

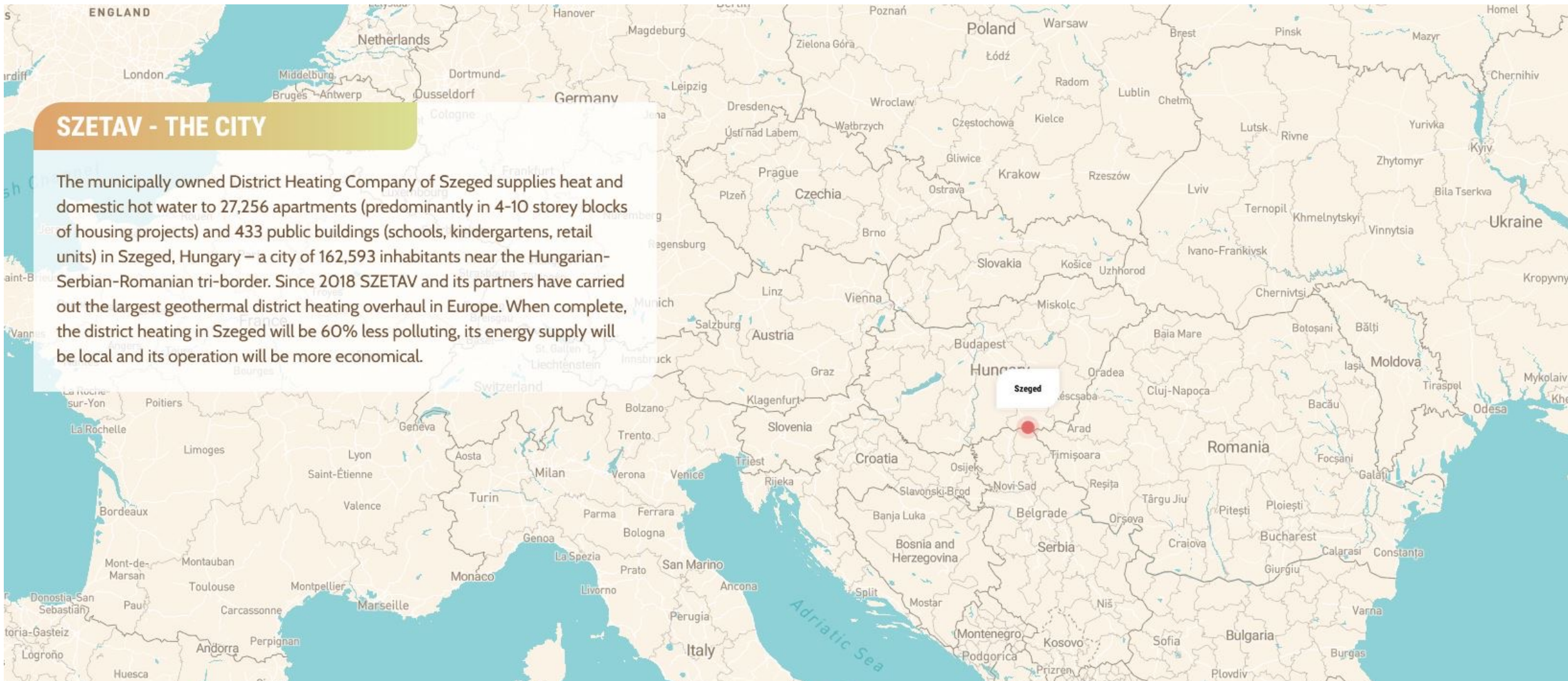


# Switching the district heating of Szeged to Geothermal



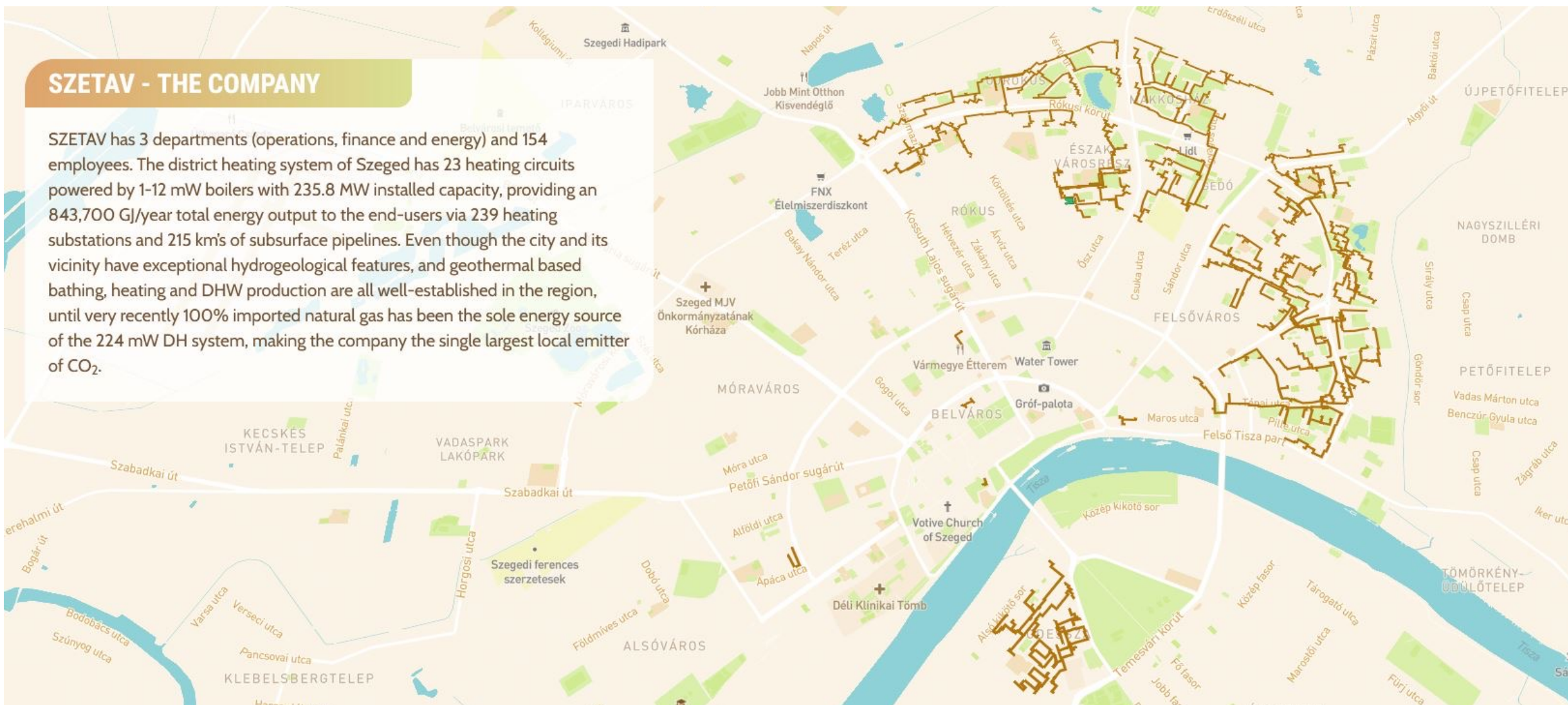
## SZETAV - THE CITY

The municipally owned District Heating Company of Szeged supplies heat and domestic hot water to 27,256 apartments (predominantly in 4-10 storey blocks of housing projects) and 433 public buildings (schools, kindergartens, retail units) in Szeged, Hungary – a city of 162,593 inhabitants near the Hungarian-Serbian-Romanian tri-border. Since 2018 SZETAV and its partners have carried out the largest geothermal district heating overhaul in Europe. When complete, the district heating in Szeged will be 60% less polluting, its energy supply will be local and its operation will be more economical.



