District heating in Lithuania

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<table>
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<tbody>
<tr>
<td>Annual DH production</td>
<td>~ 9 TWh</td>
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<tr>
<td>Heat losses in DH networks</td>
<td>15 %</td>
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<tr>
<td>Used heat production capacity</td>
<td>~ 3175 MW</td>
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<tr>
<td>The length of DH pipelines</td>
<td>2872 km</td>
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DH networks have been installed in all cities and towns
DHC share in energy sources used to satisfy heat demand (2013-2017)
The share of renewable energy in DHC (2011-2017)
RES and natural gas share
Municipal Solid Waste CHP’s in Largest Lithuanian Cities

**Vilnius**
- Population 542,664
- District heating 90%
- Annual heat demand 2.8 TWh
- Municipal waste ~145,000 t/yr.
- Total capacity 229MW_H 92MW_el
  - Biomass 174MW_H 70MW_el
  - MSW 53MW_H 18MW_el

**Kaunas**
- Population 301,296
- District heating 90%
- Annual heat demand 1.4 TWh
- Municipal waste ~200,000 t/yr.
- Total capacity 70MW_H 24MW_el (only MSW)
DH production and sales
Annual replacement and expansion of DH networks, km
LEAK DETECTION – THERMAL IMAGING
Main failures caused by external corrosion
CONSTRUCTION OF NEW PIPELINE
COMMON CONSTRUCTION OF OLD 4 TUBES PIPELINE
The purpose of the project is to develop methods, transnational collaboration processes and knowledge for smart asset management.

Drawbacks of DH:

- Capital need
- Inefficient operation (heat loss)
Specific objectives

• To identify barriers and success factors for the development and implementation of SAM, the digitalization of district heating distribution networks.

• To develop nationally adapted methods for condition monitoring of the district heating networks and of for learning.

• To fully utilize modern ICT tools for data driven predictive maintenance of district heating networks.
• Old ducts transmit half of the energy volume;
• Operational efficiency better than selling more;
• Distribution grid core assets can live 100 years;
• Need strategy for modern maintenance and asset management.
How to improve Return On Capital Employed and Reduce Risk?

Revenues – Costs → Assets
IMPOSSIBLE BALANCE?

Aging pipes
More leakage
More heat loss
Higher repair costs

Very expensive to replace old pipes
Negative impact on third parties
KNOW-HOW – EMERGING AND CONVERGING

- Asset Management (ISO 55 000)
  - Preventive
  - Condition Based
  - Data driven AM, O & M

- Digital Transformation
  - Visualization
  - New Sensors and Material
  - Data Collection & Structure

- Prescriptive & Autonomous
- Predictive
- Risk Based
- Planned
- Corrective
MAINTENANCE METHODS

1. Corrective
2. Preventive
3. Condition based
4. Predictive

Cost and Risk (OPEX)
Capital (CAPEX)
Acoustic Sensors & Algorithms

- Detect and locate corrosion and thermal wear at steel pipes before pipe burst

Benefits:
- Reduce hot water losses and risk of accidents.
- Utilize full lifetime of the pipes.
Thank you!

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