FOCUS
EMERGING
DH MARKETS

By Tibor ORBÁN,
President – Association of Hungarian District Heating Enterprises, DCEO – Budapest District Heating Company

PRESENT STATE OF THE HUNGARIAN DISTRICT HEATING SECTOR

WITH FUTURE TRENDS AND INVESTMENTS

The article presents the short history of the Hungarian district heating sector, which supplies 650,000 apartments. 45 % of the 30 – 35 PJ/a DH is co-generated at a 71 % natural gas and 23 % renewable share. At present, we have many projects under preparation or in the pipeline, as a result of which at least 200 MW geothermal, 400 MW biomass and 50 MW waste-based district heating production capacities are expected to be installed and, thus, the share of green energies may exceed 50 % by 2025. The tendencies outlined prove that DH in Hungary has taken a direction on the European route toward 4GDH.

The first district heating (DH) system in Hungary, providing heat for the building of the parliament, was put to operation in 1889. In the early 1950's, DH was provided from industrial plants, and from 1958 on, big volume DH started in Budapest. This, however, was not due to a long-term energy strategy and city planning considerations, rather it was a consequence of the great number of panel buildings erected at that time, which required DH.

The economic and energy policies of the 60's, 70's and 80's missed the development of controllable, to the needs adjusted space heating, the metering of heat consumed, and any form of incentives for consumers to reduce heat consumption. Instead of high efficiency CHP requiring higher investment costs, cheap but less efficient oil and, later, natural gas-fired heat-only hot-water boilers were preferred.

The period between the 90's and 2000 was the most difficult one in the history of Hungarian DH. Due to rapidly increasing energy costs, a permanent competitive disadvantage started to develop against competitors in the heat market, mostly against the natural gas based individual space heating. This, hand in hand with limited investments due to lack of resources, started the erosion of DH schemes which now serve about 650,000 apartments.

Some major data of the Hungarian DH schemes are summarized in Table 1.

BASIC DATA OF HUNGARIAN DISTRICT HEATING	
No of settlements with DH	96
of which village with DH	1
No of DH supplier licensees	102
No of DH systems	219
of which No of systems with peak load <10 MW	148
No of DH related CHP plants	114
Total length of network (km)	2,177
Maximum primary temperatures (nominal)	
supply (°C)	125-130
return (°C)	70-75
Avg heat loss of the grid (%)	12-13
Total installed (available) heating capacity (MWth)	7,662
No of building substations	14,858
of which multi-building substations (%)	14

Table 1: Some characteristic data of the DH systems in Hungary
Source: MEKH-MaTáSzSz

Although discontinuation of the feed in tariff system in 2011 posed a challenge toward the DH community, it initiated, nevertheless, significant innovation processes. Accordingly, CHP plants were integrated for balancing the power system, the ground gathering of green energy has achieved an unprecedented pace with a consequence that at present in 19 settlements biomass, in 13 geothermal energy, in 2 biogas and in one waste is used in their DH systems.

Figure 1 shows the development of DH production between 2010 and 2017. 70 % of DH has been generated by DH producers, while 30 % by the DH providers. The share of cogenerated DH dropped from 60 %, characteristic for the era of feed in tariff system, to about 45 %.

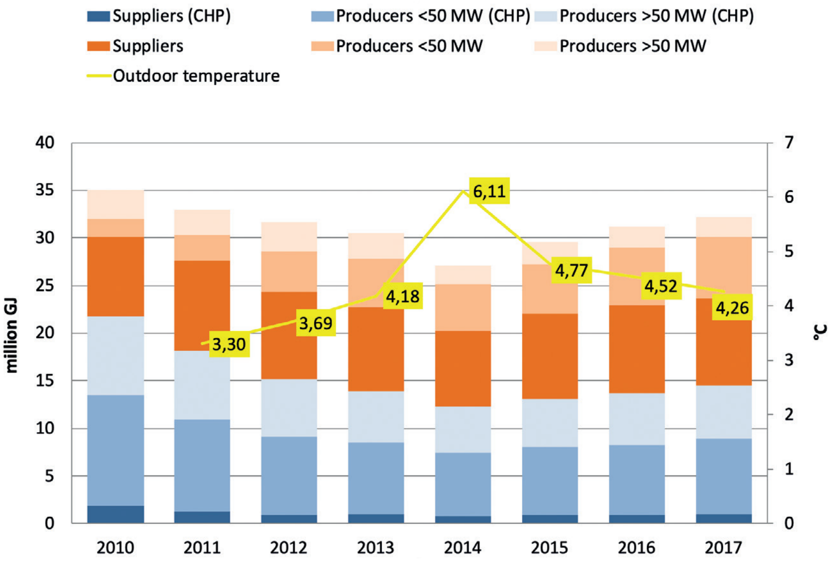

Figure 1: Volume and composition of DH production in Hungary (2010-2017)
Source: MEKH-MaTáSzSz

