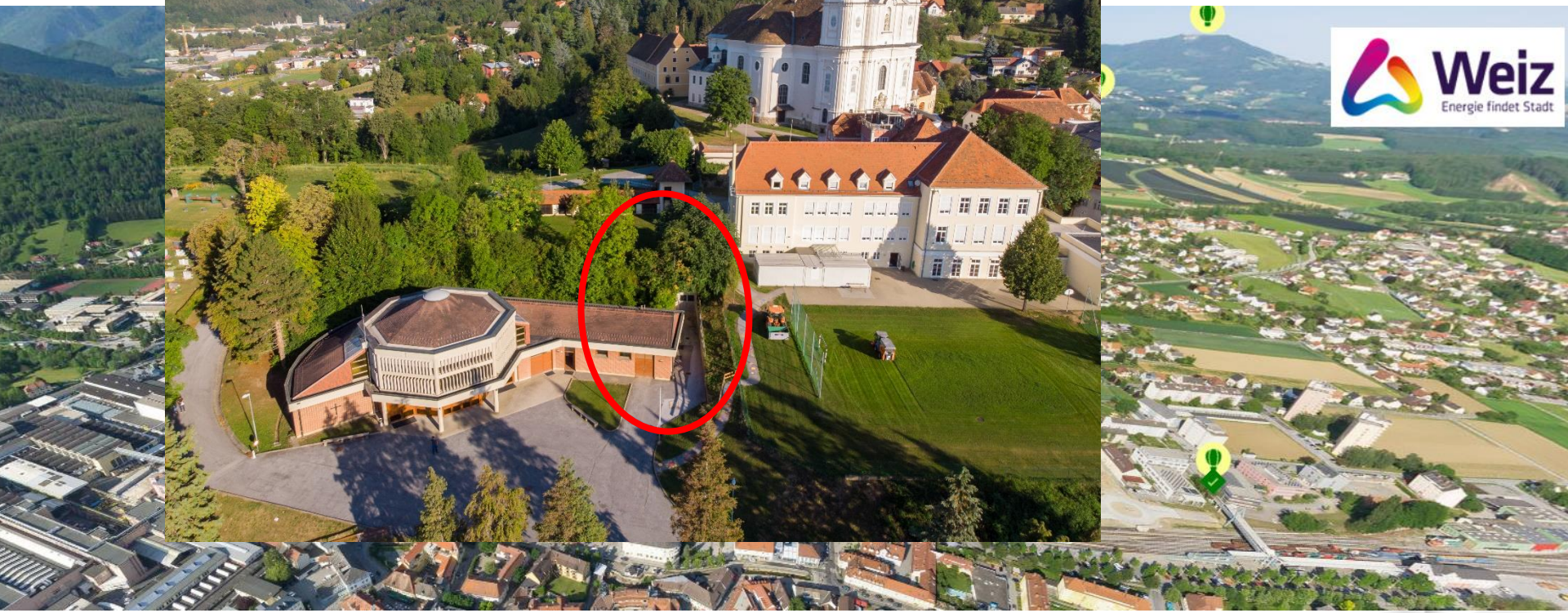
Main Strategies:
City – for living!
City – full of Energy!

