Energetics developments of Miskolc City 2015

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  - **Utilisation of local** alternative **generation sources**
    - Land fill gas
    - Biomass
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Energy strategy of Miskolc city

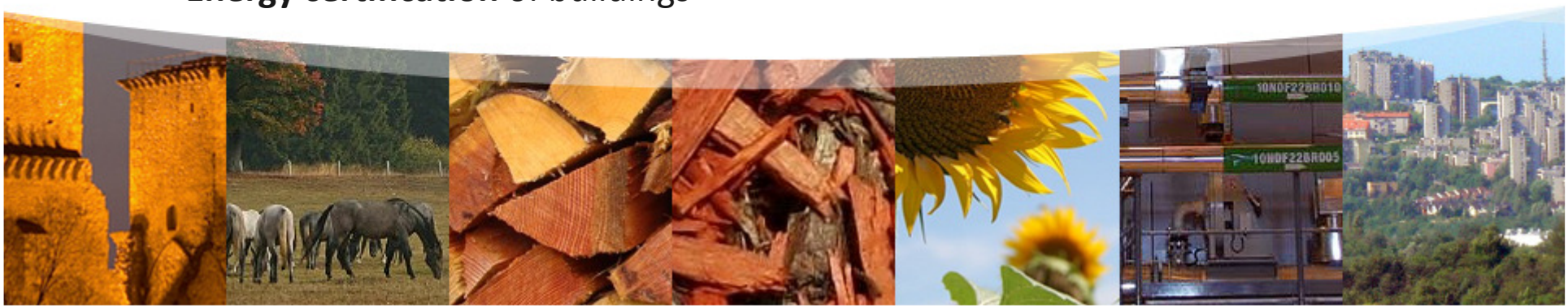
- Goals
  - Improve the **quality of air** in the city
  - Promotion of national and **EU objectives** (increase of the proportion of renewable energy)
  - Decrease of dependence from import, **natural gas replacement** (reliability of supply)
  - Implementation of **modern technologies** (innovation)
  - Utilisation of **local conditions**
  - Minimisation of **energy costs** (cost efficiency)
  - **Cooperation with national** and international **enterprises**
  - **Utilisation of funding opportunities**
  - Utilisation of the University's **intellectual potential** (cooperation)
  - **Raising awareness** (energy- and environment-awareness raising)

Energetic concept of MIHŐ Ltd.

- Goals
  - Ensuring continuous **reliability of supply**
  - Minimisation of **energy costs**
  - Economical and **efficient** operation
  - Increase of consumer **satisfaction**
- Tools
  - Involvement of **new consumers**
  - Utilisation of **renewable energy**
  - Utilisation of **funding opportunities**
  - Decrease of **debts**
  - Coordination of **the City's energy management**

Tasks of MIHŐ Ltd.

- The energy management and supply organisation of Miskolc City
  - **Heating** supply of **31,528** homes and **941 companies** and public institutions
  - Sanitary **hot water** supply of **29,753** homes and **639** companies and public institutions
  - **Operation of Municipality owned** heat generation equipment
- Centralised management of tasks in relation to the energy management of institutions maintained by the Municipality
  - Centralised **energy procurement** (natural gas, electricity)
  - **Review of** energetic invoices, **contracts**
  - Performance of **energetics related tasks** (energy balance, mining fee, data supply)
  - **Energetic inspection** of heat generation equipments
  - **Energy certification** of buildings



MIHŐ Ltd. - Indicators

- **Ownership structure**
  - Miskolc Holding Asset Management Plc. **100%**
- **Economic indicators**
  - Annual revenue **HUF 6.35 billion**
  - Balance Sheet Earnings **HUF 328 million**
  - No. of employees **189 persons**
- **Consumer indicators:**
  - Heating and sanitary hot water supply of ~32,000 homes and almost ~1,000 companies and public institutions
  - Volume of thermal energy sold **1.23 million GJ**
  - Cubic meter of air of district heated buildings **5,145,217 m^3**
- **Technical data**
  - Operated system length : **51.45 km primary + 38.56 km secondary pipe line**
  - Equipment **12 boiler house + 237 heating centres**

