



CONCERTO project in Galanta

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STATE OF THE ART AND BEYOND

Structure of the demonstration site

Municipality of Galanta

WP 3.3 –
Retrofitting
and Energy
Efficiency
Measures

WP 4.3 –
System
Integration

Galantaterm, Ltd.

WP 2.2 –
Geothermal
system
development

Bysprav, Ltd.

WP 3.3 –
Retrofitting
and Energy
Efficiency
Measures

WP 4.3 –
System
Integration

Realized activities

Municipality of Galanta

WP 3.3 – Retrofitting and Energy Efficiency Measure

- This activity is aimed on elementary school Gejzu Dusika which is heated from the geothermal source
- Due to higher than expected budget, this activity was divided into two phases (each phase a year)
- Technical specifications:
 - 6 cell plastic insulated frames with $U_f = 1,1 \text{ Wm}^{-2}\text{K}^{-1}$
 - Insulated double glazing 4 – 16 - 4 mm with $U_g = 1,1 \text{ Wm}^{-2}\text{K}^{-1}$
 - Overall U-value of the windows and doors: $U_w = 1,3 \text{ Wm}^{-2}\text{K}^{-1}$
 - According to pre-implementation studies, this activity could achieve a saving up to 30%

Before realization



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Retrofitting works



After realization – GEOCOM measure



Realized activities

Municipality of Galanta

WP 4.3 – System Integration

- **Small scale photovoltaics** - The annual energy performance of the system by is 4,86 kWp, which means annual energy gain of 4761 kWh. The PV is mounted on the roof of elementary school Gejzu Dusíka.
- **Lighting system renewal** - a comprehensive audit was realized. The result of the audit that can be achieved: energy savings of 23,7 %, what means 51 429 kWh savings per year. With the recent price rates it means 6 172 € of savings per year on the electricity costs. THIS ACTIVITY IS NOT FINISHED YET

Photovoltaics on elementary school Gejzu Dusíka



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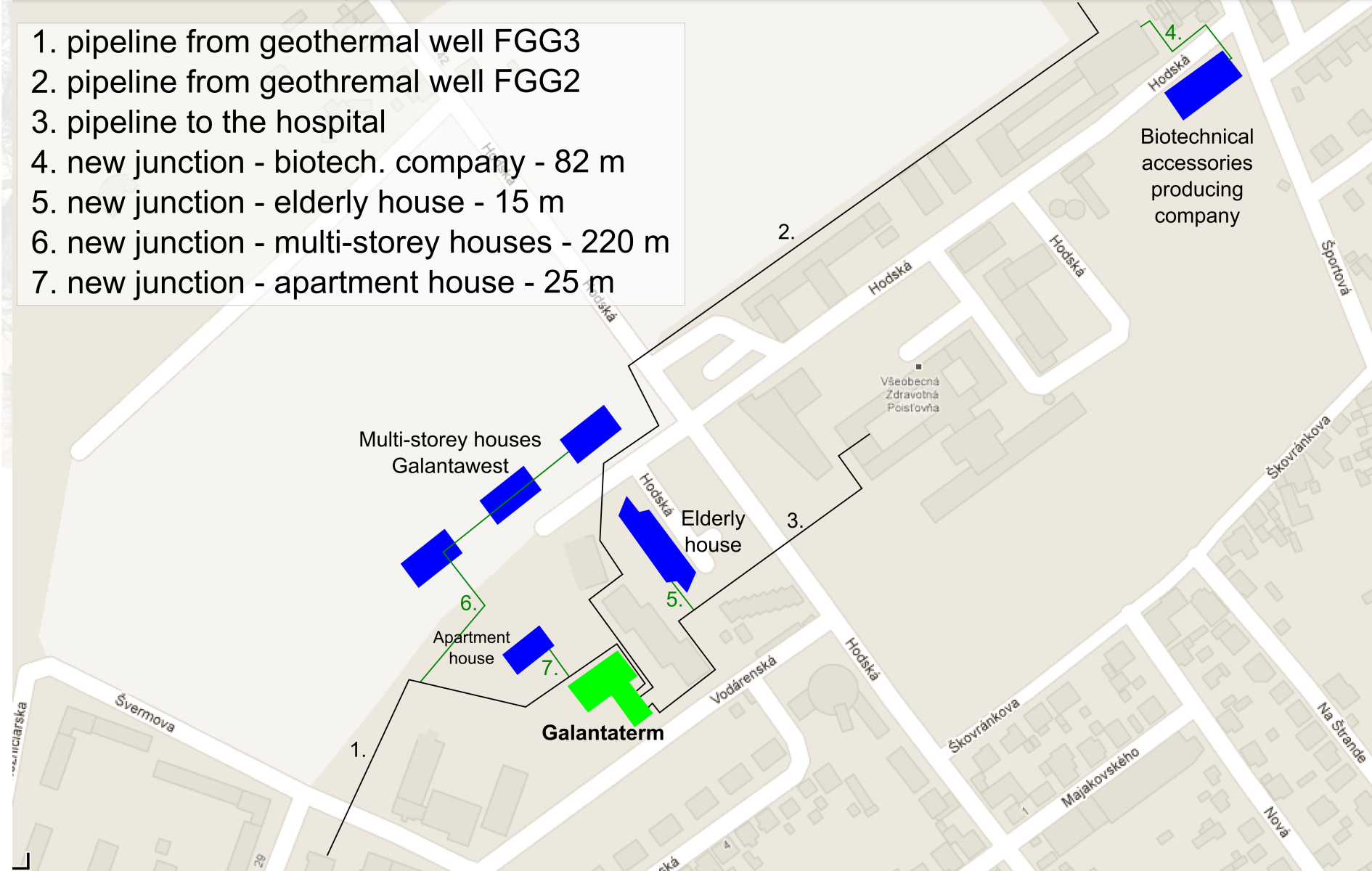
Realized activities