Source: http://www.innovationszentrum-weiz.at/360-grad-weiz

PILOT WEIZBERG

Location Weizberg – historic monument and landscape protec

Pilot: B



Source: http://www.innovationszentrum-weiz.at/360-grad-weiz

INVESTMENT SPECIFICATION OF THE INTEGRATION OF AN ENERGY STORAGE IN HUCS FOR WEIZ

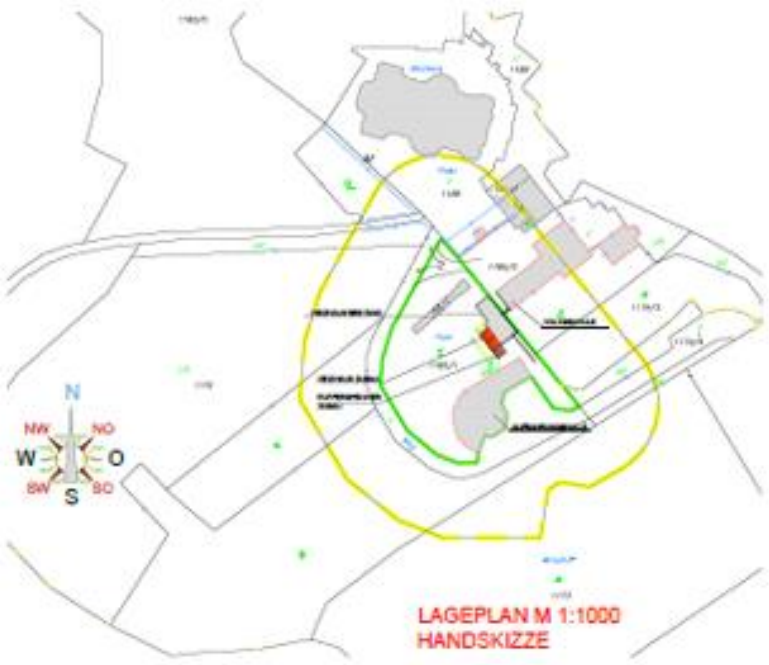
- Old church at Weizberg was built in 1065 by the lords of Radmansdorf
- In November 1758 the new building was completed
- Since 2019 the Weizberg church is a basilica
  - Basilica church is under monumental protection
  - Biomass heating plant Weizberg is working insufficient
    - Too high fuel consumption
    - Too high emissions (CO, NOx, dust and volatile unburned CnHm)
- **Challenge - of finding an innovative solution**
  - Implement a central thermal energy storage tank in connection with decentralized hot water storage tanks
    - Decrease fuel consumption & emissions
    - Increase EE & RES

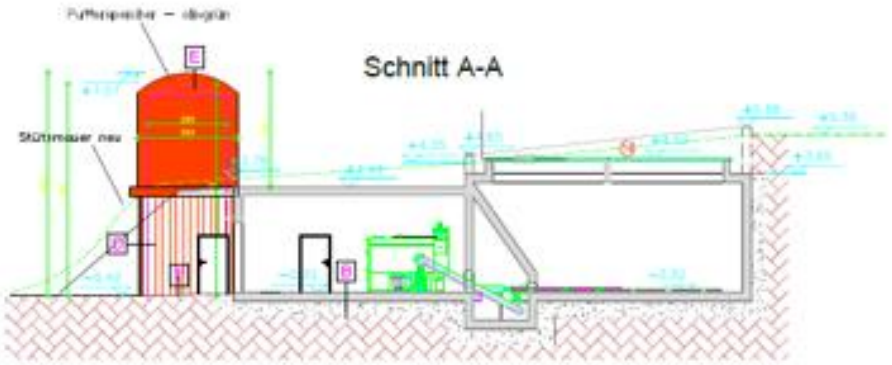
Biomass heating plant Weizberg

- Built in 1999
- Heat supply for 12 consumers is ensured by two biomass boilers fired with regional wood chips (1500 MWh/a)
- Largest consumers
    - Hotel, parish, primary school
    - Requirements concerning monumental protection

INVESTMENT SPECIFICATION OF THE INTEGRATION OF AN ENERGY STORAGE IN HUCS FOR WEIZ

- Protection of the landscape presupposes that **landscape is not changed or threatened by the construction** of the storage tank
- The zone marked in red show **minor structural measures**, as well as the uppermost part of the water buffer tank will reach out of the ground, but **not or only barely visible for visitors of the basilica**, as it is covered by bushes and the parish buildings





Source: W.E.I.Z. 2019

But we have also other good news !