Although, in the Hungarian public opinion, DH is often considered an outdated way of heating supply for big housing estates, several considerable projects have recently been realised by exploiting financial resources provided to the DH sector within the framework of the National Energy Strategy, which wears the signs of 4GDH characters. Due to this development, the share of natural gas within the DH mix generated dropped to about 70 %. On top of this, as a result of the great number of EU co-financed projects (in preparation or under way) to use green energy, the installation of at least 200 MW geothermic, 400 MW biomass and 50 MW waste based new heat generating capacities can be expected in the coming years. This means that the share of green energies might exceed 50 % by 2025 (see Figure 3).

As can be seen in Figure 2, featuring the fuel structure for 2017, beside the still high, 71 % share of natural gas that of biomass use adds up to almost 18 %, while waste and geothermal energy represent 4 %-5 %, and the total of all others has only a narrow 3 % share.

Nowadays, in the countries with the most developed DH culture, the implementation of 4GDH is in progress, where the prior social motivations are radical reduction of losses, the preference of sustainability and climate protection aspects, organic integration into diverse smart energy systems, a client centered approach based on smart metering as well as smart cost allocation. In these countries, DHC is taken as a means of national and local energy policy and as such, it is harnessed for climate protection and sustainable development.

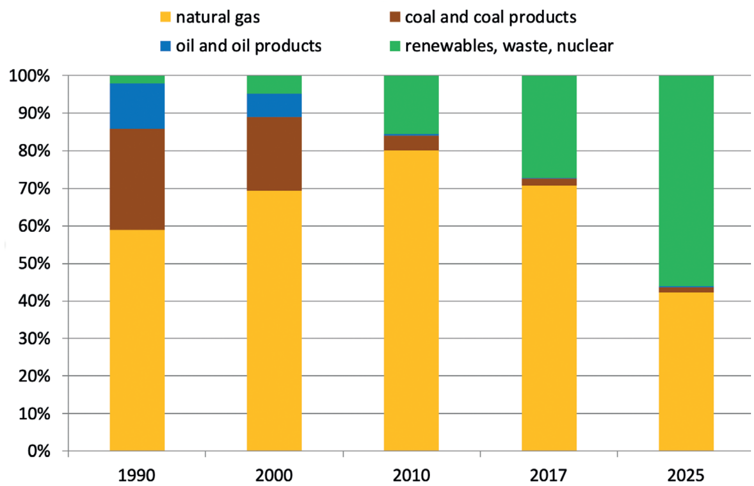

Figure 3: Fuel structure of DH production (2000-2025)
Source: MEKH-MaTáSzSz

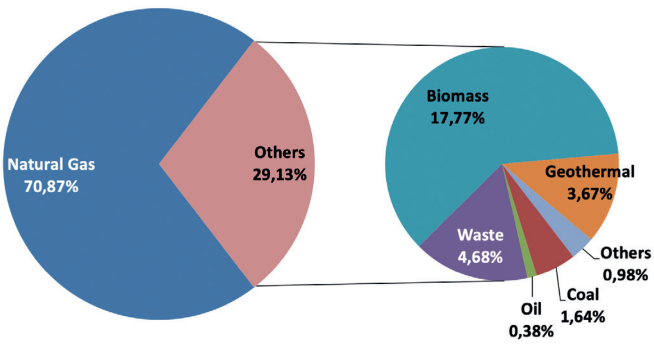

Figure 2: Fuel structure of DH production (2017)
Source: MEKH-MaTáSzSz

In the following, two examples of good practices are presented.

In Miskolc, a decision was made to substitute the natural gas based DH of the previous period for renewable based DH. The process began in 2008 with the utilisation of biogas, emerging in a waste dumpsite, in boilers and gas motors that supply DH. It was taken further, in 2011, with the installation of a 3 MW biomass boiler to supply another DH territory. Finally, this was followed by the delivery of a geothermal project, so far the biggest in Hungary, which through a 10 km long pipeline feeds almost 1 PJ/a of green heat to two major districts since the heating season of 2014/2015 (see Figure 4), and brought forth a fivefold increase of geothermal energy use in Hungary.

DHC (district heating and cooling) allows for the utilisation of fuels like waste, waste heat and renewables; the use of which, in individual space, heating is difficult or impossible. It abates disturbing effects connected to energy supply, the application of refrigerants with GHG impact, or building necessitation caused by mechanical equipment installed. In addition, DH diminishes health related risks, if we consider the heat island phenomena of settlements, or air pollution.

