The status of the Hungarian District Heating and CHP regulation

Róbert Kubitsch
Hungarian Energy Office

ERRA Technical Exchange Programme
Budapest, 21 February, 2011
Content

• The parameters of the Hungarian District Heating Sector
• The Hungarian District Heating Market
• The Hungarian District Heating Regulation
Climate conditions in Hungary

• Moderately dry continental climate
• Mean annual temperature: about 10°C
• Average temperature range
  in January: -4°C – 0°C; in July: 18°C – 23°C
• Recorded temperature extremes
  in summer: 43°C; in winter: -34°C
• Yearly precipitation
  low lands: 500 to 600 mm; high lands: 600 to 800 mm
• Number of heating degree hours in a year:
  3,000 – 3,300 in most cities (up to 3,500 in the northeastern region)
Business volumes of DH in Hungary

- District Heating supply: in 94 settlements (242 independent DH systems)
- Number of supplied flats: 640,000
- Built in thermal capacity: 10,300 MW
- Supplied heat energy: 14,300 GWh
- More than 80% of DH is generated by natural gas
- Heating demand of a standard flat (135 m$^3$): 38 GJ
- Length of distribution network: 3,400 km
The background of the current situation

Transition of the Hungarian economy (1990)

- Majority of apartments were sold to their tenants
- The new owners typically never had the money for modernizing the flats

- Municipalities became independent (1992)
- They obtained the DH properties including only part of heat power plants

- DH customers ceased operations or separated
- Industrial DH demand decreased, supply of steam shrank dramatically

- DH subventions were cancelled (after 1992)

- Settlement construction stopped

- Weakly insulated houses; lack of individual metering and control devices
- Municipality owned District Heating systems
- Significantly smaller heat demand
- New dwelling connections to DH have stagnated

Settlement construction stopped
Government programs have been launched for improving insulation and modernizing heating systems.

If full modernization and insulation took place, heating demand may be reduced down to 40%.
Demand of District Heating (2)

- Natural gas companies have expanded very quickly; more than 70% of dwellings are connected to the gas network.
- Lack of competitiveness of DH versus gas heating (but currently 5% VAT versus the standard 25% VAT).

Not many residential connections (some new residential parks with district heating and cooling).

On the commercial and office investment market DH has a better competitive position (e.g. tri-generation opportunity).
Structure of heat procurement and supply

- **Heat Producer**
  - DH Supplier without own heat production
  - DH Supplier with own heat production
  - Heat Customer
Ownership structure, market players

- Privately owned (largest ones: Dalkia /French/, RWE, E.ON /German/)
  - Municipality owned
  - Jointventure owned

- Municipality owned
  - Jointventure owned
Licensing (for operation)

Notary (Municipality) → DH Supplier

Hungarian Energy Office → CHP plant of Heat Producer or DH Supplier

Notary (Municipality) → Boiler of Heat Producer or DH Supplier
Combined Heat and Power (CHP) generation

- Privatizing of power plants (mid 90’s)
- Part of them were updated with large combined cycle CHP units
- DH is produced up to 75% by cogeneration
- 20% of the national electricity production is cogenerated
- Of the latter, 85% is DH related cogeneration

- New government rule for medium scale cogeneration (after 2000)
- Mandatory purchasing for CHP electricity at attractive prices
- < 20MWe and later < 50MWe CHP plants (gas engines, gas turbines, CCGTs)
Obligatory take over of electricity in case of cogeneration and renewable production

- Much higher price than the market price
- Originally till 2010 or till the return of the investment
- Quotas in MWh during the obligatory take over period

TSO

Universal Service Provider or Electricity Trader 1

Universal Service Provider or Electricity Trader m

Residential and Non-residential customers
Price setting

Heat Producers

Heat providing usually through long-term contracts

Heat price

Non-residential heat price

DH Suppliers

Not regulated

Regulated by the municipality

Residential heat price

Effective price or price formula
Requirements towards residential DH price according to the relevant DH act

The price must:

• inspire to produce and supply heat safely on the least cost;
• inspire to use capacities efficiently;
• inspire to spare with DH;
• take into consideration the reasonable cost of continuous and secure operation;
• reflect the advantage deriving from the support of CHP operation (obligatory take-over of electricity)
Price control of the Hungarian Energy Office

1. Initiation
2. Resolution
3. Forwarding resolution
4. Issuing Tariff Decree

Legal background:
- District Heating Act
- Ministerial Decree
- Method of the Hungarian Energy Office
- Municipality Tariff Decree
Price control (Heat Producers)

Checking Heat Producers’ prices:

- Heat Producer’s price ←→ Country-wide average price + ¼ of the deviation
- Heat Producer’s price ←→ Theoretical price based on the Price Formula of transferring CHP electricity price support

Price Formula:

\[
\text{Price}_{\text{Heat}} = \frac{(\text{Cost}_{\text{Heat}} + \text{Electricity} + \text{Profit}_{\text{Heat}} + \text{Electricity}) - \text{Turnover}_{\text{Electricity}}}{\text{Quantity}_{\text{Heat}}}
\]

\[
\text{Profit}_{\text{Heat}} + \text{Electricity} = \text{Assets (fixed)} \times \frac{\text{Equity}}{\text{Equity} + \text{Debt}} \times \text{rate}
\]

Rate: average of the yield of the 5-year state bonds (for the preceding year) + 4 percentage points (maximum 10%)

Possible price structure:
- Capacity fee (HUF/MW/year)
- Heat price (HUF/GJ)
- Supplementary water fee (HUF/m³)

Average heat price: 8-9 Euro/GJ
Checking DH Suppliers’ prices:

(1) Defining categories of DH Suppliers:
- Category A: >= 10001 flats
- Category B: 3001 - 1000 flats
- Category C: 701 - 3000 flats
- Category D: <= 700 flats

(2) Calculating the yearly cost of a standard flat (38 GJ yearly consumption) for each DH Supplier

(3) For each category calculating the weighted average yearly cost of a standard flat

(4) The yearly cost of a standard flat with the DH Supplier’s prices

Weighted average yearly cost of a standard flat in the relevant category + 15%

Average residential yearly cost of a standard flat:
Euro 610 - 715

Possible tariff structure:
- Capacity fee for heating (HUF/air-m³/year)
- Heating fee (HUF/GJ)
- Capacity fee for hot water (HUF/air-m³/year)
- Water warming fee (HUF/water-m³)
Future

• Significant decrease of obligatory takeover prices related to electricity from CHP plants? (elimination of cross financing)
• Remarkable price increase in DH?
• Other ways of supporting DH prices? (especially in case of heat production based on renewable sources)
• Centralized (government level) DH price setting, covering not just DH Suppliers, but Heat Producers as well?