- The **building phase started in February 2020** and **was completed** with the installation of the water buffer storage tank **at the end of June 2020.**

INVESTMENT SPECIFICATION OF THE INTEGRATION OF AN ENERGY STORAGE IN HUCS FOR WEIZ

Costs categories	Costs [€]
Storage	55.633,75
Heating pipes	44.687,49
Regulation	18.961,07
Electrical installation	19.251,60
Emergency heating station and water treatment	15.466,15
Construction costs	116.174,56
Planning and tendering	22.227,90
Total excluding VAT	292.402,53

Source: W.E.I.Z. & AEE Intec 2019

KPI	Initial situation	After the pilot action
External energy needs (kWh/year)	1930 m^3	1939m^3
External energy cost (€/year)	125€/t	125€/t
CO_2 emissions (t/year)	29,34t	29,01t
Autarky rate (%)	100%	100%
Use of energy from RES (kWh/year)	1833,500 kWh	1812,965 kWh
Hours without service interruptions/discomforts	8692,17 h	8729,75 h
Average power peak (kW)	479 kW	409 kW

As construction is finished

THANK YOU

https://www.youtube.com/watch?v=L3DyPew9t2s

D.C.6.1 and D.C.6.6: WEBINAR, 1.3.2021

Implementing photovoltaic plants and storage systems at the Manor Bračak in Croatia

Martina Krizmanić Pećnik

CROATIA - THE MANOR BRAČAK

Cultural heritage Building with new technologies:

- Built in 1889.
- In 2017. reconstructed and restored in accordance with best practices in renewing heritage on the principle of energy efficiency.
- Restored to the highest standards of energy efficiency.
- Used as central place for organizations, companies and institutions interested in renewable energy.
- It also serves as business incubator for young companies.

BACKGROUND OF THE PILOT

Building insulation

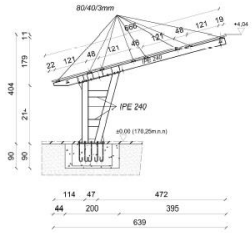
- Internal wall insulation
- Energy efficient windows and doors

HVAC system

- Wood pellets boiler
- Micro CHP - Combined Heat and Power
- Air-water heat pump
- Heat recovery ventilation system

- Efficient lighting system

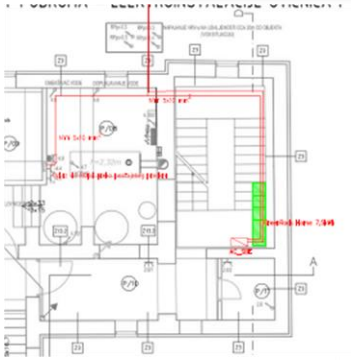
Photovoltaic System

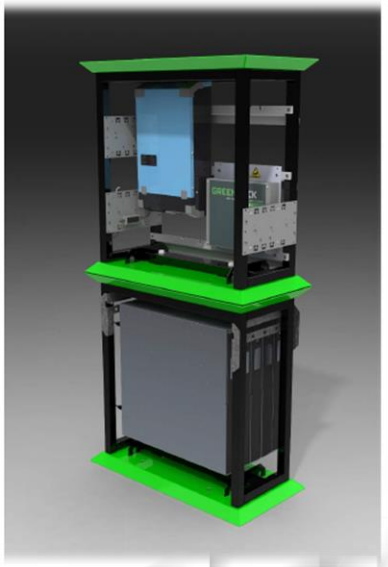


- Location - parking lot
- Steel canopy covers three parking spaces
- **10,8 kWp**
- Overall, 36 installed PV modules on site (300 Wp/module)
- Monocrystalline PV modules
- 36 microinverters
- Grid-connected PV (surplus goes to battery and grid)
- Roof surface ~ 60m2
- Projected production ~ 11 MWh annually