Galantaterm, Ltd.

WP 2.2 – Geothermal System Development

- Enhanced geothermal energy using for heating and DHW producing
- New buildings connected to the geothermal system
- Free capacity is a result of retrofitting
- Project documentation of a geothermal reinjection well

1. pipeline from geothermal well FGG3
2. pipeline from geothermal well FGG2
3. pipeline to the hospital
4. new junction - biotech. company - 82 m
5. new junction - elderly house - 15 m
6. new junction - multi-storey houses - 220 m
7. new junction - apartment house - 25 m



RESULTS – GEOCOM measure Galantaterm, Ltd.

New junction features

Providing heat from the geothermal source	YES
Providing DHW from the geothermal source	YES
Delivery period per year	365 days
Delivered heat (in GJ)	7 144 GJ
Delivered heat (in kW)	1 955 kW
Replaced consumption of natural gas (in m3)	236 969 m3/year
CO2 reduction due to geothermal source usage (in t)	442 t/year
Pipeline length (in m)	approx. 2 x 342 m
Budget of the junction	up to 150 000 EUR



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Realized activities

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WP 3.3 – Retrofitting and Energy Efficiency Measures

- 3 geothermal heated multi-storey houses were retrofitted
- Overall budget after the public procurement:
 - Česká 1437: 220 916,19 EUR
 - Mierova 1436: 226 375,01 EUR
 - Železničarska 1432: 218 715,01 EUR

WP 4.3 – System Integration

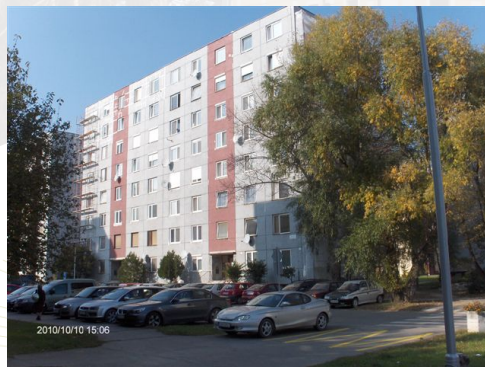
- Photovoltaics mounted on each retrofitted multi-storey house
- Peak performance of each PV: 2,16 kWp
- Annual energy gain up to 2160 kWh