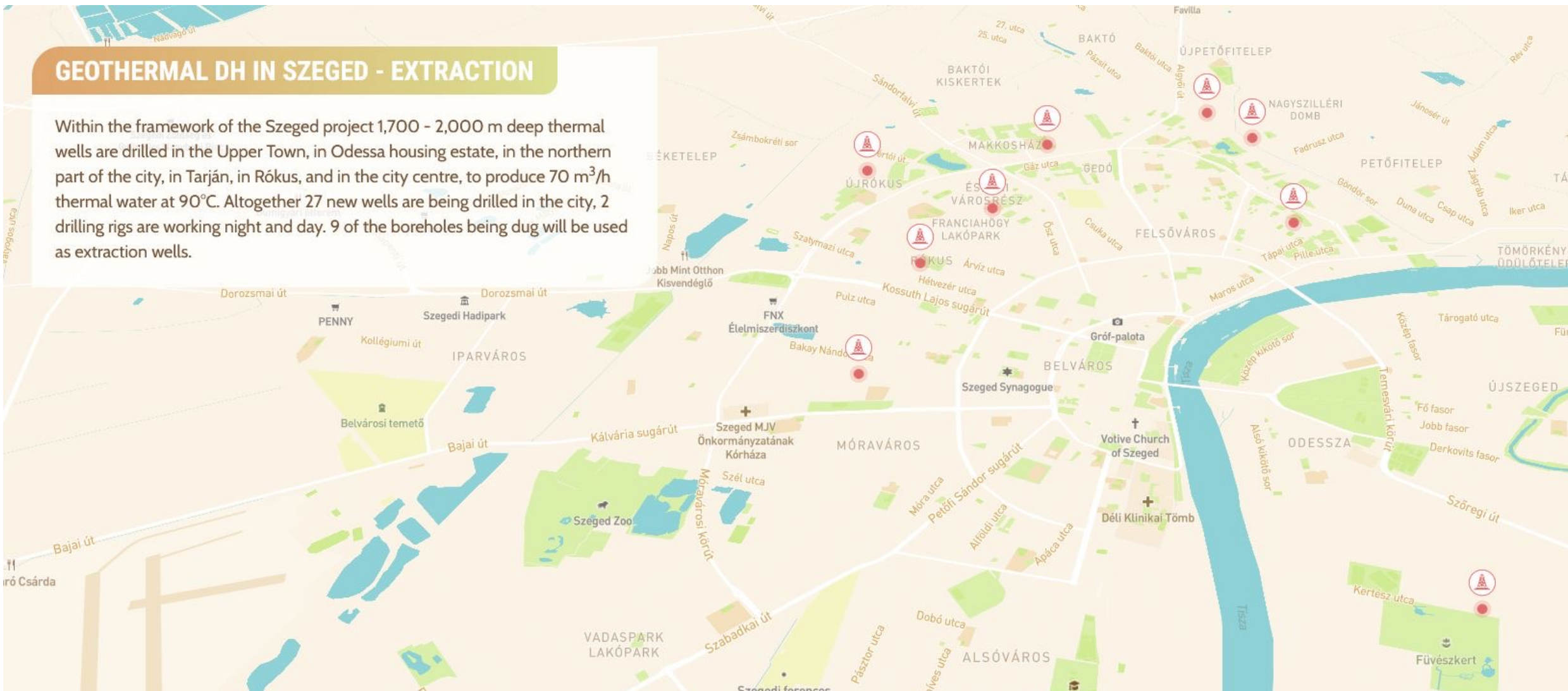
## SZETAV - THE COMPANY

SZETAV has 3 departments (operations, finance and energy) and 154 employees. The district heating system of Szeged has 23 heating circuits powered by 1-12 mW boilers with 235.8 MW installed capacity, providing an 843,700 GJ/year total energy output to the end-users via 239 heating substations and 215 km<sup>2</sup> of subsurface pipelines. Even though the city and its vicinity have exceptional hydrogeological features, and geothermal based bathing, heating and DHW production are all well-established in the region, until very recently 100% imported natural gas has been the sole energy source of the 224 mW DH system, making the company the single largest local emitter of CO<sub>2</sub>.



## GEOHERMAL DH IN SZEGED - EXTRACTION

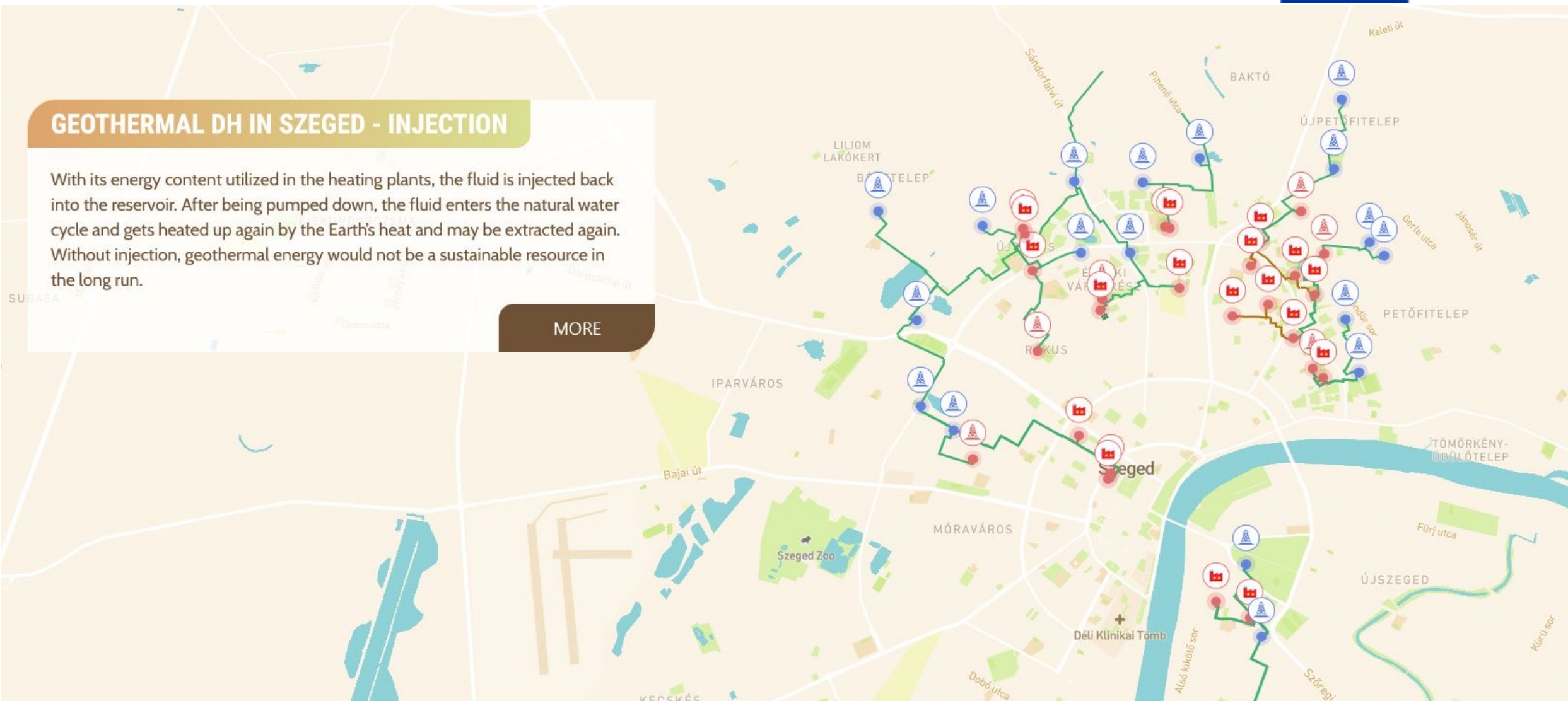
Within the framework of the Szeged project 1,700 - 2,000 m deep thermal wells are drilled in the Upper Town, in Odessa housing estate, in the northern part of the city, in Tarján, in Rókus, and in the city centre, to produce 70 m<sup>3</sup>/h thermal water at 90°C. Altogether 27 new wells are being drilled in the city, 2 drilling rigs are working night and day. 9 of the boreholes being dug will be used as extraction wells.