Battery System

- Inside the building (under the stairs)
- GREENROCK Carbocap battery system
- 8 kWh capacity
- LTO cell (lithium titanate) – a modified version of the lithium-ion cell with a longer lifespan
- 20.000 cycles (3 times longer than other battery technologies)
- Safe (non-combustible, non-flammable, non-explosive)
- Efficiency >95%
- Depth of discharge (DoD) 90%
- A source of electricity at a time when there is no sun





ELECTRICITY CONSUMPTION AND PRODUCTION - SAVINGS

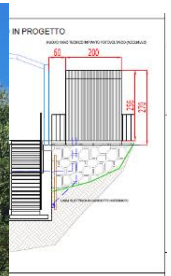
- Production 11,340.00 kWh per year
- Electricity consumption energy at the billing metering point - average of 20,500.00 kWh per year
- 55% less

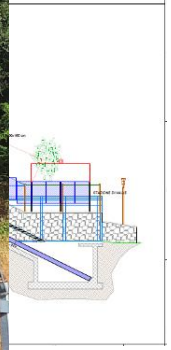
D.C.6.1 and D.C.6.6: WEBINAR, 1.3.2021

Italian pilot intervention on the energy efficiency of the sloping elevator in the City of Cuneo

Store4HUC | City of Cuneo | Elisa Marino

THE PILOT ACTION IN CUNEO





PILOT ACTION SPECIFICS

Pilot action, energy efficiency oriented, consists of →

- PV plant installation along the runway of the elevator
- Storage unit + inverter = storage system
- Technical room for hosting all electric equipment
- Underground cable ducts

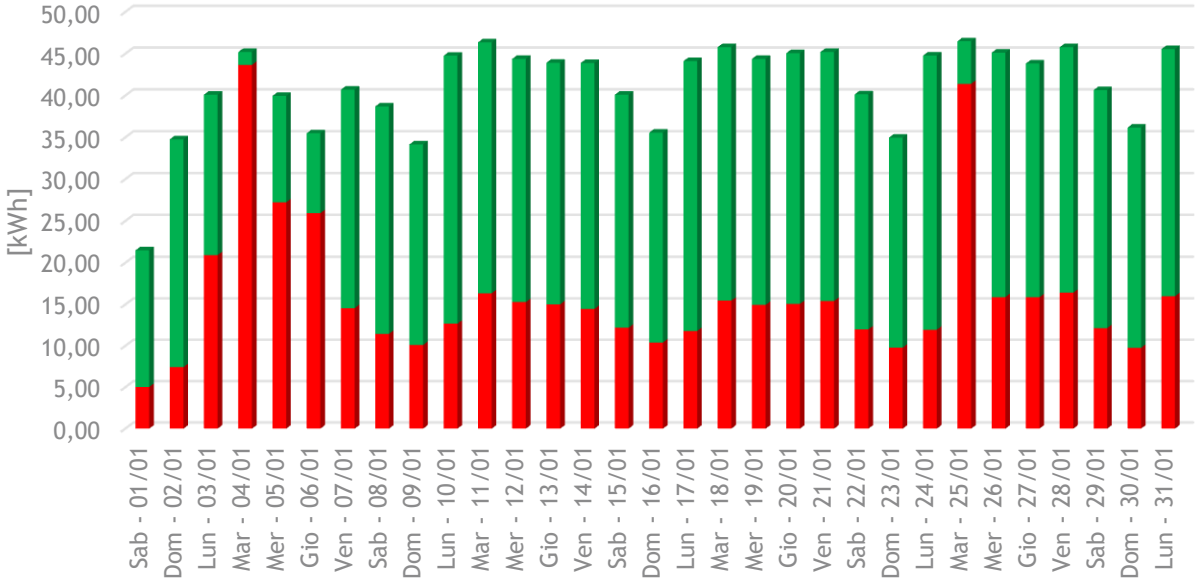
↓

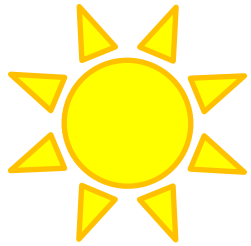
Reduce the consumption of energy from the public grid and make the system as most independent from it as possible, optimizing the energy sources management

