

What are the best tools and instruments in Eastern Europe?

The main trends in rehabilitation of DH systems in post plan economy countries



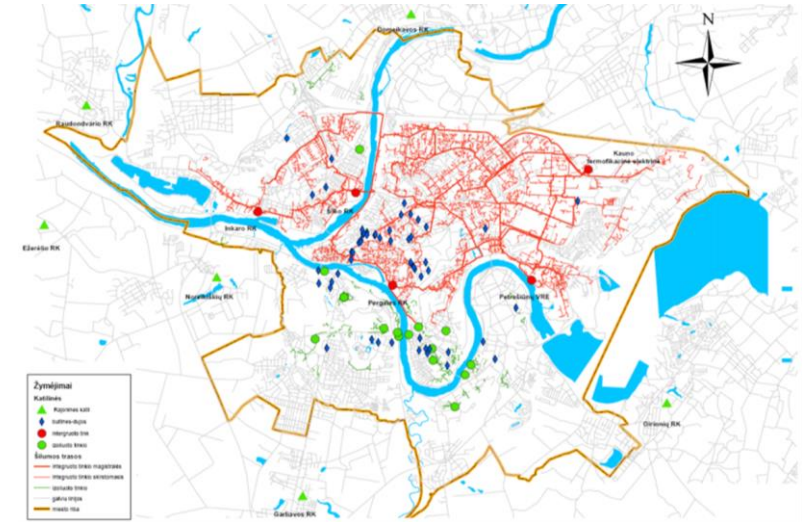
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How post-plan economy countries saved and modernized DH systems

- Regulation of disconnections
- Cost based and predictable pricing system based on regulatory laws
- Independant energy regulator, exclusion of political influence
- Planning of DH infrastructure, construction of CHP plants and waste incinerators, introduction of RES...
- State support (reduced VAT, investment funds, feed-in tariffs for cogenerated electricity...)