WP 3.3 – Retrofitting and Energy Efficiency Measures

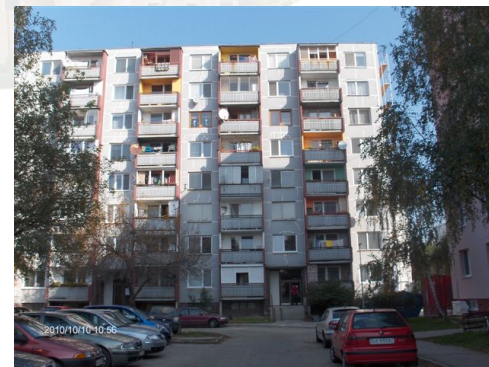
Situation Before the Retrofitting



Mierová 1436



Česká 1437



Železničarska 1432

External walls on the facing - 300 mm aerated concrete boards; **shield** - 150 mm reinforced concrete boards.

Roof - 250 mm aerated concrete panels, 2 x 40 mm basalt wool and 150 mm concrete panel boards on the ceiling.

Loggias - prefabricated reinforced panel boards. Set-out is approx. 1,2 m.

Doors and windows at the common spaces - not insulated, made by a single glass and steel frame.

Retrofitting Features



Mierová 1436



Česká 1437



Železničarska 1432

Doors and windows at the common spaces - replacement for double glass with vacuum insulation, U-value: 1,1 W/m² x K, 5 cell plastic and aluminium frame

Facade insulation - 70 mm EPS polystyrene till 22,5 m height; 70 mm rockwool above 22,5 m height

Ceilings of the common spaces - insulation - 70 mm EPS polystyrene

Ceilings of the cellars - insulation - 50 mm rockwool

Roof insulation - 100 mm XPS polystyrene, roof foil and geotextile separation layer

Machinery room insulation (above the roof) - 40 mm XPS polystyrene, roof foil and geotextile separation layer

Plinths insulation - 30 mm XPS polystyrene

Loggias insulation - 40 mm XPS polystyrene



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Situation After Retrofitting

Multi-storey house on Česká 1437



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Situation After Retrofitting Multi-storey house on Česká 1437



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Situation After Retrofitting Multi-storey house on Česká 1437



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Situation After Retrofitting

Multi-storey house on Mierová 1436



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Situation After Retrofitting

Multi-storey house on Mierová 1436



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Situation After Retrofitting

Multi-storey house on Mierová 1436



Situation After Retrofitting

Multi-storey house on Železničarska 1432



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Situation After Retrofitting

Multi-storey house on Železničiarska 1432



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Situation After Retrofitting

Multi-storey house on Železničarska 1432



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Situation After Retrofitting

Multi-storey house on Železničarska 1432



Energy Performance Evaluation Before Retrofitting

Conditions before retrofitting

Construction element	U-value	
	Before retrofitting	Requirement according to Slovak technical standard 73 0540:2002
Ceiling of the cellar	1,11	0,75
Gable wall	0,69	0,46
Facing wall	0,77	0,46
Roof	0,37	0,30
Windows of the common spaces	3,00	2,00
Doors of the common spaces	6,00	2,00
Wall of the entrance	3,04	0,80

Energy Performance Evaluation Before Retrofitting

Comparison of heat requirements

Multi-storey house	Heat requirement of the building (kWh/y)	Heat loss of the building (W/K)	Standardized heat requirement on m ² (kWh/m ² x y)
Česká 1437	254 452,00	4331,67	77,98
Mierová 1436	256 601,00	4377,03	77,98
Železničiarska 1423	196 132,00	3521,82	75,71