Challenges of district heat supply

- **Motivation**
  - **Unpredictability of gas prices,** unreliability of supply
  - Lack of **co-gen energy generation** support
  - Open **funding** opportunities
  - Progress of environment-friendly **technologies**
  - Utilisation of **local** renewable energy potentials (geothermal energy, biomass)
  - Change in customer attitudes, effects of the „**panel" program**
  - Economic situation of consumers, continuous increase of **debts**
  - **Change in legislation** (official price, break even point, overhead cost decrease, public utility tax)
- **Opportunities**
  - Involvement of **new consumers**
  - **Geothermal** heat utilisation
  - Utilisation of **biomass** sources
  - Utilisation of **biogas**
  - Promotion of district heat supply

Opportunities – Involvement of new consumers

Connections already realized:

- Miskolc City Sports Centre
- B-A-Z County Library
- Ice Hall
- House of Arts

- Regional Centre of OTP
- Extension of Vocational School for health workers
- Patak Str. - Rozmaring house
- Andor Str. Housing estate
- Búza square – Food Hall
- Extension of Avas High School
- Széchenyi walking street quarter
- Miskolc City Sport Swimming Pool
- New Municipality building unit
- Block of flats at 4 Görgey Str.
- Miskolc City Library

Projects under preparation:

Implementation phase:

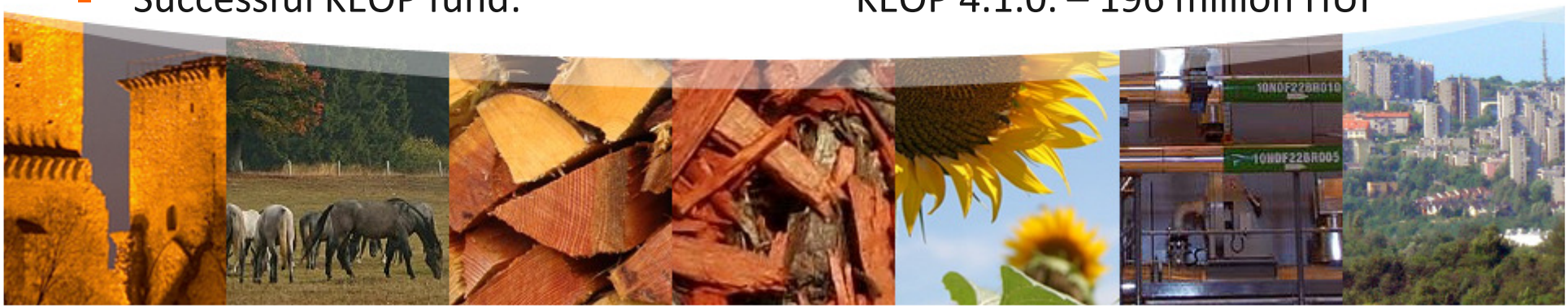
- Semmelweis Hospital
- Szent Ferenc Hospital
- Miskolctapolca Swimming Pool
- Magyar Posta Zrt. Office Building
- Magyar Telekom Nyrt. Office Building

Preparation phase:

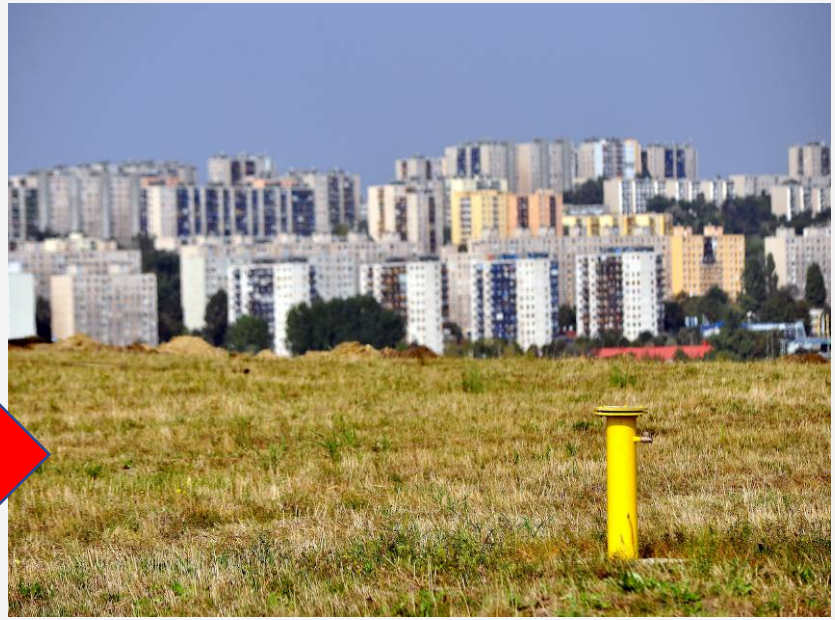
- University heat plant (Science Museum)
- Hotel next to Miskolc Centrum building
- Kossuth building unit (OTP Ingatlan Zrt.)
- Csengei Str. Property development
- Miskolc National Theatre
- Egressy Béni Music School
- Eötvös József Vocational School
- Herman Ottó High School

Renewable energy utilisation – Landfill gas

- **Rehabilitation of the dump** in Bogáncs Street(22 ha, 5 million tons of waste)
- **Utilization of methane** as naturally occurring greenhouse gas (~250 m^3/h), for the generation of heat&hot water and electricity
- Output: 0,4 MW_t + 0,5 MW_e
- No. of houses supplied 319
- Length of new gas pipeline: 2.050 m
- No. of production wells: 150
- Annual energy generation 3.5 million kWh
- CO2 emission decrease 3,900 tons/year
- Natural gas replacement 350,000 m^3/year
- Total project cost: 500 million HUF
- Successful KEOP fund: KEOP 4.1.0. – 196 million HUF

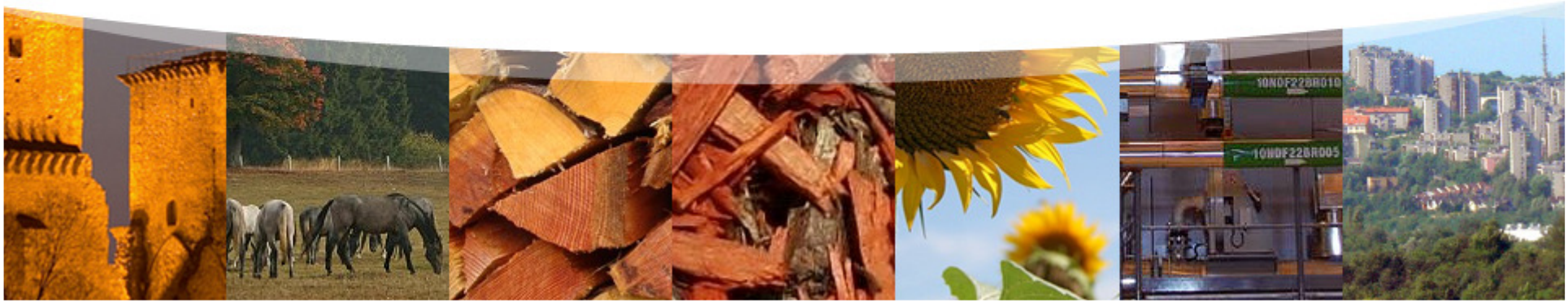


Renewable energy utilisation – Landfill gas



Renewable energy utilisation – Biomass

- **Biomass heating plant in the Kilian District**
  - Output: 3 MW; 41,000 GJ
  - Efficiency: 85 %
  - Temperature step: 90 / 70 °C
  - Running time: ~ 5,550 hours (only in heating season)
  - Annual biomass demand : 4,500 tons
  - Green house emission reduction : 50,077 tons
  - Triggered amount of natural gas : 1,300,000 m^3/year
  - No. of houses supplied: 1,100
  - Length of new district lines: 170 m DN 200 + 740 m DN 150
  - Total investment cost: 780 MHUF, from which 320 MHUF KEOP funds
  - Project Company: Bioenergy-Miskolc Kft. (75 % WIS Zrt., 25% MIHŐ Kft.)
  - **Further development opportunities: Heat supply of Diósgyőr and Bulgárföld districts (1 billion HUF)**