## GEOTHERMAL DH IN SZEGED - INJECTION

With its energy content utilized in the heating plants, the fluid is injected back into the reservoir. After being pumped down, the fluid enters the natural water cycle and gets heated up again by the Earth's heat and may be extracted again. Without injection, geothermal energy would not be a sustainable resource in the long run.

MORE



## ROKUS

### Basic data

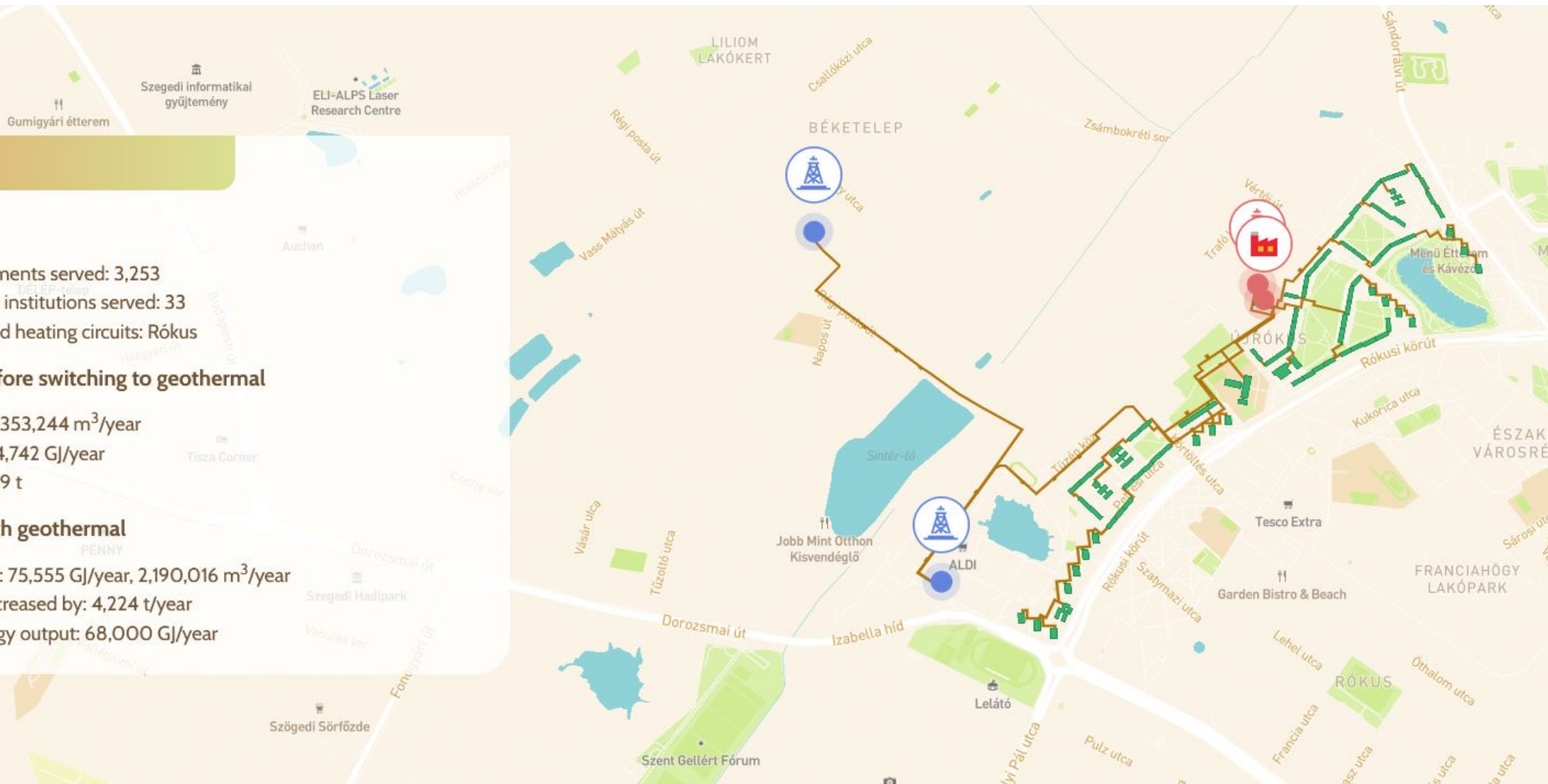
- Number of apartments served: 3,253
- Number of public institutions served: 33
- Heating plants and heating circuits: Rókus

### Energy balance before switching to geothermal

- Natural gas used: 353,244 m<sup>3</sup>/year
- Energy output: 84,742 GJ/year
- CO<sub>2</sub> output: 6,809 t

### Energy balance with geothermal

- Natural gas saved: 75,555 GJ/year, 2,190,016 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,224 t/year
- Geothermal energy output: 68,000 GJ/year



## ROKUS 2

### Basic data

- Number of apartments served: 1,747
- Number of public institutions served: 37
- Heating plants and heating circuits: Rókus

