



# Introduction to District Heating

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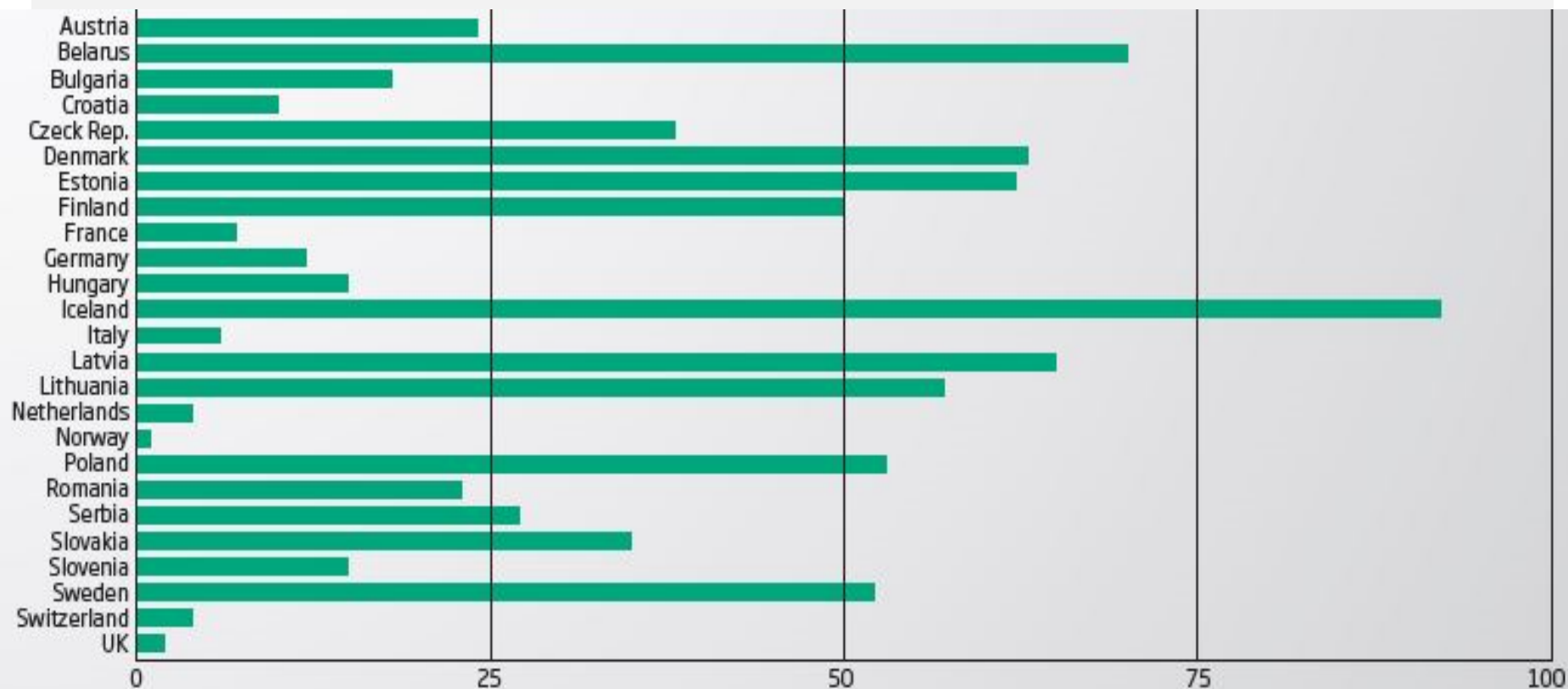
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# DH i Europe



Share of citizens served by district heating in 2013 in percent

Source: Euroheat and Power: District Heating and Cooling Country by Country Report 2015.



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# DH

- The aim:
  - Make or buy heat, Move heat & Market heat
  - Delivered to meet customer demands for space heating & preparation of domestic hot water & industrial processes.
  - Use renewable natural sources or resources that will be lost if they are not used.



