„GeoPower”

Small and large scale HP: Technologies and market development

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Content

- International review
- Current Hungarian heat pump statistics
- Key factors of the technology development
- Project examples, innovative solutions
- Factors which affect on the Hungarian heat pump market development

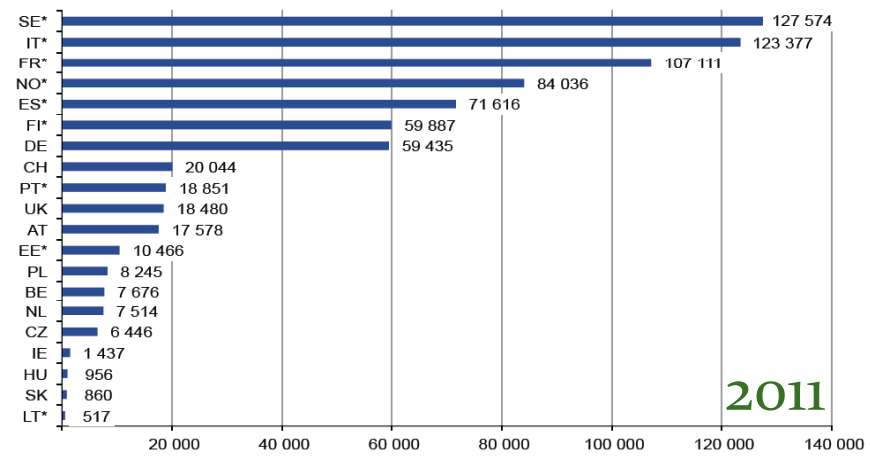
Objective: the quality heat pumping

- Adjusted to the EU 3x20% objectives:
- European Heat Pump Association (EHPA):
  - COP, EER
  - SPF, SEER
- Monitoring:
  - Spatial distribution
  - For new and renovated buildings
  - For property types (family house, business center, industrial, agricultural properties)

EHPA: Minimum efficiency values defined as follows (operating points – required COP):

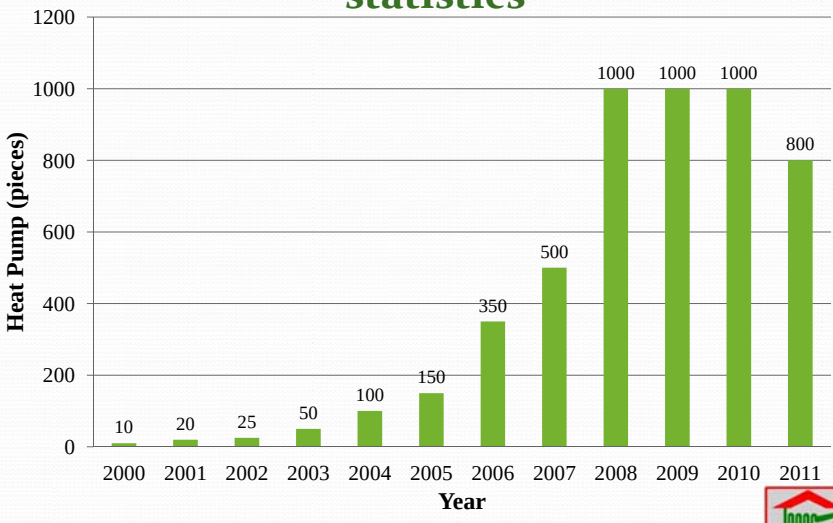
- Brine to water B0/W35 - 4.0
- Water to water W10/W35 – 4.5
- Air to water A2/W35 – 3.0
- Direct expansion E4/W35 – 4.0

