District Heating & Cooling (DHC) network

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Agenda

- District Heating & Cooling (DHC) network
- DHC network – Issues…
- DHC network – Observations…
- DHC network – Example…
- Towards Smarter DHC…
District Heating & Cooling (DHC) network
Switching from linear mode to an interconnected and bidirectional mode

Ensuring consistency
- Needs/ expectation of the customers
- Available energies
- Recovery methods

Source: Cerema
Key performance Indicators (KPIs) in design phase

- Thermal density (MWh / ml.an)
- The duration of use at full power of the boiler
- The needs of buildings were on average between 10% and 30% higher when calculated with the RT2012
- Network operators generally provide a little gap in their design

Explanation of differences between design/operating phases

- Failure to take into account thermal renovation projects (for not informing owners)
- Wrong phasing of the project, or delay of development that is ultimately not done
- Non connecting some buildings
- A particularly smooth weather
Supply temperature optimization: objective and issues

- Set the DHC operating temperature as low as possible in a real time approach, to decrease thermal losses.

Supply Temperature optimization has to take into account

- Consumers real time demand / Consumers forecast demand
- Propagation time of water into network pipes
- Constraints related to max. pressure and flow in the network

Need of real-time DHC modeling…
Towards smarter DHC...

Good understanding of consumers’ demand and network behaviour according to local constraints and energy market

Sub-stations/Buildings Demand/Monitoring

Heat and Electricity Load forecast
Towards smarter DHC...

Optimal scheduling of heat and electricity production

Choose the optimal sources and production mix

Use optimal decoupling of production and demand

Energy Storage: buffer or building mass

« Optimal »...: taking into account multicriteria constraints (economical, environmental, technical, local..)
Towards smarter DHC...

**Clients**
- Adjustment of parameters (priority, shedding ...)
- Storage management

**Network**
- Adjustment of temperature and pressure pumps
- Storage management

**Central Production**
- Energy costs, availability,
- Generators selection
- Efficiency of producers, technical minimum
- Market opportunities
- Environmental impact

**Production parameters management**
- Expectations and needs
- Quality and Quantity
- Hot, Cold & electricity

**Optimisation**
- Cost / Price Changes
- Commitments (Regulation, Contract ...)
- Availability (Quality & Quantity)
- Flexibility

**Customer/Markets data acquisition**
- Expectations and needs
- Quality and Quantity
- Hot, Cold & electricity

**Market Opportunities**

**Smart DHC**