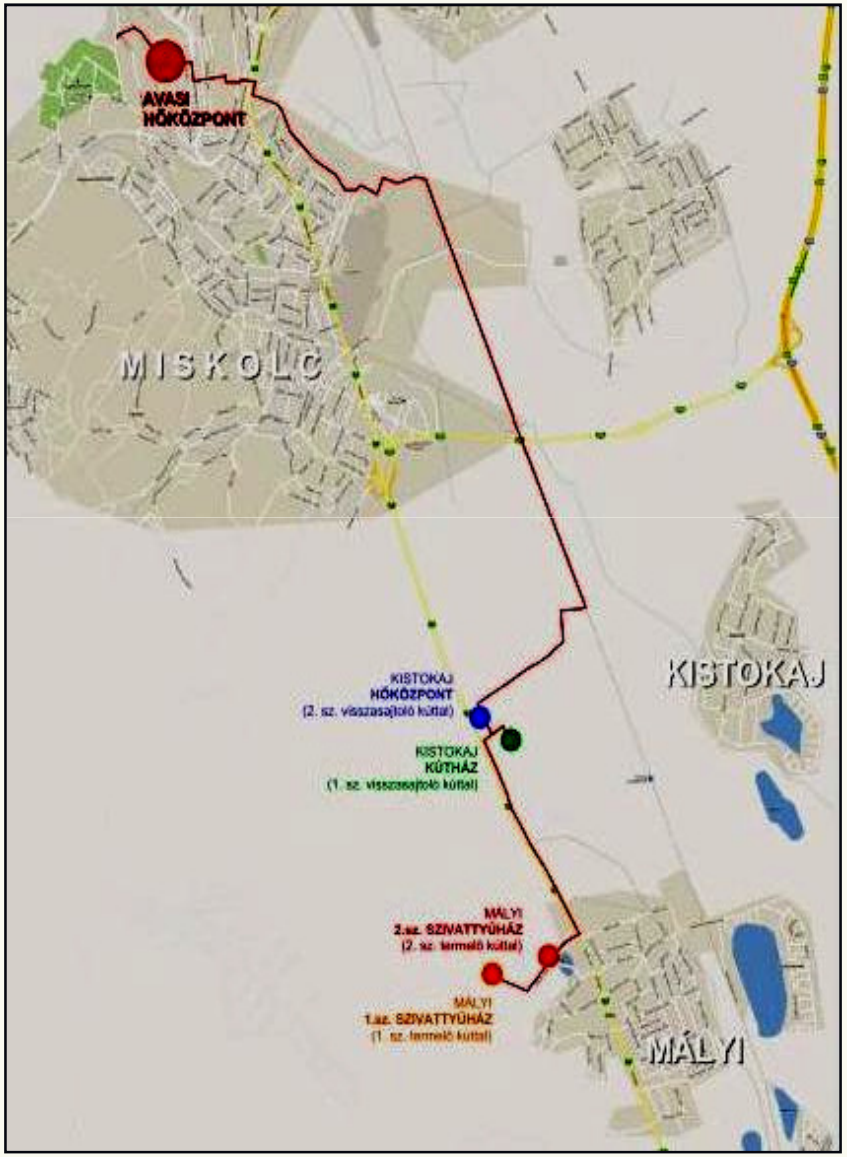
Renewable energy utilisation – Biomass

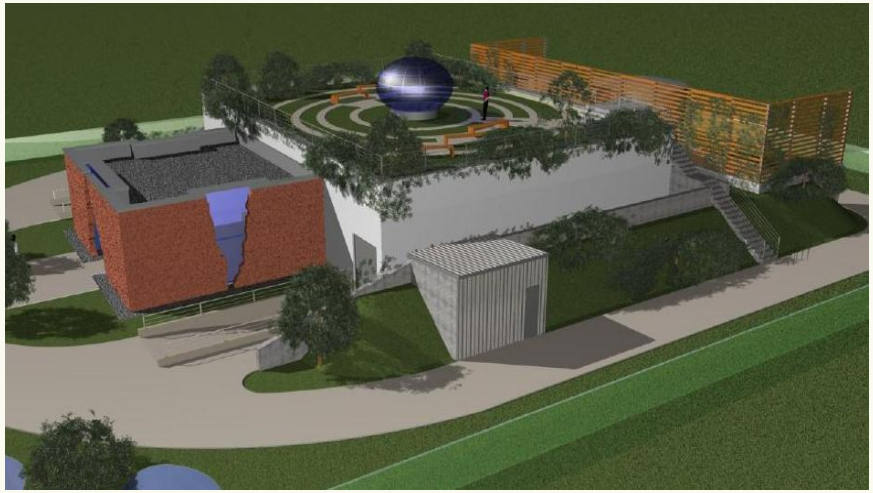
Renewable energy utilisation– Geothermal energy

- **Mályi – Kistokaj – Miskolc**
  - **Technical data:**
    - Output: 2x30 MW; ~800.000 GJ/year
    - Foot deep wells : 2305 m és 1514 m
    - Measured water flow : 6,600-9,000 l/min (kb. 110-150 l/sec)
    - Measured water temperature : 105 °C and 95°C
    - Built transmission line length : 3,1 km + 9,2 km cable routing
    - Green house emission reduction : 166 million tons (in 20 years)