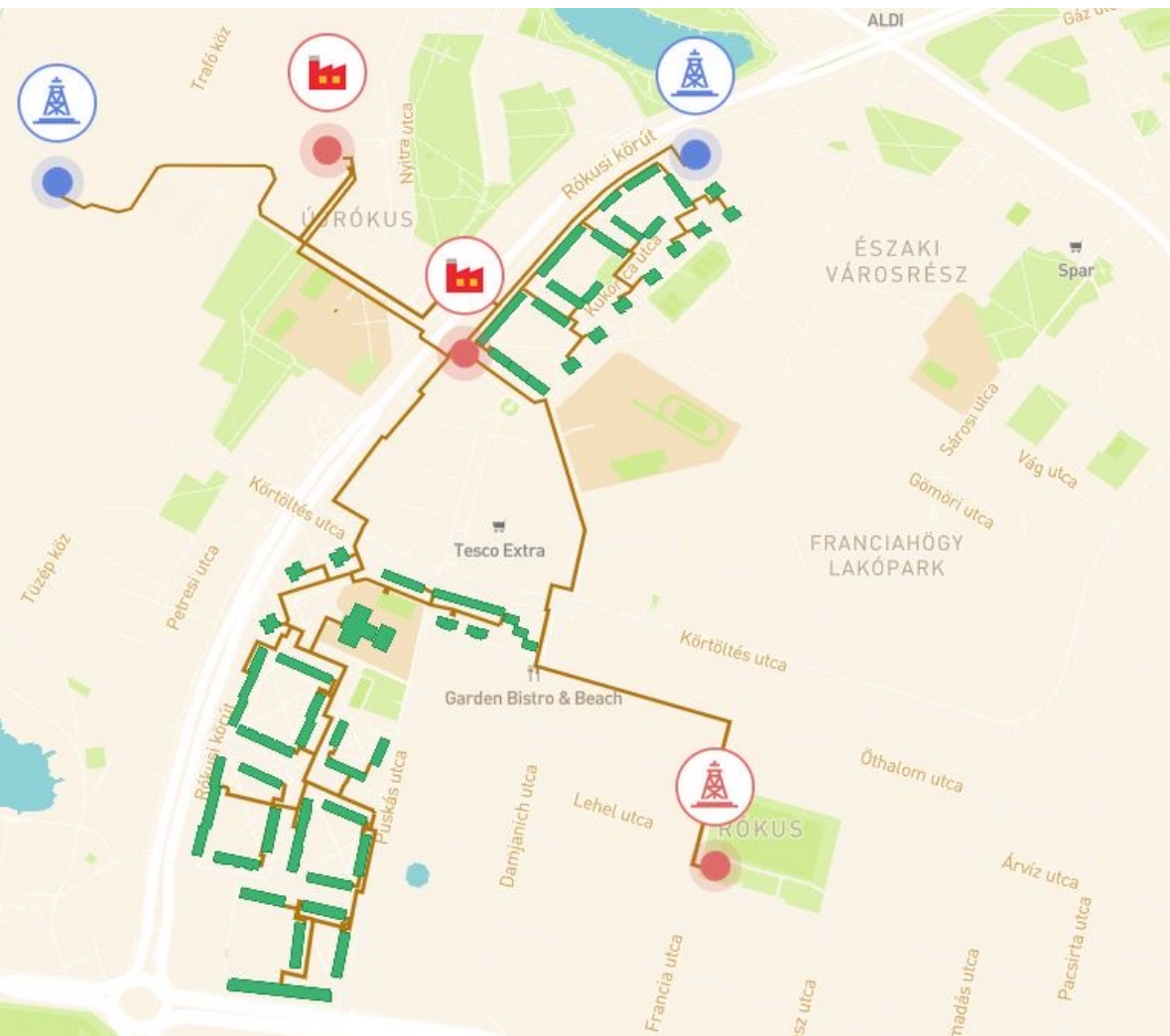
### Energy balance before switching to geothermal

- Natural gas used: 1,895,892 m<sup>3</sup>/year
- Energy output: 76,251 GJ/year
- CO<sub>2</sub> output: 3,657 t

### Energy balance with geothermal

- Natural gas saved: 19,251 GJ/year, 558,000 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 1,076 t/year
- Geothermal energy output: 57,000 GJ/year

BÉKETELEP



## ODESSA

### Basic data

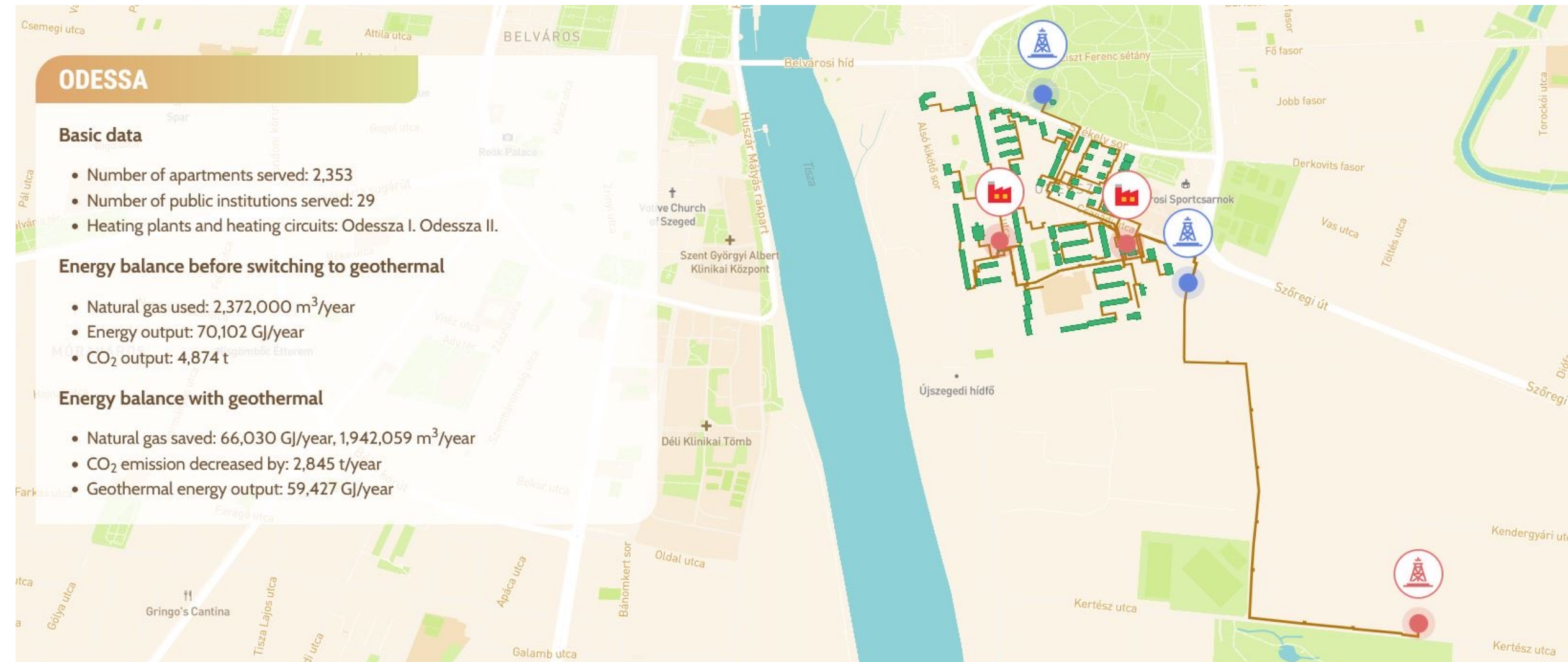
- Number of apartments served: 2,353
- Number of public institutions served: 29
- Heating plants and heating circuits: Odessza I. Odessza II.

### Energy balance before switching to geothermal

- Natural gas used: 2,372,000 m<sup>3</sup>/year
- Energy output: 70,102 GJ/year
- CO<sub>2</sub> output: 4,874 t

### Energy balance with geothermal

- Natural gas saved: 66,030 GJ/year, 1,942,059 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 2,845 t/year
- Geothermal energy output: 59,427 GJ/year