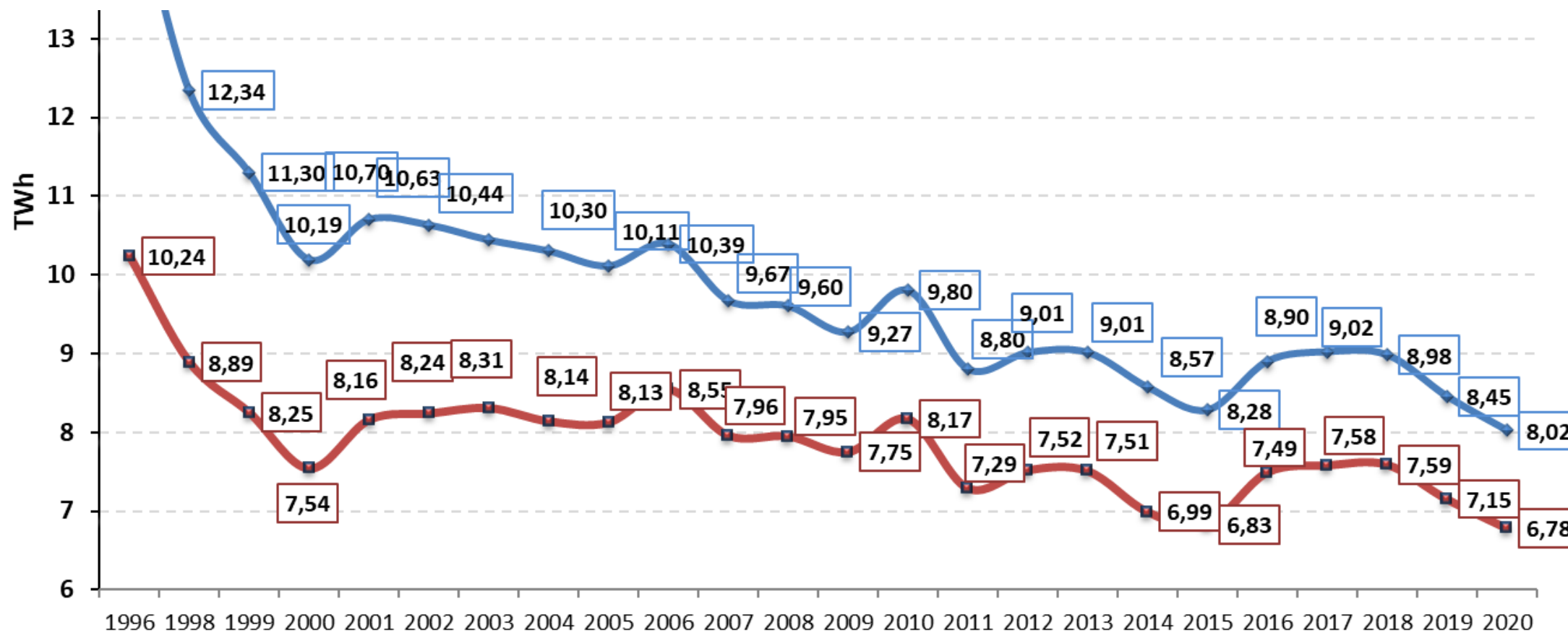


Challenges in DH sector of the post-plan economy countries

- Essential changes in structure of consumers (disconnections, cancelled supply of hot water...)
- Reduction of heat sales (thermo-renovation of buildings...)
- Conversion from imported and fossil fuels to local **renewable** resources
- Rehabilitation of DH networks and heat substations
- Mandatory introduction of heat and hot water meters
- Digitalization...



Decrease of heat sales in Lithuania



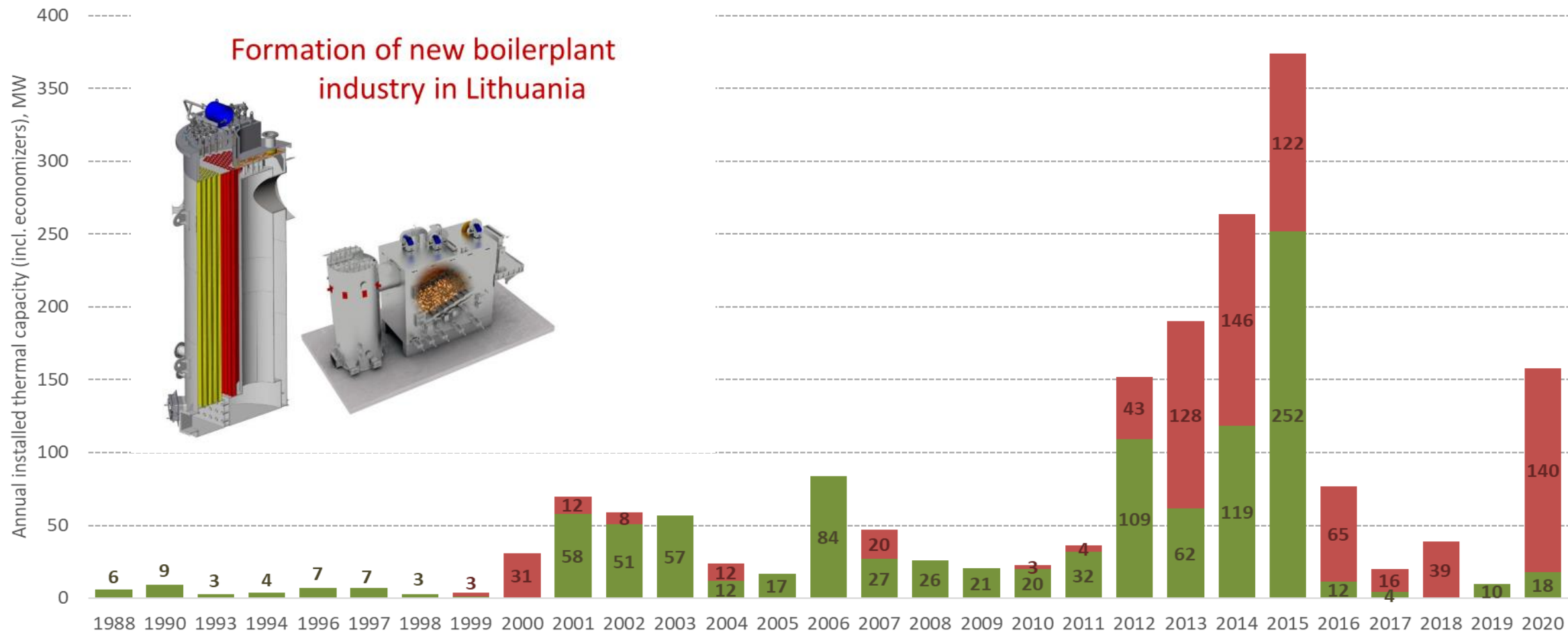
Incentive to build heat production plants based on RES