    - No. of houses supplied : **Phase I.: Avasi heat-area (12,167 homes)**

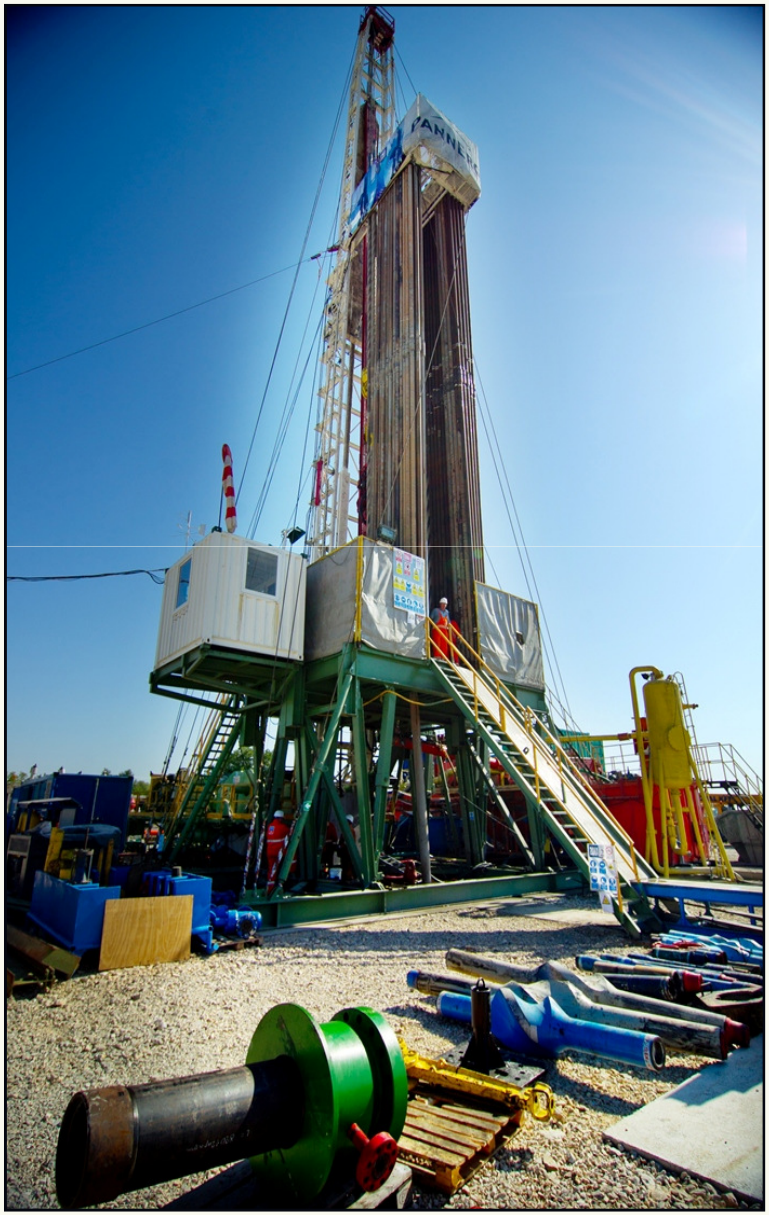
      Phase II. : Downtown (14,559 homes)
  - **Project data:**
    - Project companies: **Miskolc Geotermia Plc.** and **KUALA Ltd.** (90 % - Pannergy Nyrt, 10 % MIHŐ Ltd.)
    - Long-term heat supply contract → 25 years
    - Investment cost: 25 millió €, KEOP funds: 1,3 billion HUF
    - 2 producing wells and 3 reinjection wells, heat transfer station, titanium heat exchangers)
    - **Heat service launch date: Phase I. : 4 May/2013, Phase II.: 1 September 2014**