## NORTH TOWN

### Basic data

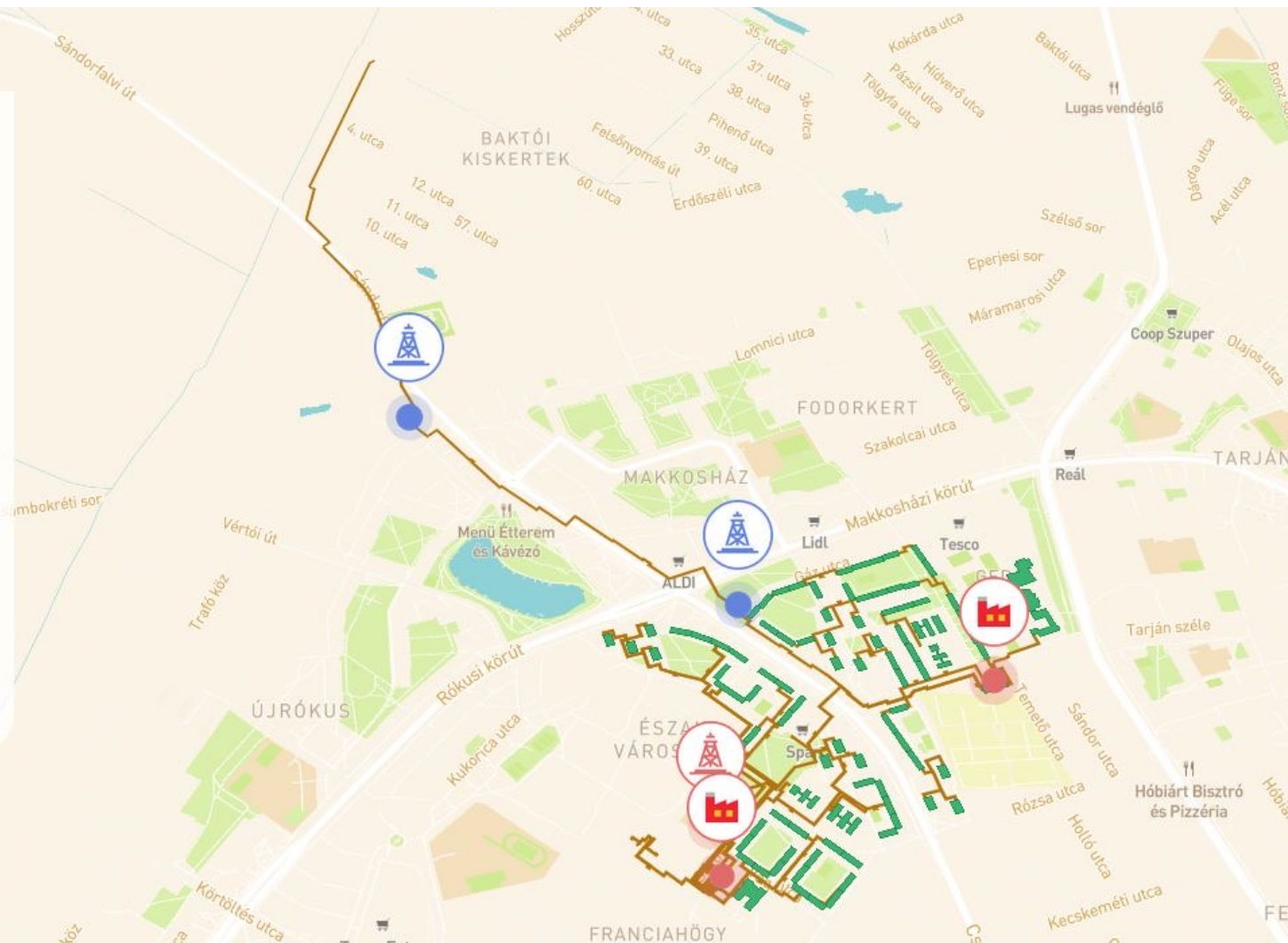
- Number of apartments served: 4,049
- Number of public institutions served: 76
- Heating plants and heating circuits: Észak I/A, Észak I/B

### Energy balance before switching to geothermal

- Natural gas used: 4,114,458 m<sup>3</sup>/year
- Energy output: 122,076 GJ/year
- CO<sub>2</sub> output: 7,936 t

### Energy balance with geothermal

- Natural gas saved: 81,480 GJ/year, 2,361,739 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,555 t/year
- Geothermal energy output: 73,332 GJ/year



## MAKKOSHAZA

### Basic data

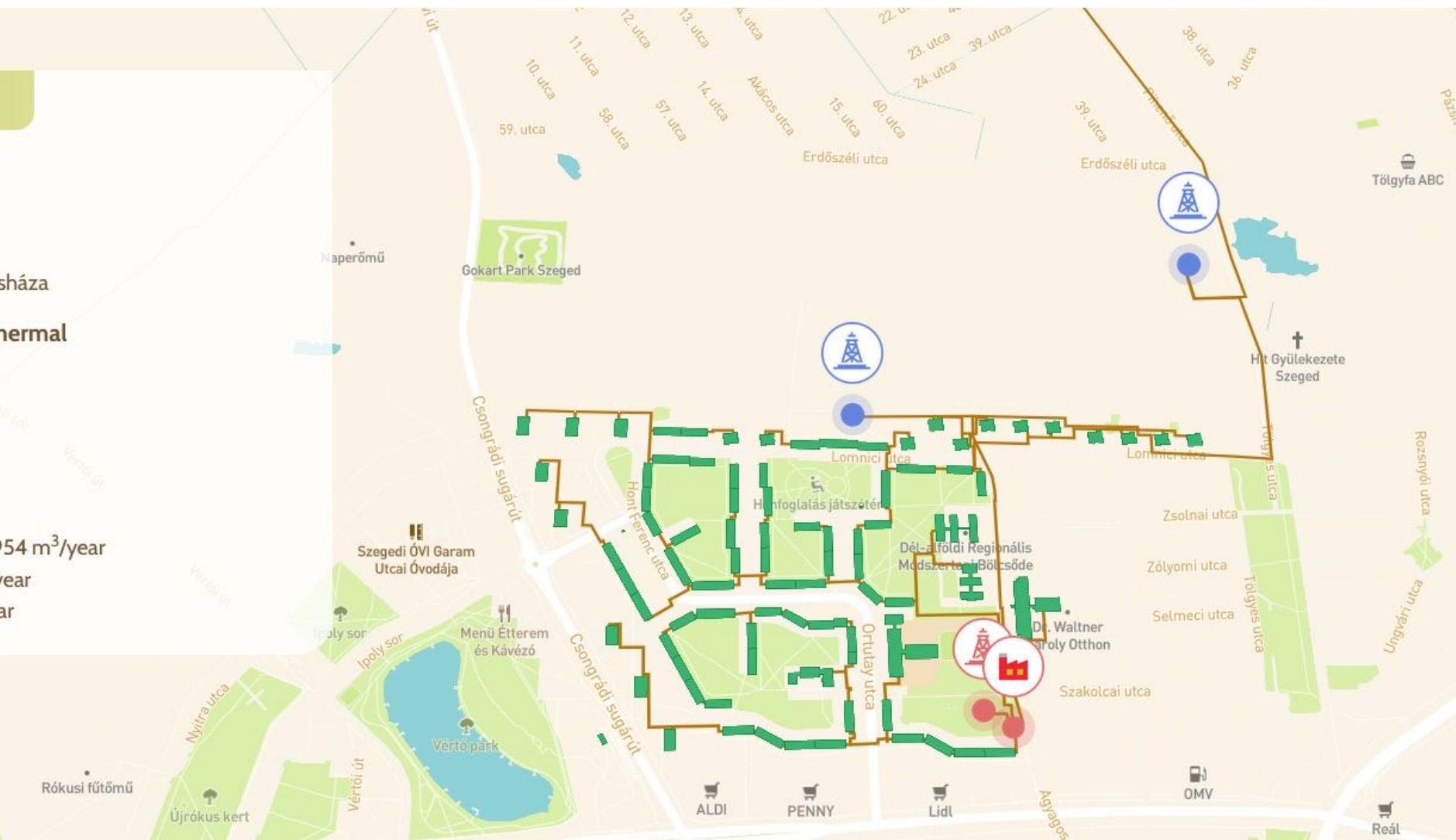
- Number of apartments served: 3,033
- Number of public institutions served: 17
- Heating plants and heating circuits: Makkosháza

### Energy balance before switching to geothermal

- Natural gas used: 3,076,706 m<sup>3</sup>/year
- Energy output: 91,286 GJ/year
- CO<sub>2</sub> output: 5,934 t