- Feed-in tariffs for cogenerated green electricity
- Allowed additional return on investments for RAB related to RES
- Obligation to buy heat from external heat producers if it's cheaper (usually based on RES)
- Mandatory connection of external heat producers to the DH networks
- Monthly auctions for heat production based on transparent rules and objective criteria
- Saved and sold carbon allowances – investment funds for DH utilities
- EU and state subsidies for energy plants based on RES..



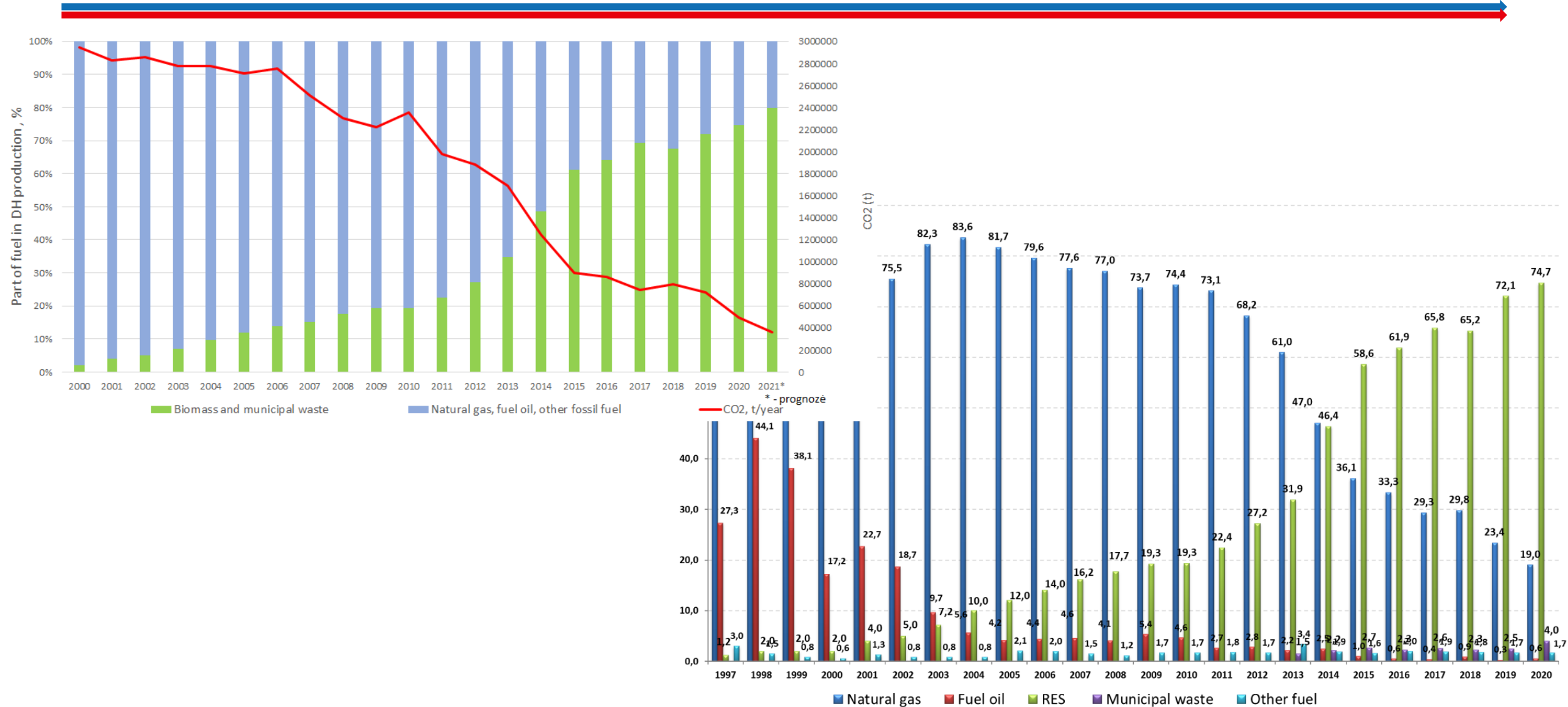
Installation of biomass firing heat plants