The share of renewables in Miskolc DH is 60 %, replacing 25 Mm3/a natural gas and diminishing the GHG impact by avoiding the emission of 50 kt/a of CO2.

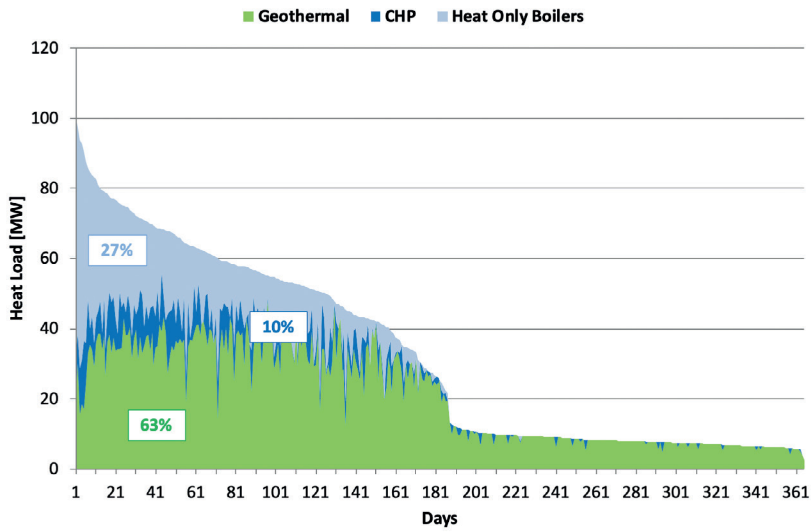

Figure 4: Duration curve of Avas-Belváros DH systems (Miskolc)
Source: MIHO Kft.

In Kaposvár, the goal was set to utilise local energy from local energy sources, according to the scheme drawn by Figure 5.

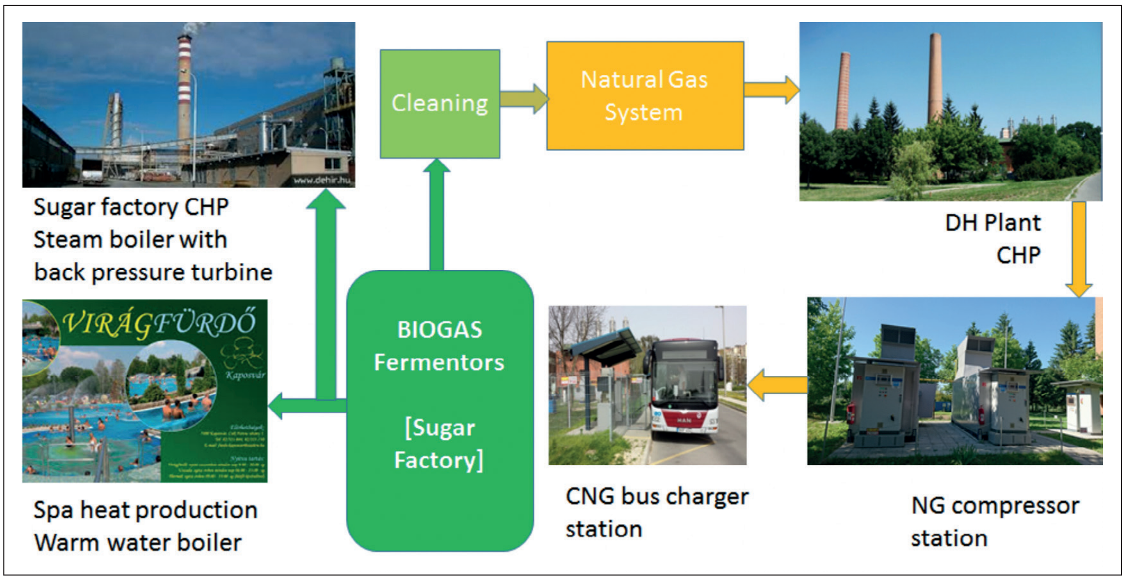

Figure 5: Utilising local energy from local energy sources (Kaposvár)
Source: Zanatyné Uitz Zsuzsanna

The project implements an integrated cooperation of diverse line energy systems, improves safety of energy supply, reduces energy losses and reinforces the local economy.

The examples mentioned and the tendencies outlined above prove that DH in Hungary has woken up from its deep sleep and has taken direction on the European route toward 4GDH.

For further information please contact:

Tibor Orbán, TOrban@fotav.hu