### Energy balance with geothermal

- Natural gas saved: 69,999 GJ/year, 2,028,954 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 2,028,954 t/year
- Geothermal energy output: 63,000 GJ/year



## UPTOWN

### Basic data

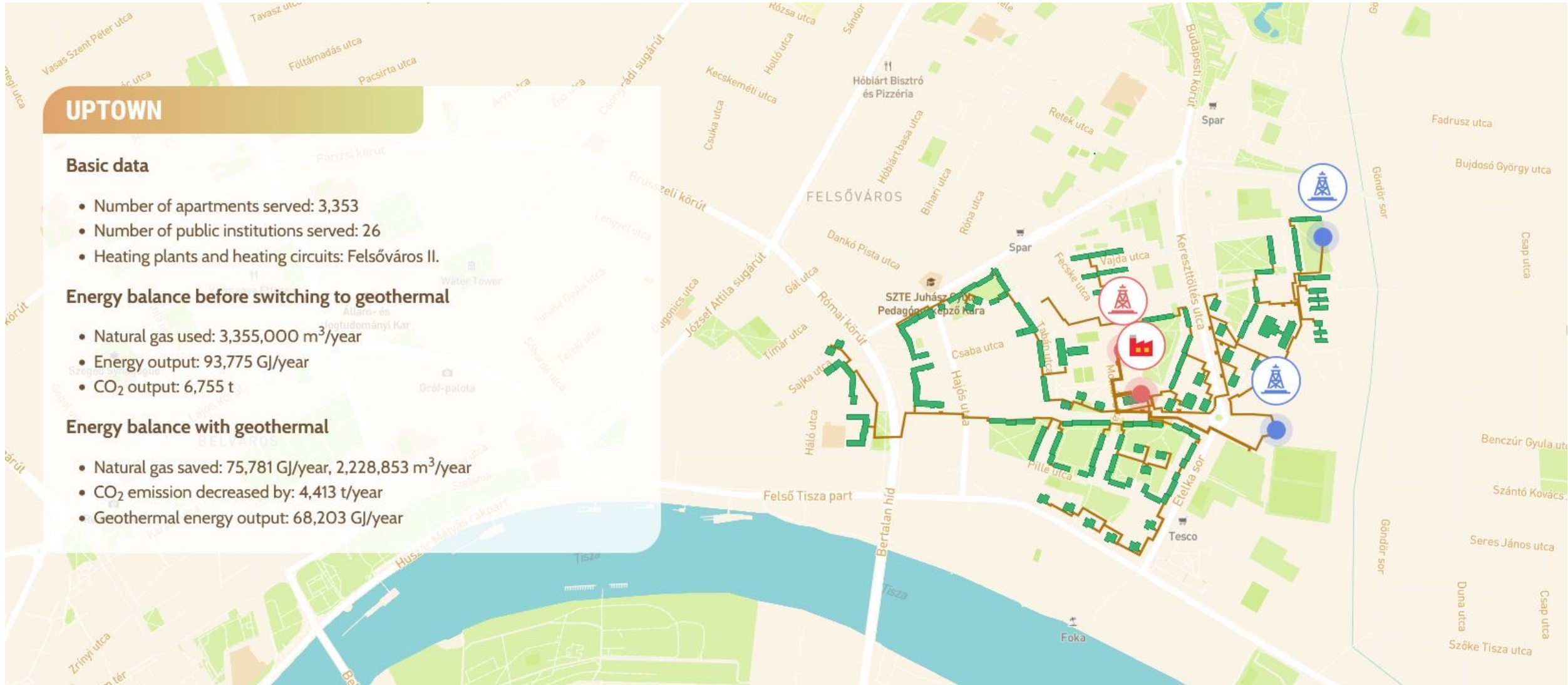
- Number of apartments served: 3,353
- Number of public institutions served: 26
- Heating plants and heating circuits: Felsőváros II.

### Energy balance before switching to geothermal

- Natural gas used: 3,355,000 m<sup>3</sup>/year
- Energy output: 93,775 GJ/year
- CO<sub>2</sub> output: 6,755 t

### Energy balance with geothermal

- Natural gas saved: 75,781 GJ/year, 2,228,853 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,413 t/year
- Geothermal energy output: 68,203 GJ/year



## TARJAN

### Basic data

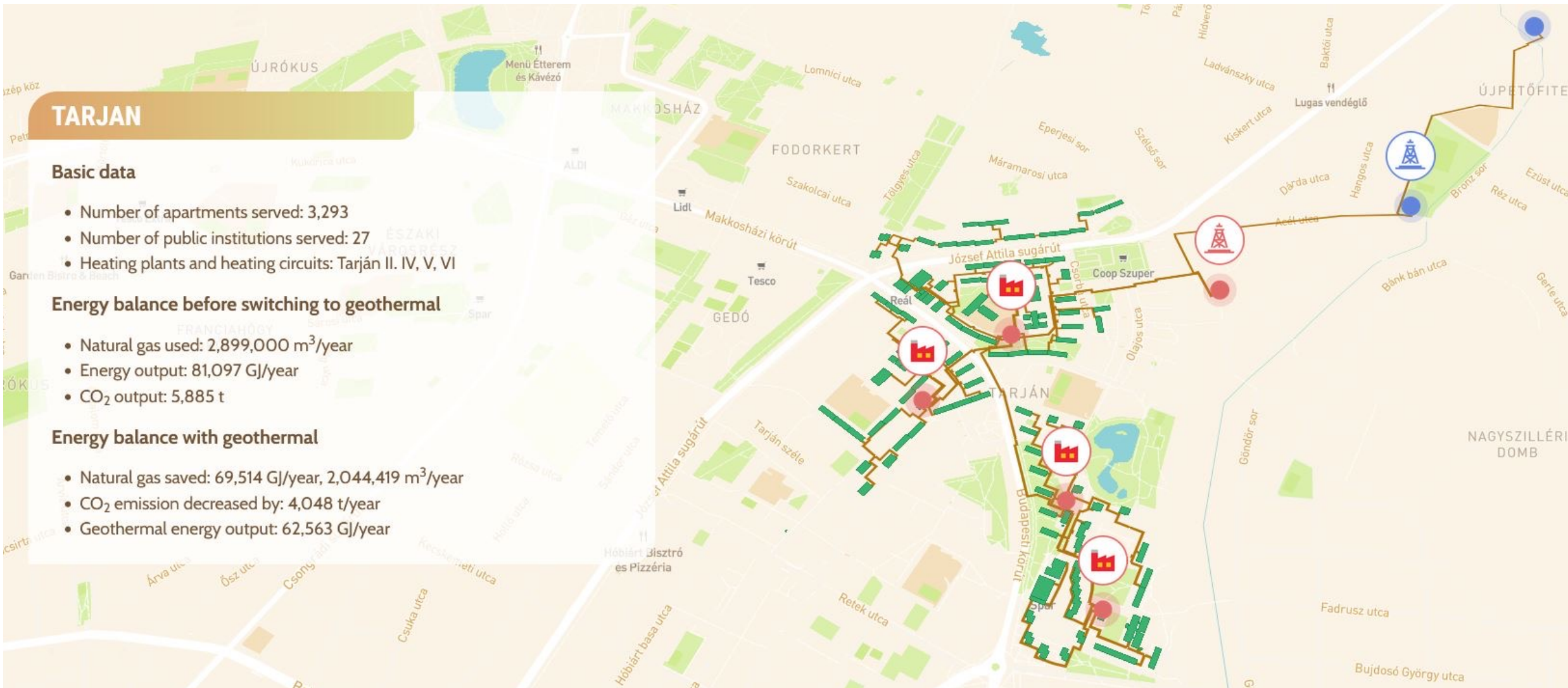
- Number of apartments served: 3,293
- Number of public institutions served: 27
- Heating plants and heating circuits: Tarján II. IV, V, VI