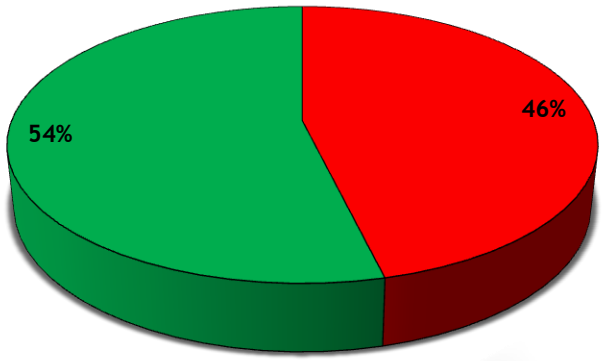
PILOT ACTION TESTING RESULTS

Testing period: 20 October 2021 – 19 February 2022

- **54% auto-production** of energy coming from the PV plant/storage
- **46% energy** provided by the public grid





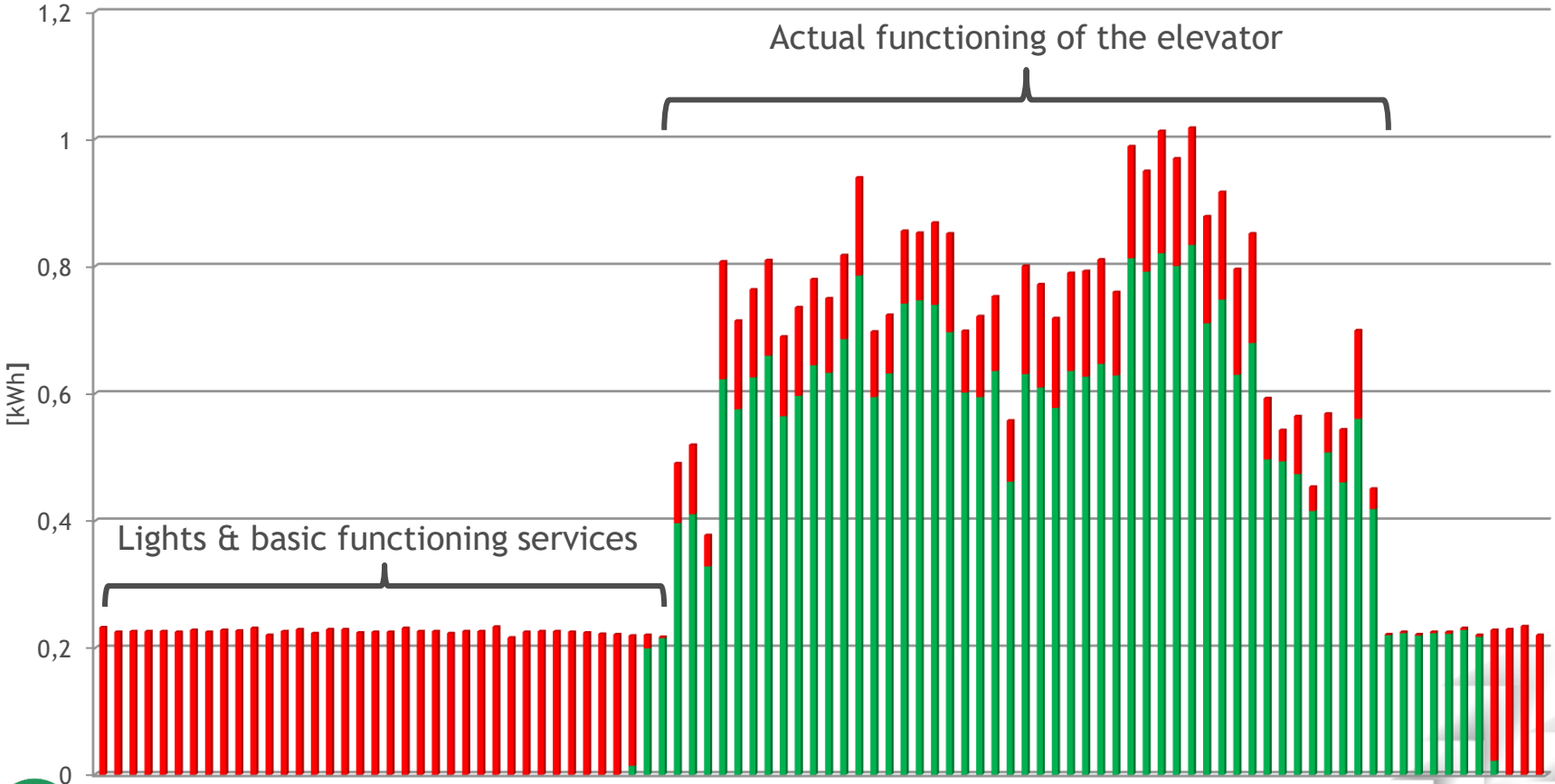


PILOT ACTION TESTING RESULTS

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
STORE4HUC

Testing period: 20 October 2021 – 19 February 2022

Daily consumption example



FORECASTS FOR THE FUTURE

At least 60% of the total energy consumption of the elevator will be provided by the PV plant during Spring and Summer months

Thank you for your attention!

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PP07 – City of Cuneo - Store4HUC

https://www.interreg-central.eu/Content.Node/Store4HUC.html

Second Store4HUC WEBINAR

1st of March 2022