Energy Performance Evaluation – U-values After Retrofitting

Conditions after retrofitting

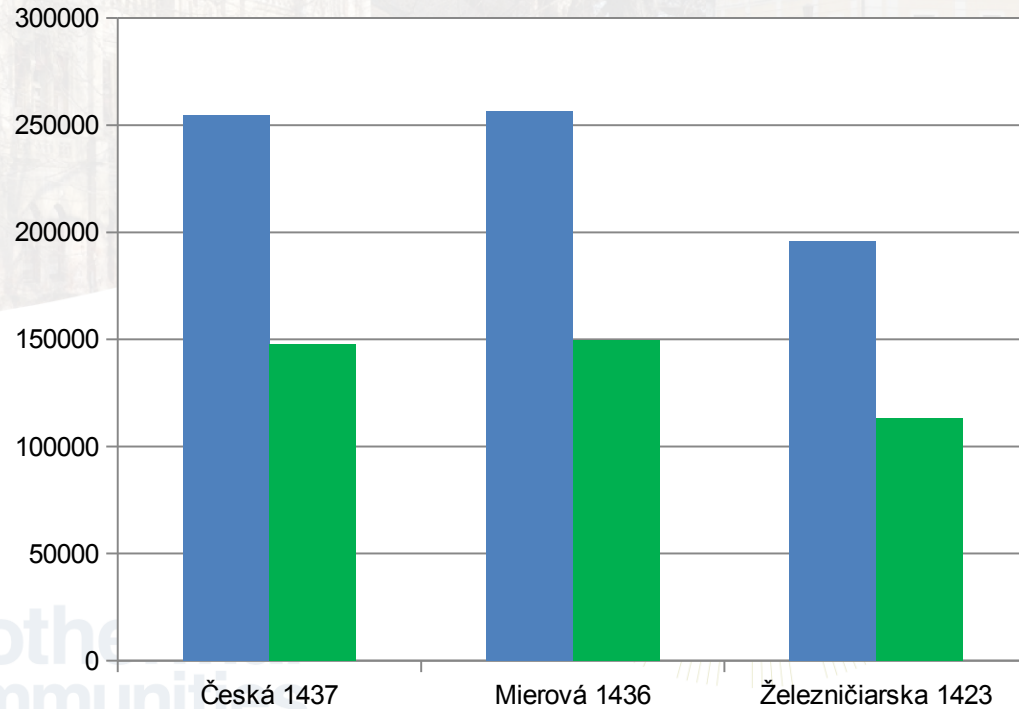
Construction element	U-value		
	Before retrofitting	After retrofitting (proposed condition)	Reduction in %
Ceiling of the cellar	1,11	0,49	55,86 %
Gable wall	0,69	0,31	55,07 %
Facing wall	0,77	0,32	58,44 %
Roof	0,37	0,18	51,35 %
Windows of the common spaces	3,00	1,50	50,00 %
Doors of the common spaces	6,00	1,50	75,00 %
Wall of the entrance	3,04	0,69	77,30 %

Energy Performance Evaluation After Retrofitting

Comparison of heat requirements

Multi-storey house	Heat requirement of the building (kWh/y)	Heat loss of the building (W/K)	Standardized heat requirement on m2 (kWh/m2 x y)	Heat requirement savings due to retrofitting (kWh/y)	Heat requirement savings due to retrofitting (%)
Česká 1437	147 683,00	3 031,51	49,22	106 769,00	41,96
Mierová 1436	149 831,00	3 076,87	49,94	106 770,00	41,60
Železničiarska 1423	113 278,00	2 512,89	41,85	82 854,00	42,24