### Energy balance before switching to geothermal

- Natural gas used: 2,899,000 m<sup>3</sup>/year
- Energy output: 81,097 GJ/year
- CO<sub>2</sub> output: 5,885 t

### Energy balance with geothermal

- Natural gas saved: 69,514 GJ/year, 2,044,419 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,048 t/year
- Geothermal energy output: 62,563 GJ/year



## SZILLERI

### Basic data

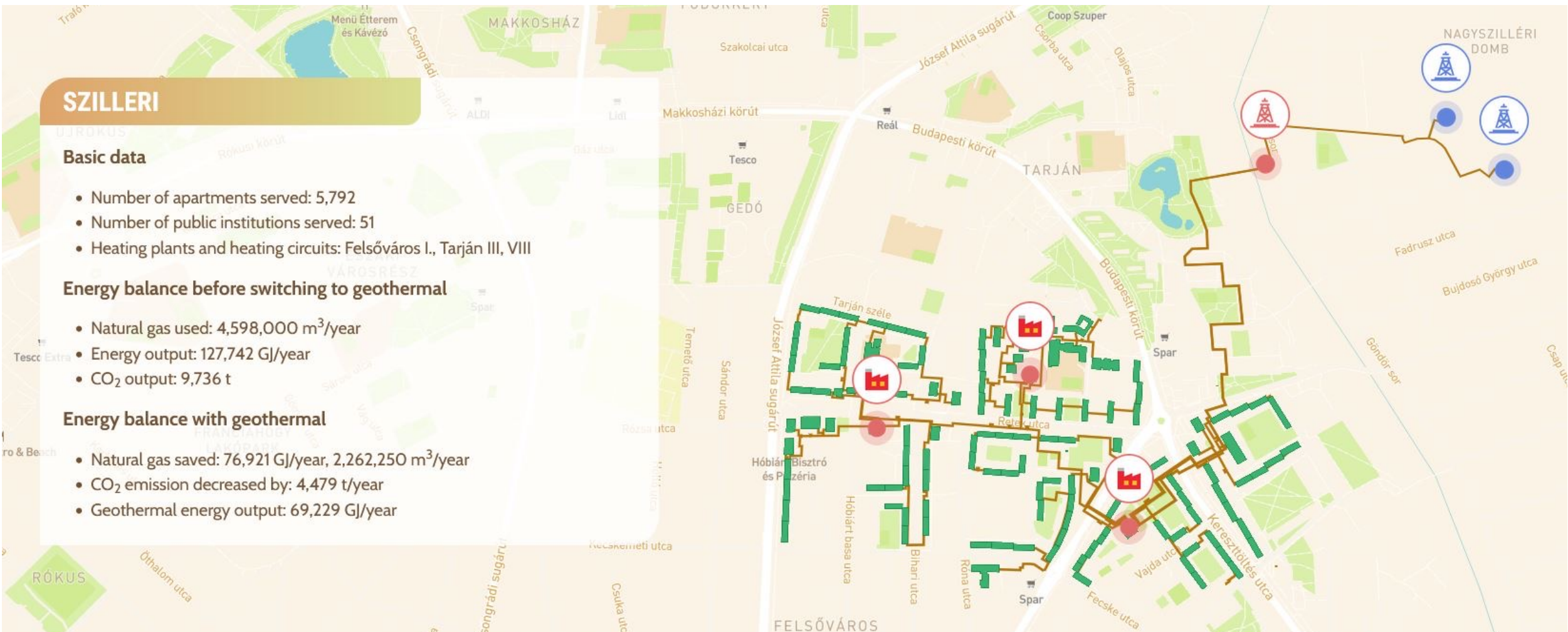
- Number of apartments served: 5,792
- Number of public institutions served: 51
- Heating plants and heating circuits: Felsőváros I., Tarján III, VIII

### Energy balance before switching to geothermal

- Natural gas used: 4,598,000 m<sup>3</sup>/year
- Energy output: 127,742 GJ/year
- CO<sub>2</sub> output: 9,736 t

### Energy balance with geothermal

- Natural gas saved: 76,921 GJ/year, 2,262,250 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,479 t/year
- Geothermal energy output: 69,229 GJ/year



## CITY CENTRE

### Basic data

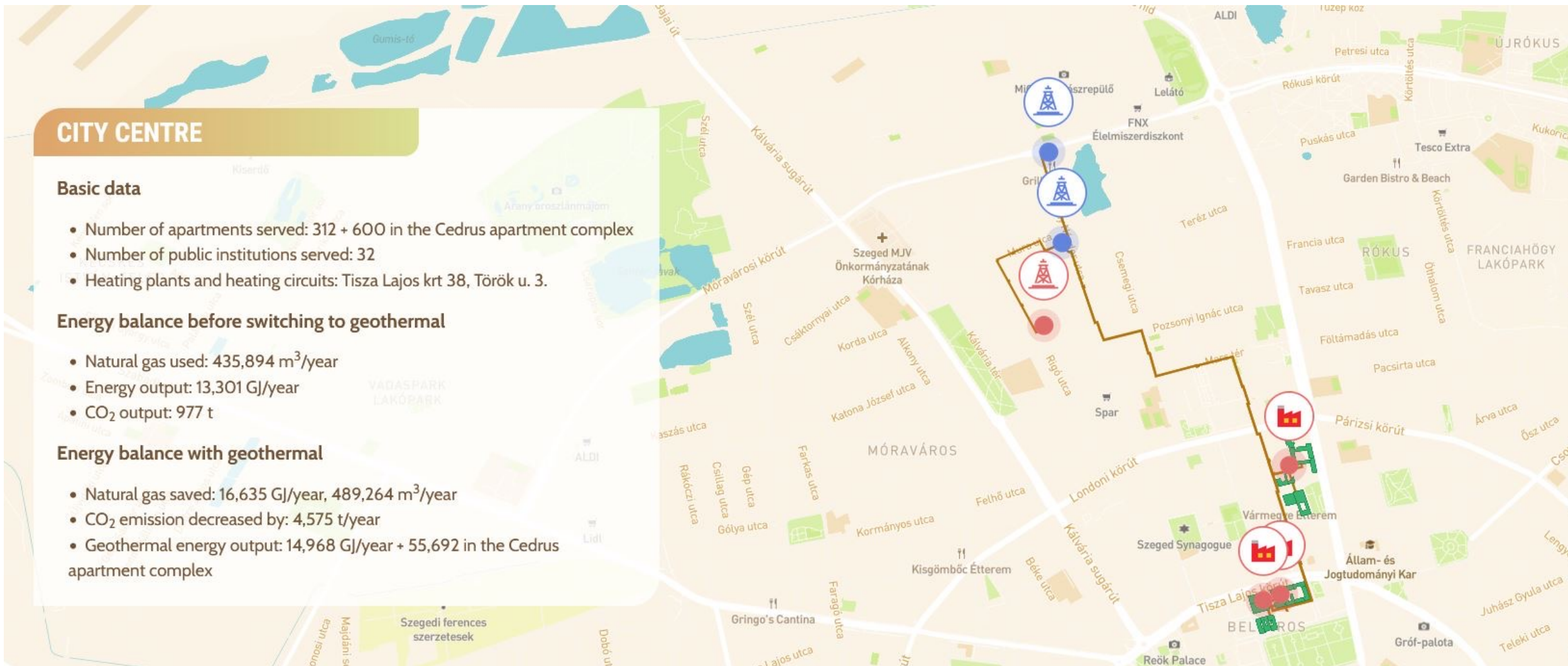
- Number of apartments served: 312 + 600 in the Cedrus apartment complex
- Number of public institutions served: 32
- Heating plants and heating circuits: Tisza Lajos krt 38, Török u. 3.