The total thermal input of biomass boilers (DH companies and Independent Heat Producers) (HOB+CHP)



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Switch from imported fossil fuels to local renewable resources – CO₂ reduction



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Upgrade DH demo case Salcininkai

The retrofitting measure in 2015 were applied to the boiler house in the city of Salcininkai.



Old fossil fuel fired boiler



New biomass fired boiler



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}

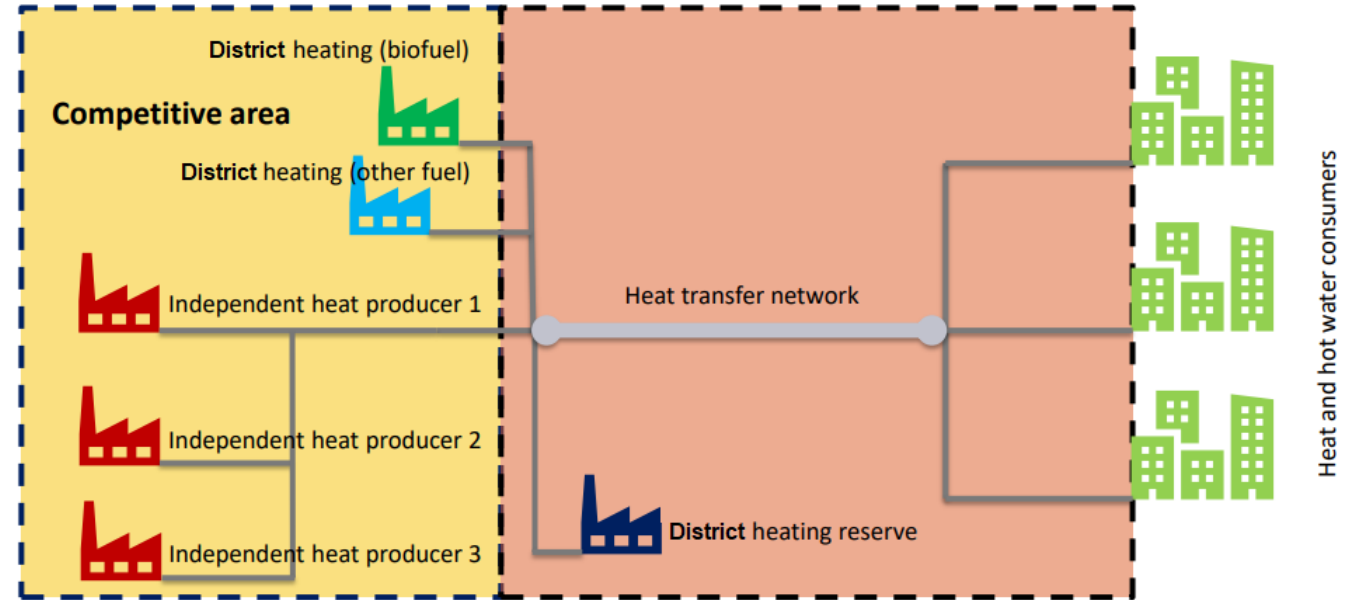
Kaunas

- 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)



Competition model in DH production?