Paraffin based latent storages in connection with geothermal district heating system in Lendava

Store4HUC, Štefan Žohar (DA Sinergija)

PILOT IN LENDAVA (SI)

Paraffin based latent heat storage system in connection with the geothermal DHS

Aim: to change fossil fuel with RES, reduction of consumption (4.000 kWh/a or 3%) and CO_2 emission (22 t/a) and the costs for heating; use of innovative solution

Target groups: municipality/public (transferable to private sector)

Challenge: low temperatures in the geothermal DHS - purchase of a suitable material (PCM material, storages)

Transferability: unique in Slovenia - to areas with the geothermal potencial, or combined with the biomass heating system

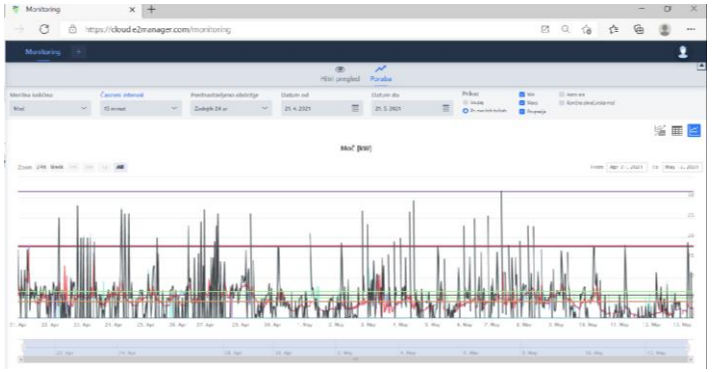
Sustainability: in accordance with the current *LEC* and *SEAP*, maintenance is ensured by the municipality - owner of the infrastructure