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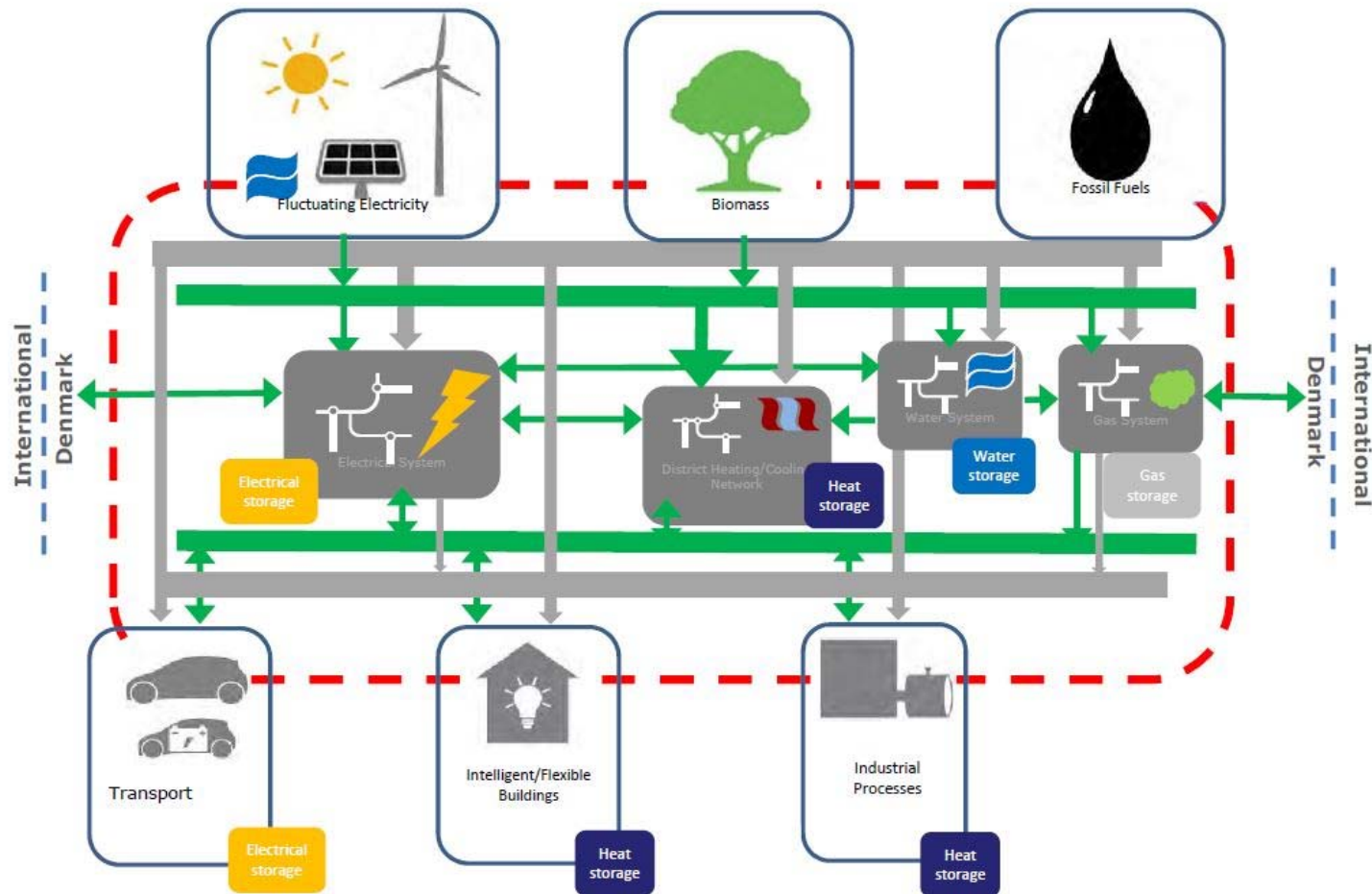


# DH

- Technology:
  - Supply units – production.
  - Distribution grid.
  - Customer substations - units.
  - Customer heating systems.