- Single pool buyer?
- Bilateral contracts?
- Auctions?
- Regional Energy Exchange (Warmelast), DK case
- Independent Operator - Energy Exchange (BALTPPOOL), LT case



- All heat sources divided into regulated (peak, reserve) and competing
 - *Only technologically adequate heat sources can guarantee the required parameters, while IHPs are built at random locations of the city*
 - *No competition (just regulatory limitation) in the winter months*
 - *Barriers in long-term infrastructure planning and development*



Benefits of natural gas replacement by biomass

- Strengthening of country's energy independence
- Fulfillment of international obligations – EU task: 20x20x20
- Macro economical and fiscal benefits
- Development of rural regions
- Promotion of local manufacturers
- Decarbonisation of the DH sector (saved carbon allowances sold to other countries)
- Green heat suitable for class A++ buildings
- Significant reduction of DH prices
- Achieved national energy strategy targets



- Bank confidence and loans available when regulation and pricing predictable (Heat law, Energy regulator...)
- Private operators and investors
- Excess carbon allowances sold
- EU and national funds allocated for DH sector rehabilitation
- Heat producing consumers (procumers)...



Reduction of supply water temperature:

- Large cities from 150 to 110 °C
- Cities from 110 to 70-90 °C

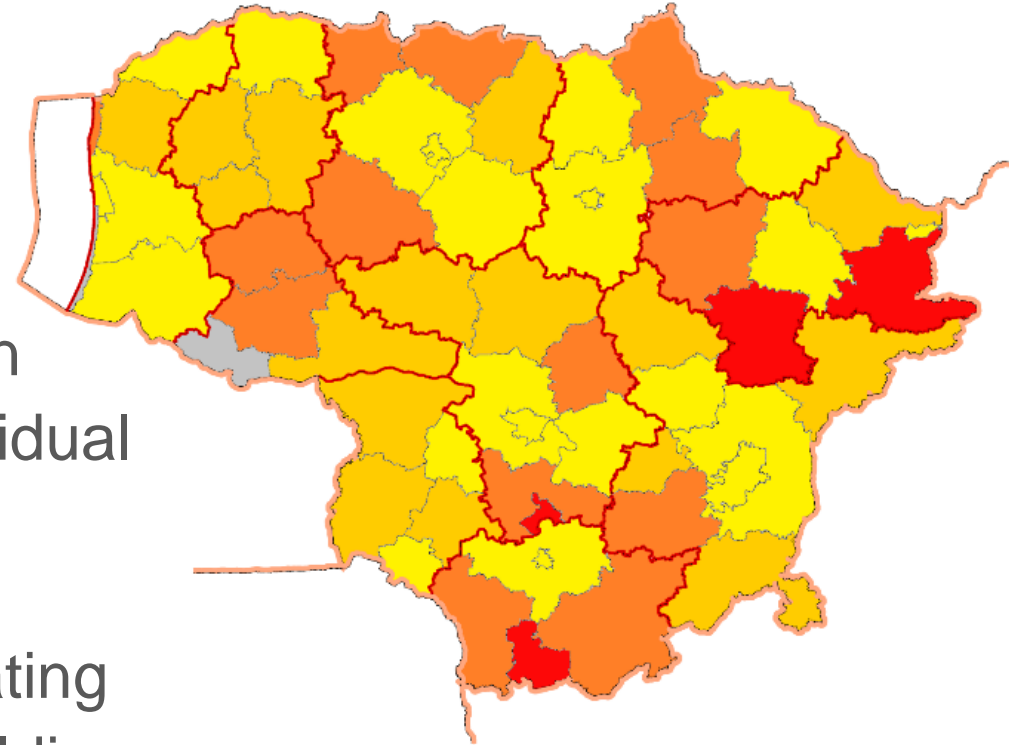
Switch from temperature control to flow regulation