Renewable energy utilisation – Geothermal energy





Renewable energy utilisation – Geothermal energy



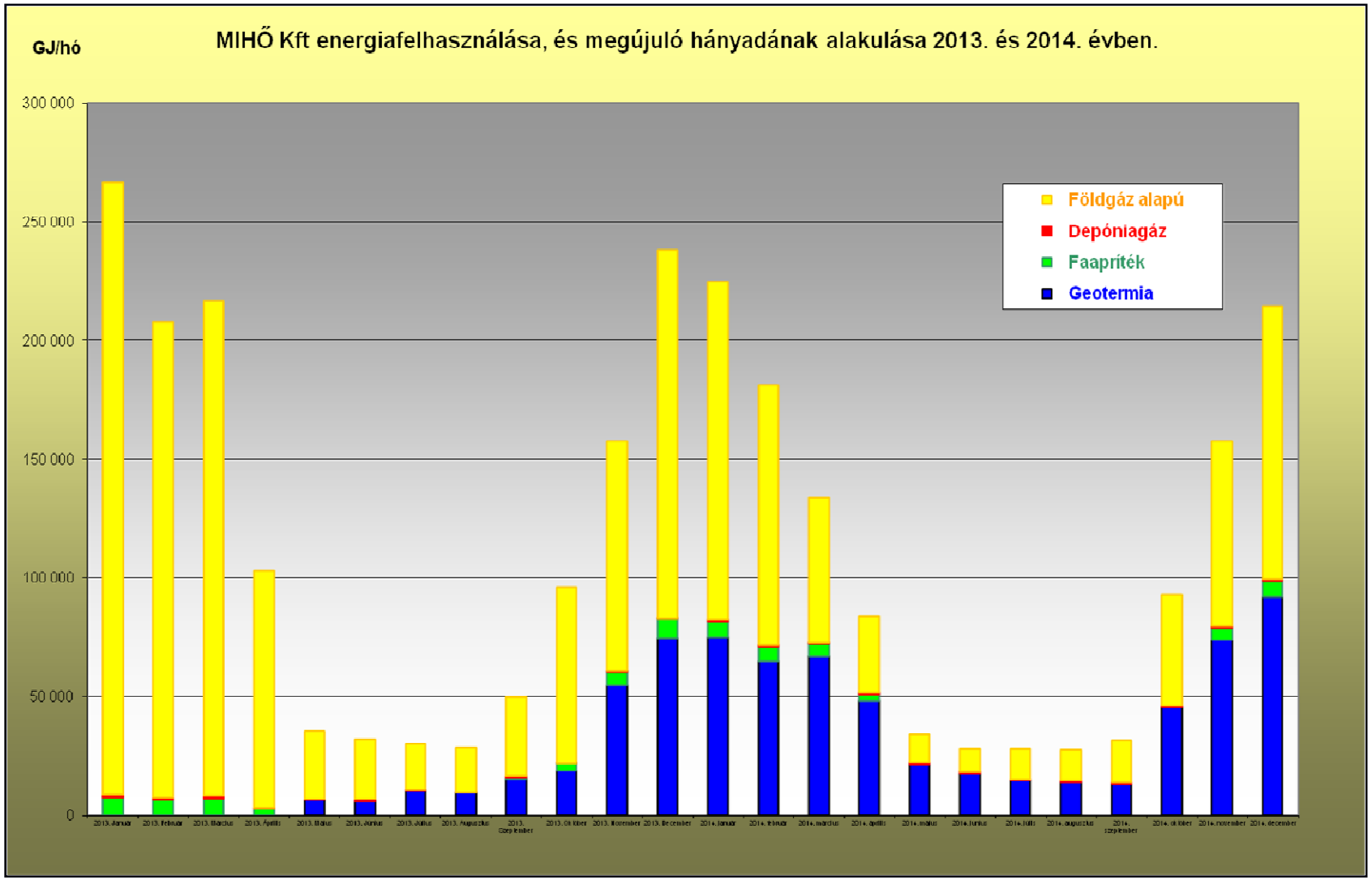
Additional short term development opportunities