European heat pump market



Source: EHPA

Hungarian "estimated" heat pump selling statistics



The largest BHE systems in the EU

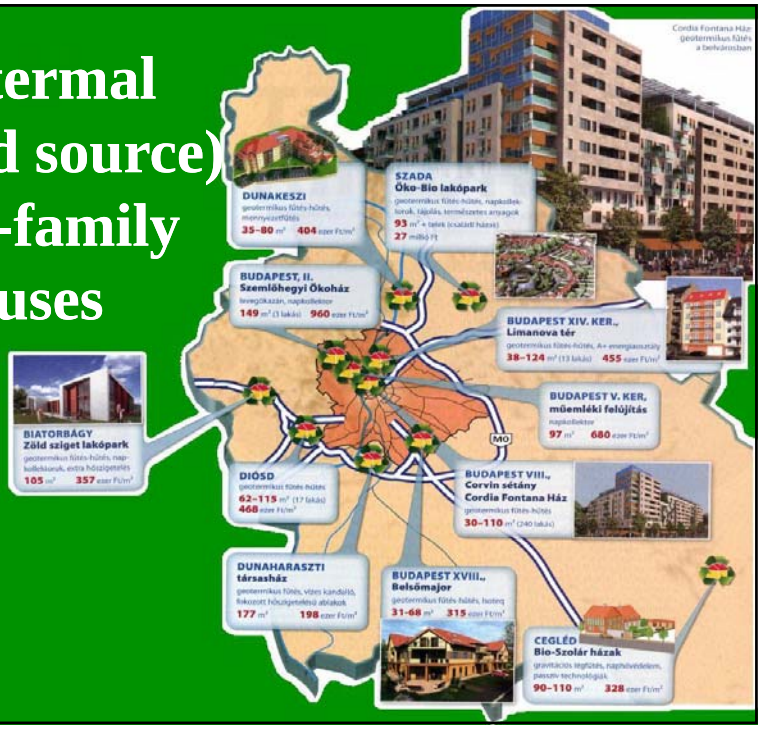
Europe	Country	City/Project name	No. BHE	Depth BHE	Total BHE length
1.	UK	London Shopping Center	400	150 m	60 000 m
2.	NO	Loerensko, SiA hospital*	ca. 300	150 m	ca. 45 000 m
3.	NO	Oslo, Nydalen district	180	200 m	36 000 m
4.	SE	Lund, IKDC	153	230 m	35 190 m
5.	SE	Stockholm, Vällingby Centr. *	133	200 m	26 600 m
6.	SE	Kista, Kista Galleria*	125	200 m	25 000 m
7.	HU	Budapest Pillangó street, Tesco	150	150 m	22 500 m
8.	HU	Törökbálint, Telenor House	180	100 m	18 000 m
9.	TR	Istambul, Metro market	168	107 m	18 000 m
10.	HU	Törökbálint, School and Sport Centr.*	180	100 m	18 000 m
11.	DE	Golm near Potsdam, MPI	160	100 m	16 000 m
12.	SE	Stockholm, Blackeberg area	90	150 m	13 500 m
13.	HU	Budapest Pesti street, Tesco	130	100 m	13 000 m
14.	HU	Páty, Monicomp Ltd., logistics centr.	120	100 m	12 000 m
15.	SE	Örebo, Musikhögskolan	60	200 m	12 000 m
16.	DE	Langen, DFS	154	70 m	10 780 m
17.	CH	Zürich, Grand Hotel Dolder	70	150 m	10 500 m

BHE: Borehole Heat Exchanger * under construction

Technology development: key factors for success also in Hungary

- Economic feasibility
  - Energy price levels
  - Energy price ratios
  - Price level of technology (in absolute and relative terms)
  - Quality of products
  - Efficiency of products
  - Result: impact on total cost of ownership
- Image and technology awareness
  - Public
  - Installers, architects and planners
  - Policy makers, politicians and decision makers

Geotermal (ground source) multi-family houses



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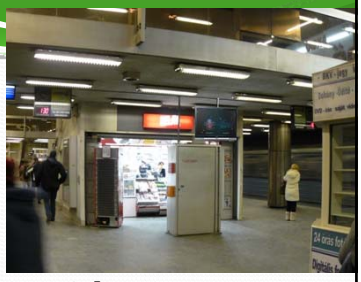
Budapest Metro: heat pump pilot project