Replacement of central heat substations by individual ones

Optimization of DH networks configuration

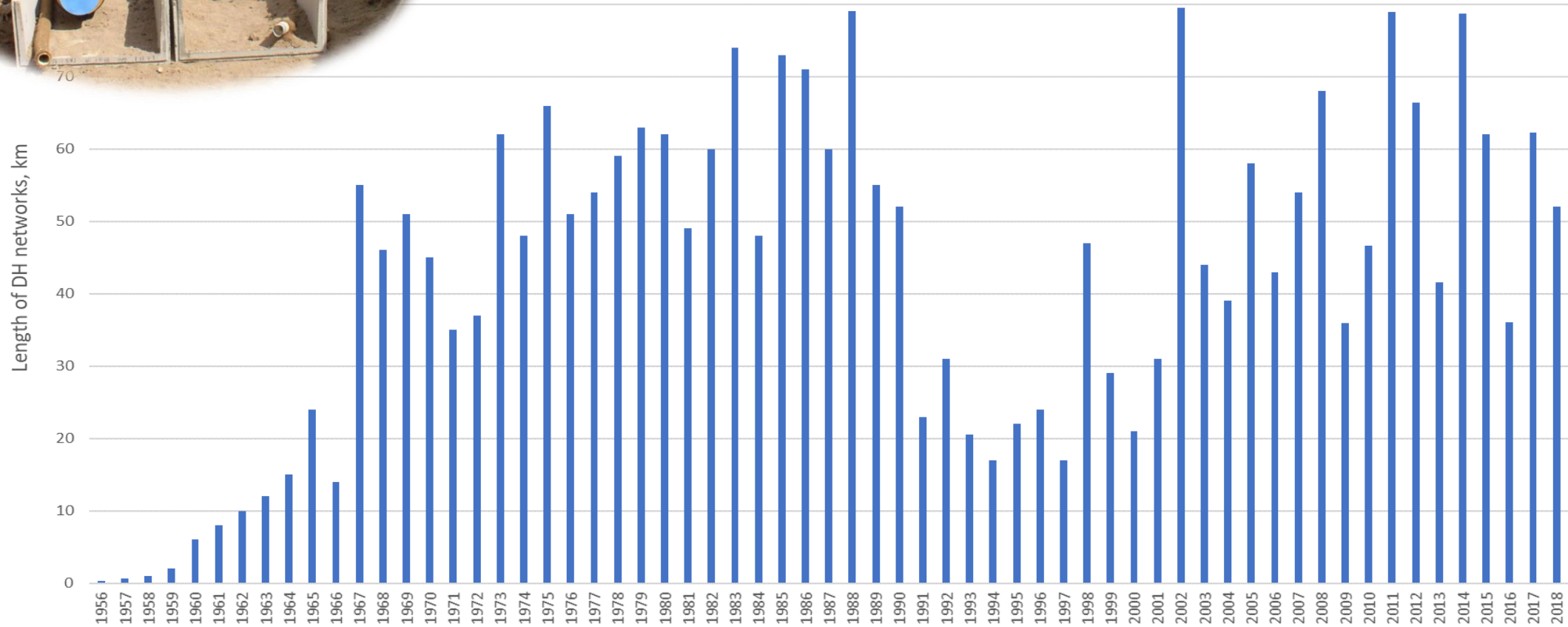
Optimal combination of district and individual heating

Coordination of DH pipeline replacement to building renovation (district renovation)