Energy Performance Evaluation Comparison of Heat Requirement

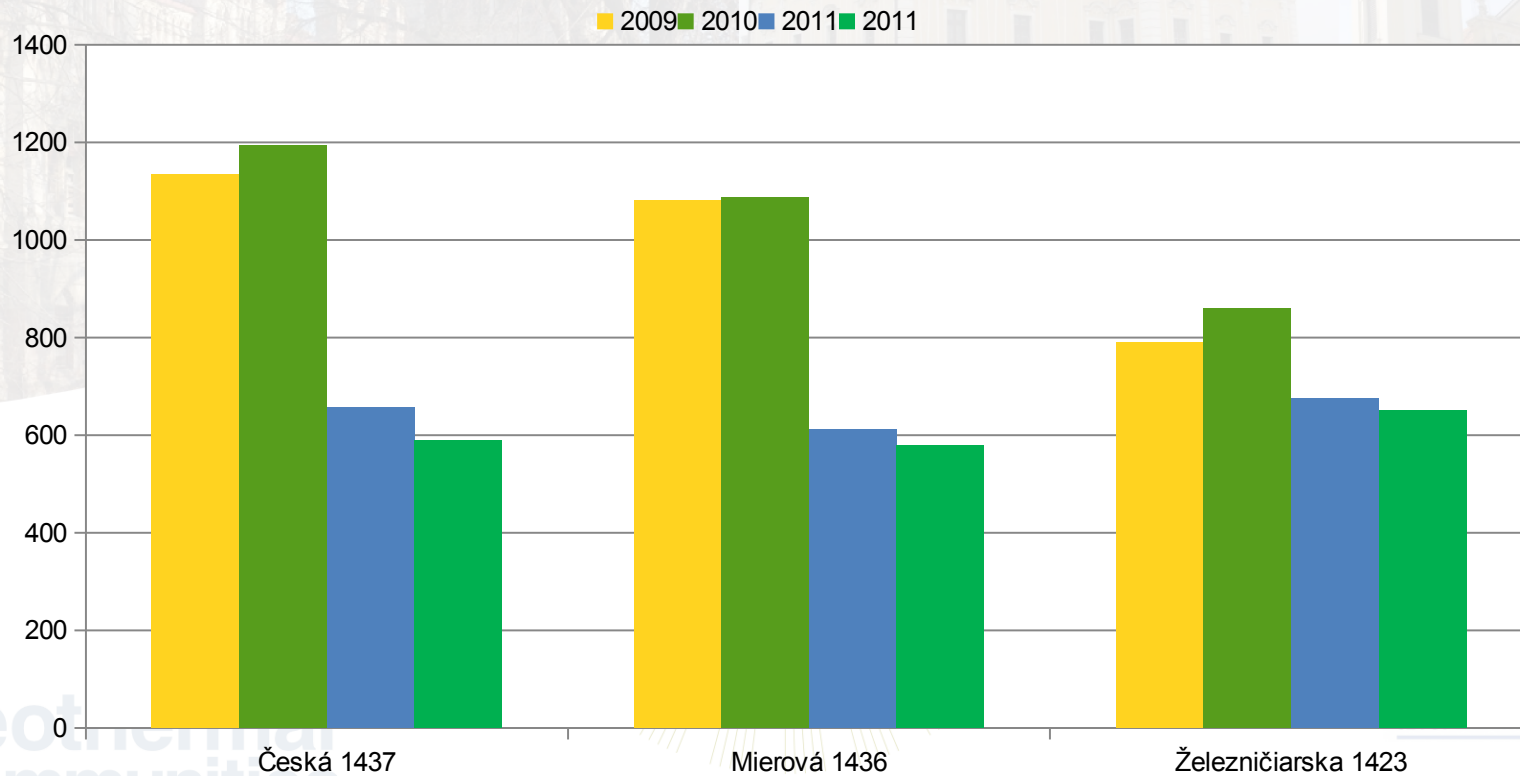


■ Heat requirement before retrofitting
■ Heat requirement after retrofitting



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Monitored Energy Performance Comparision of Heat Consumption (in GJ)



Summary of WP results

Results of WP:

- Total heat requirements decrease by: 296 393 kWh/y, what means 1067,01 GJ/y - more than the annual heat requirement for a whole multi-storey house before retrofitting,
- At the recent price level of geothermal heating it means: 14 874,12 € savings of district heating per year,
- Savings per household: 3087,43 kWh/y what means 155,00 €/y

The real results will be delivered from the audit of the building and from the monitoring of the project.



Thank You for attention



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