- **Tender monitoring – New Széchenyi Plan**
  - Connecting **new consumers** by utilising **renewable energy sources** (KEOP)
    - Connection of St. Ferenc and Semmelweis Hospitals by supplying **geothermal** heat energy
    - Connection of Bulgárföld and Diósgyőr districts by supplying **biomass** based heat energy
  - **Energy efficiency projects**
    - Institutional **energy racialization** (preliminary assessment carried out for 160 institutions)
- **Opportunities of the 2014 – 2020 EU programming period (7,000 billion HUF funding)**
  - Complex energetic refurbishment of district heating systems
    - Modernisation of network distribution systems
    - Refurbishment of heat centres
    - Establishment of new ring mains

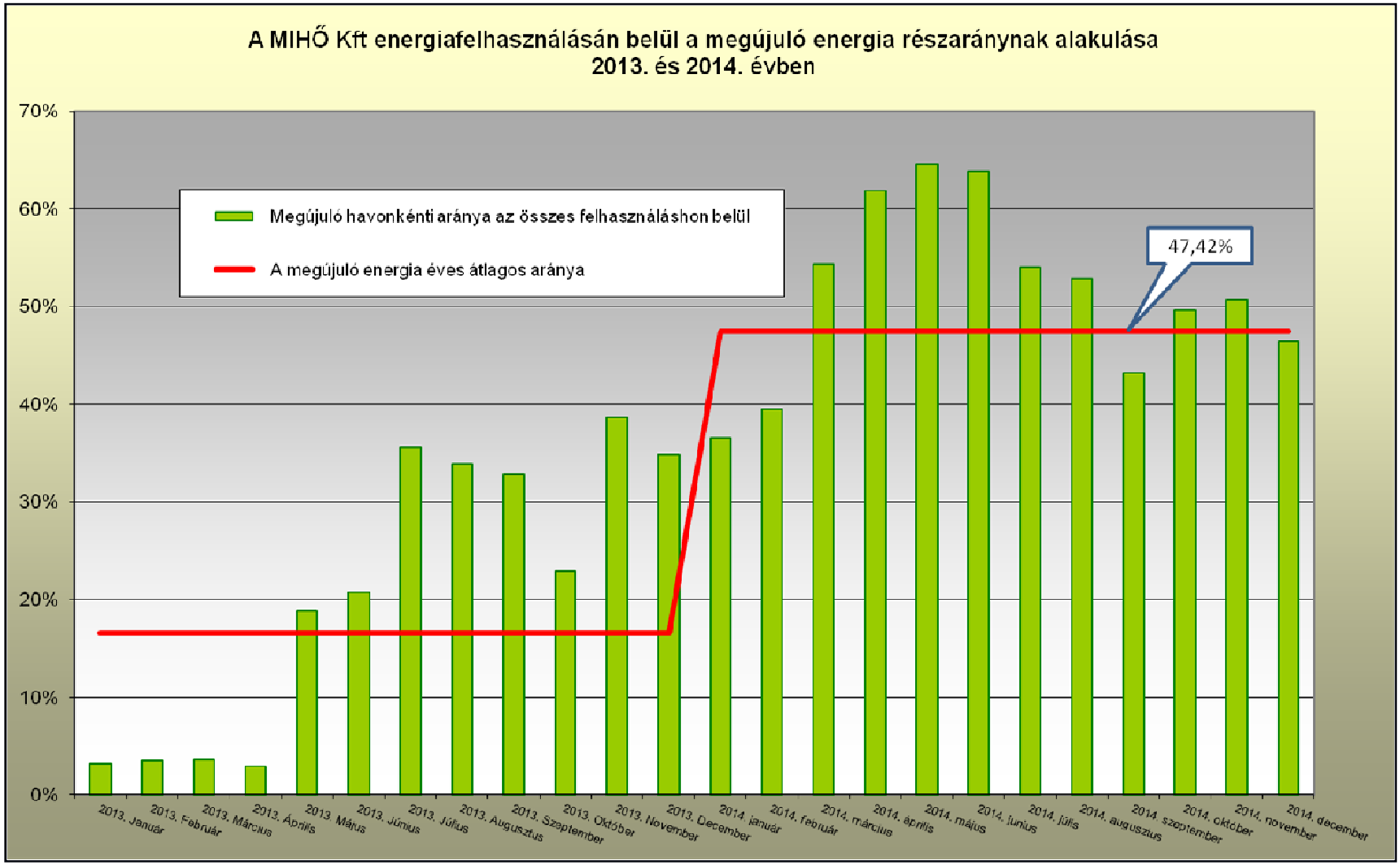
New Széchenyi Plan

- **Connection of Magyar Posta and Magyar Telekom buildings** (1.2 MW)
  - Total eligible project cost: 139,848,842 HUF
  - Total amount of funds granted: 69,924,421 HUF
  - Launch date of implementation: 15/03/2014
  - Close date of implementation: 31/03/2015
- **Connection of St. Ferenc and Semmelweis Hospitals** (4.7 MW)
  - Total eligible project cost : 279,672,815 HUF
  - Total amount of funds granted : 139,836,408 HUF
  - Launch date of implementation : 15/03/2014.
  - Close date of implementation : 31/03/2015
- Construction of 5 MW capacity woodchip-fired heat plant in **Diósgyőr**
  - Investment cost: 1,066 billion HUF
  - Planned implementation 2014 – 2015
  - Funds already granted, payment postponed

Energy mix in the 2013-2014 heating period



Achievements



Summary

- **Our goal is**
  - To provide competitive energy and district heating service to the consumers of the city of Miskolc
- **Means for implementation**
  - Utilisation of landfill gas, biomass and geothermal energy sources
  - Exploiting tendering opportunities
- **Achievements**
  - Utilisation of **three different renewable energy sources**
  - Saving up to 100 mHUF by **centralised energy procurement** for Miskolc
  - In Miskolc **47,42% of the consumers –** 31,528 houses and 941 other consumers – have been supplied with **renewable energy for heating in 2014,** resulting in triggering **19,339,446 m^3 natural gas** and the reduction of **CO_2 emission by 36,704 tons**.

Thank you for your kind attention!

www.miskolc.hu

www.miho.hu