### Energy balance before switching to geothermal

- Natural gas used: 435,894 m<sup>3</sup>/year
- Energy output: 13,301 GJ/year
- CO<sub>2</sub> output: 977 t

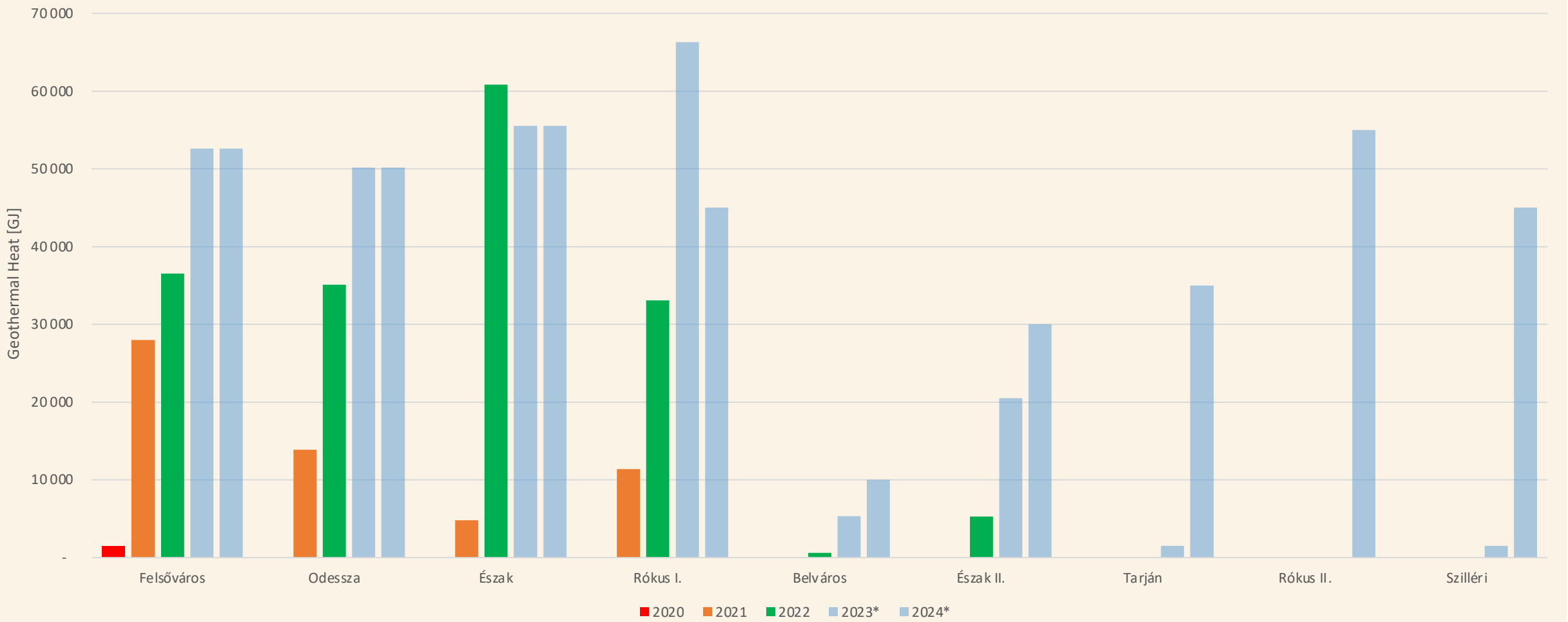
### Energy balance with geothermal

- Natural gas saved: 16,635 GJ/year, 489,264 m<sup>3</sup>/year
- CO<sub>2</sub> emission decreased by: 4,575 t/year
- Geothermal energy output: 14,968 GJ/year + 55,692 in the Cedrus apartment complex

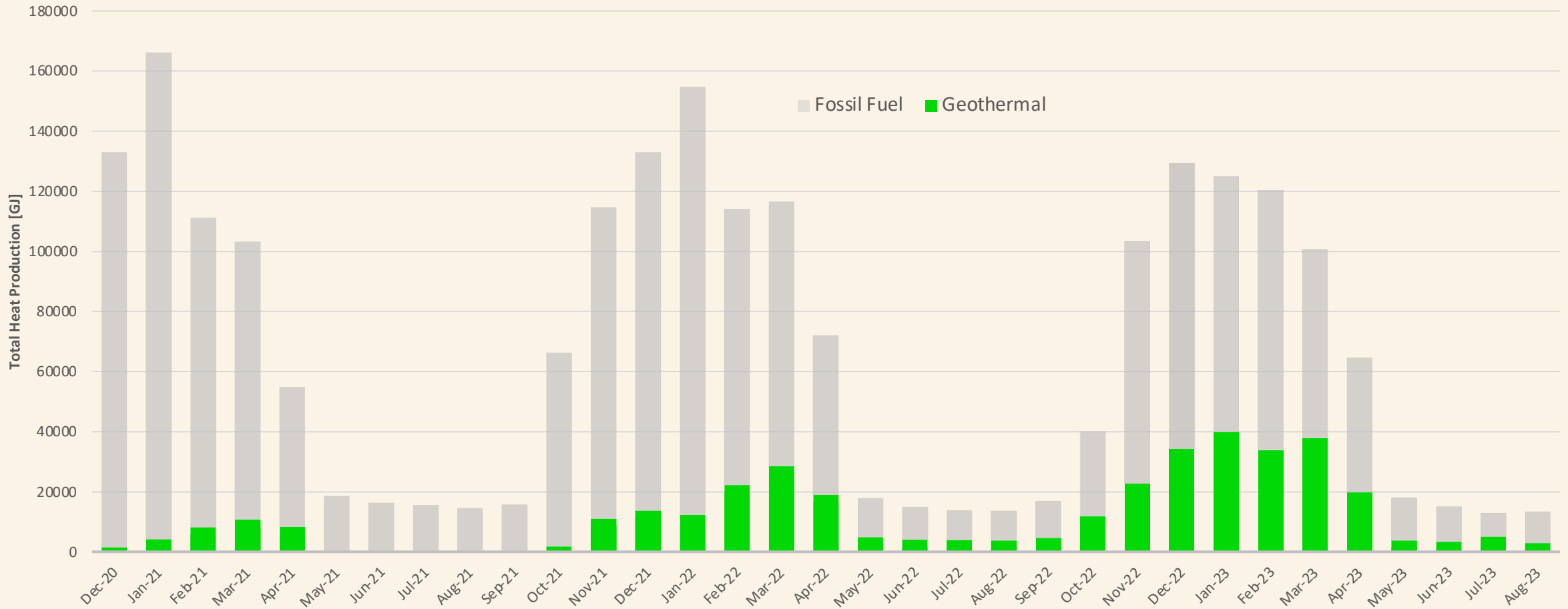




## Geothermal heat utilization



## HEAT PRODUCTION PORTFOLIO OF DISTRICT HEATING OF SZEGED







# Thank you for your attention!

More about the geothermal project of Szeged: <https://geotherm.szetav.hu/>