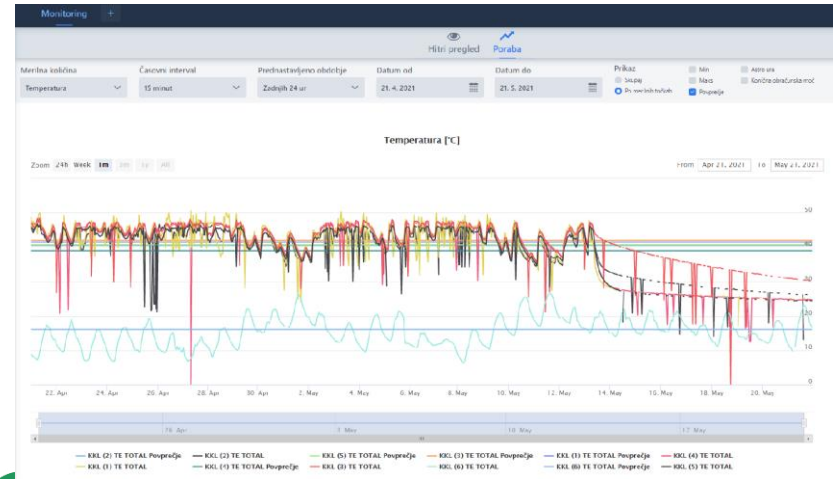
1. **investment:** Pipelaying and connection of the building to the geothermal network
2. **investment:** Installation of the storage system and PCM material

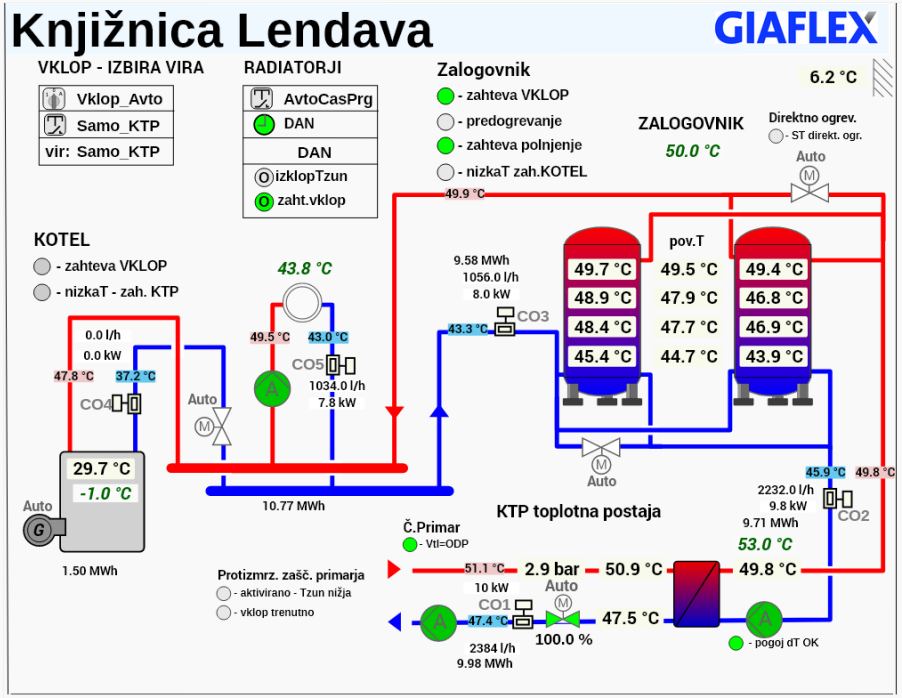
Progress: Investment is FINALISED; Monitoring process IN PROGRESS

Installed central control system for pilot in Lendava

The testing and monitoring works are still running …







PILOT IN LENDAVA (SI)

… RESULT´s !!!

KPI	ENERGY NEEDS	ENERGY COST´s	CO_2	AUTARKY RATE	RES SHARE	SUPPLY SECURITY	POWER PEAK	PROFITIBILITY	LOCAL ECONOMY
	kWh	EUR	t CO_2	%	kWh	-	kWh	-	-
Pre-investment status	84.351	8.460,45	23,53	0	0	99	22,25	n/a	n/a
Target (prediction)	80.133	5.272,93	0	0	0	100	16,5	1,49	0,48
Status quo (after pilot implementation)	69.930	2.102,42	0	0	0	100	21,6	1,99	0,48