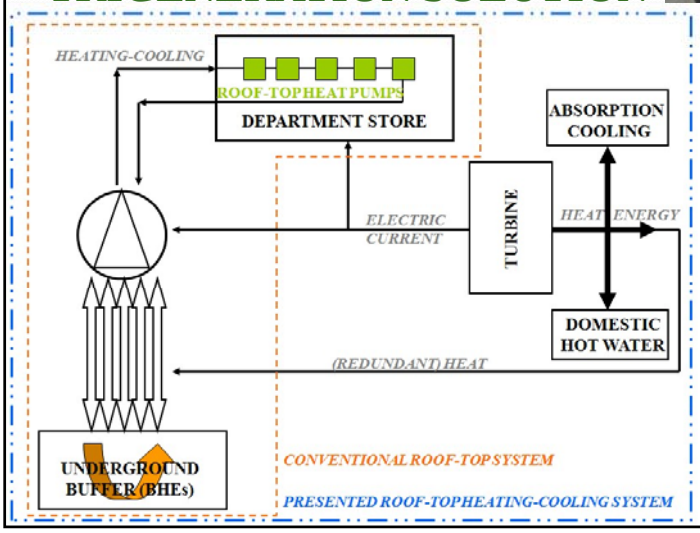
- Capacities: Heating: 17 kW, Cooling: 13 kW
- Heat source: horizontal collector in the air ducts under the metro station
- Heat utilization: in the maintenance- and control rooms of the station (for 20 person)
- Services: active heating and cooling, domestic hot water

BKV tunnel-heat utilization

TESCO in Budapest

- 5 roof-top heat pumps
  - 645 kW – for heating
  - 860 kW – for cooling
- 130 pcs, 100 m depth BHE = 13.000 m total length
- 30 kW electricity production by microturbine, its waste heat utilized for water heating (DHW)
- Permanent cooling performance supported by absorption chiller towards the bakery
- Unused heat energy is feeded back into the BHE system

TESCO – TRIGENERATION SOLUTION



5 roof-tops

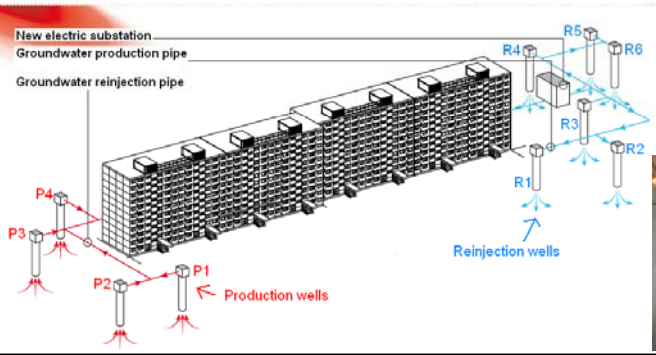
Heat pump exploitation instead of district-heating: Budapest XIII. district, Hun str.

- 252 flats
- 8 staircases
- 4 pumping wells, 6 sinking wells
- Disconnection was May 31. 2009.
- DHW service from 31. May 2009.
- Heating service: from 15. Oktober 2009.
  (radiator heating 60 °C, 880 kW)

Heat pump heat center - panel house

Pilot project : Hun utca 1-15.

The first block of flats building in Hungary with geothermal heat pump system



SUMMARY

Fees paid for GEO-NRG, after the insulation

	Area/piece		Base fee	Heat fee	Total/flat/year	Total /flat type/ év
Property types	18 m²	2	- Ft	29 096 Ft	29 096 Ft	58 192 Ft
	35 m²	80	- Ft	56 576 Ft	56 576 Ft	4 526 081 Ft
	61 m²	94	- Ft	98 604 Ft	98 604 Ft	9 268 767 Ft
	69 m²	80	- Ft	111 536 Ft	111 536 Ft	8 922 845 Ft

Total (gross):	**22 775 886 Ft**
Ie. 1 GJ energy:	**4 200 Ft**

Savings: (compared with district heating) **11 479 994 Ft** **33,5%**

Savings: (original, compared with uninsulated conditions) **18 268 835 Ft** **44,5%**

Factors affected on the Hungarian heat pump market development

- Real estate property renovation program, enhancement of the energy efficiency (public facility, panel-, apartment-, family houses) –there is currently no support program
- Energy acts (renewal energy law)
- Green Bank for the finance – currently under organization
- Energy price revision – METAR will start in January, 2013
- „H" heat pump tariff extend for the summer cooling as well
- The task of the MAHÖSZ: taking over the EHPA's quality development programs

Result:

5000-10000 heat pump/year till 2020

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Thanks for your attention!

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