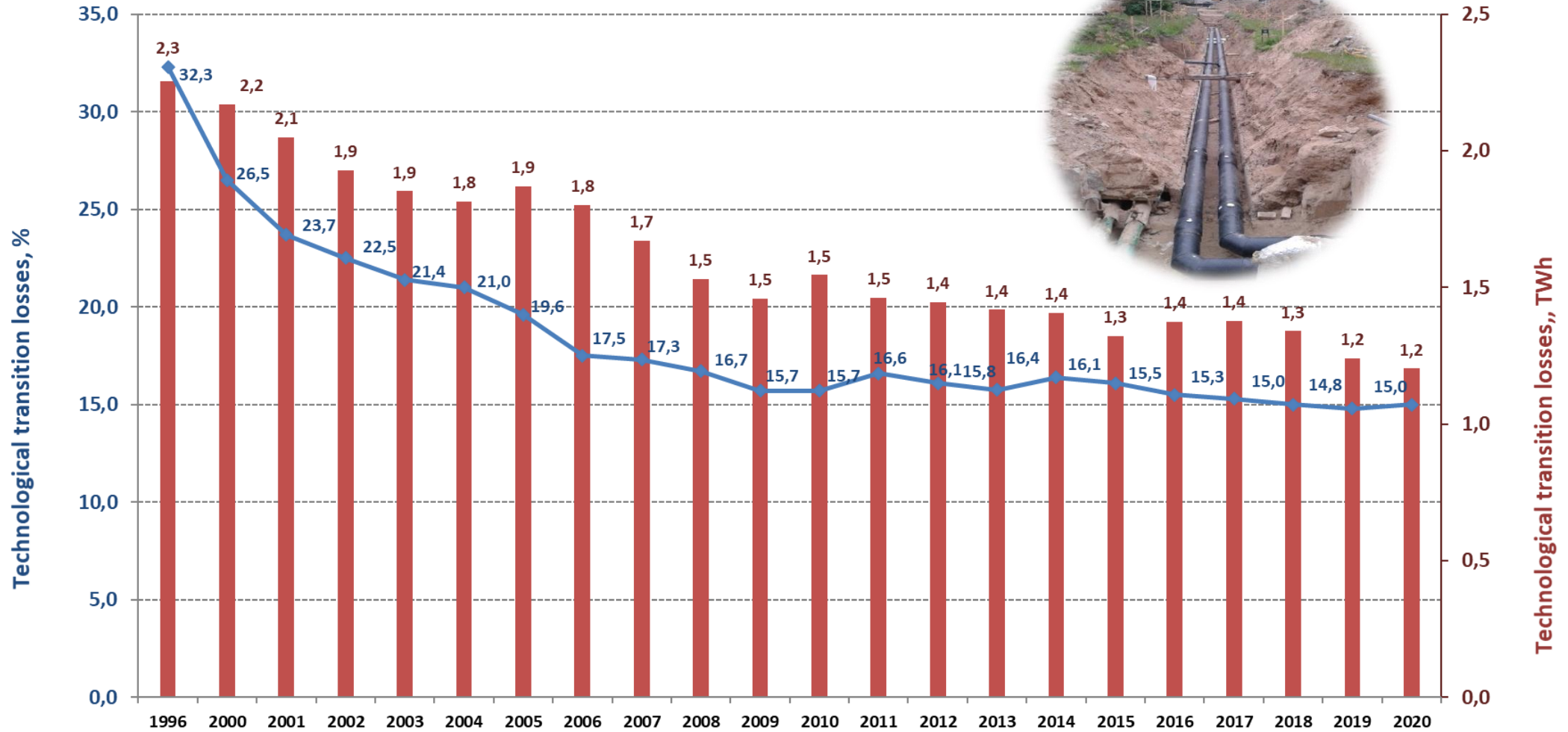


Thermosimulation of future DH networks



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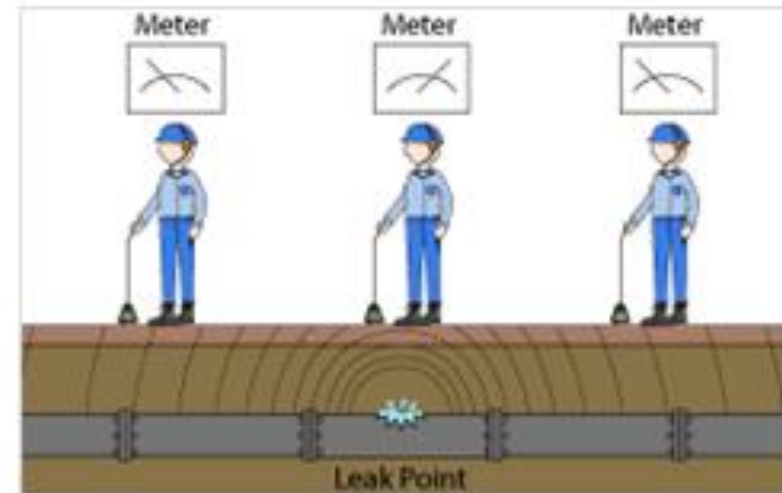
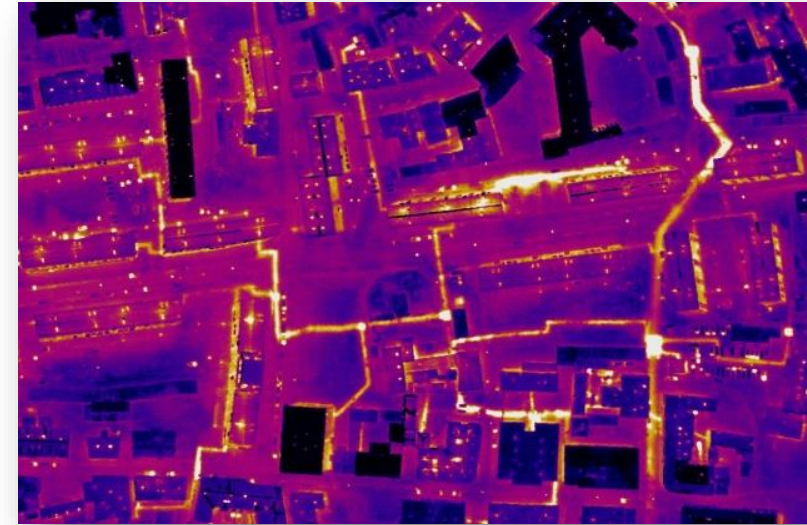
Reduction of heat losses in Lithuanian DH networks



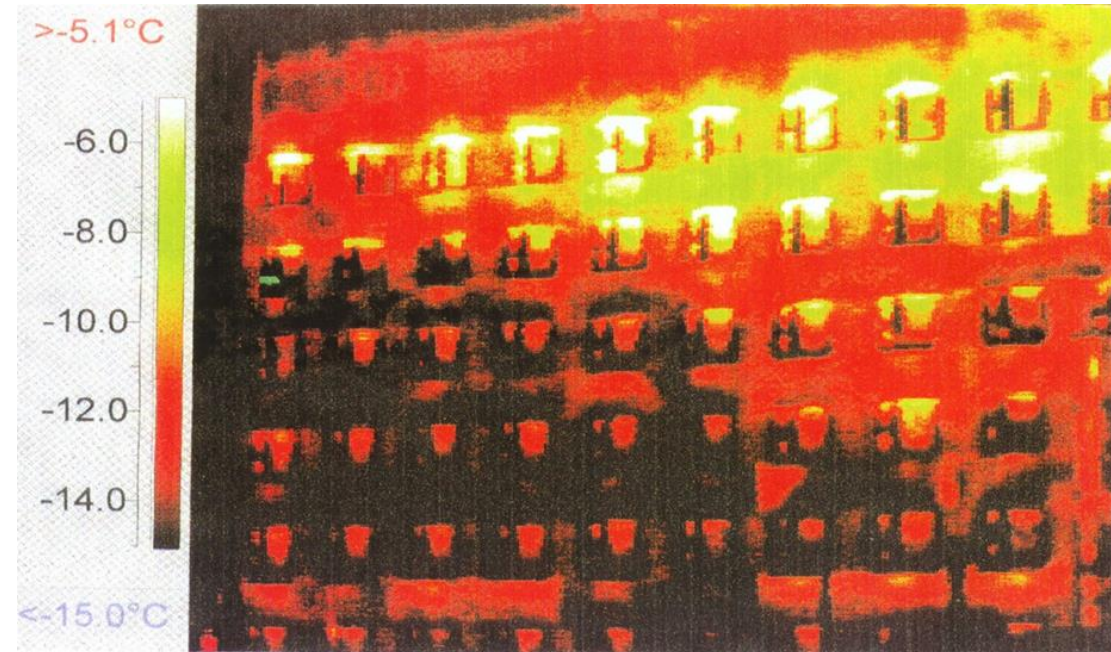
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Increasing reliability of DH networks

- Fast identification of leakages (indicative wires...)
- Monitoring of DH tranches conditions (infrared cameras, geo-radars, temperature and water indicators..)
- New technologies in net water treatment (reverse osmos, vacuum degassers, chemical additives...)
- Smart assets management (tube wall thickness measurements, corrosion rate controllers etc.)
- Planning of tube replacement „just in-time“



- Mandatory „building level“ heat metering for all consumers and remote readings
- Automatic individual heat substations in each building
- Balancing of internal heating systems
- Apartment level regulation and payment for heat



- Vast introduction of CHP plants
- Diversification of RES (solar, waste and ambient heat)
- District heating and cooling
- Heat sales and purchase (two direction heat trade)
- Digitalization of DH systems
- New services and products





Thank you for attention
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