# DH - Part of Flexible Energy



# My Home is My Castle

- Individual boilers:
  - CO2-emissions?
  - Operation & Maintenance?
  - Cost-benefit analysis?



# Individual/Community

- Idea: Common investments/operation/maintenance
  - Supply units: huge investments or common trade
  - Distribution grid: huge investments
  - Customer substations – units: save money
  - Customer heating systems: integration.





# Obligatory Elements in DH

- 1) A suitable heat source that is cheap.
- 2) Demands from the heat market.
- 3) Pipes that connect the demands and the sources.



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# Current Heat Resources

- 1) Upgraded excess heat from thermal power stations (CHP or cogeneration).
- 2) Waste incineration (Waste-to-Energy Plants).
- 3) Excess heat from industrial processes.
- 4) Fuels that are difficult to handle in small boilers – e.g. wood waste and straw.
- 5) Geothermal heat sources.
- 6) Solar thermal heat sources
- 7) Heat pumps.



# The Fundamental Idea of DH

## Secondary Energy Supply

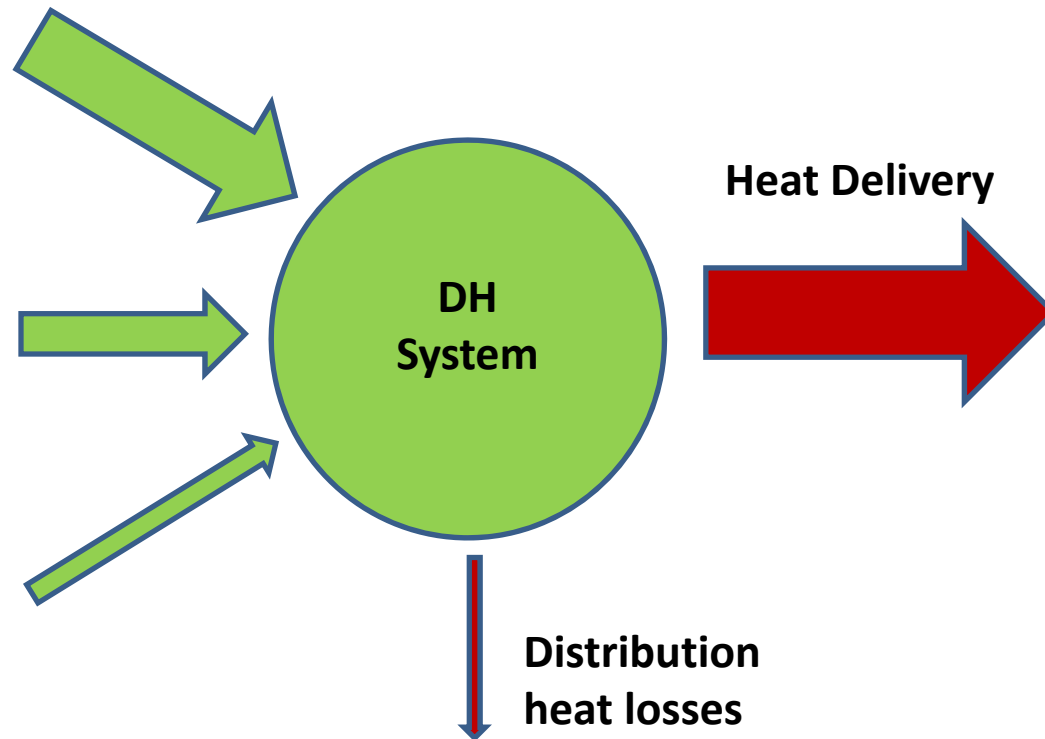
Heat recycled from CHP, waste incineration and industrial excess heat.

## Primary Energy Supply

Renewables – e.g. geothermal, biomass and solar heat.

## Primary Energy Supply

Fossil fuels for peak and backup supplies? – changing into e.g. heat pumps,



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# My Community is My Home

- Common DH-System:
  - CO2-emissions?
  - Operation & Maintenance?
  - Cost-benefit analysis?



# Main Consumer Benefits

- Comfortable, simple, continuous and reliable direct heat delivery.
- Less floor space and lower capital investment for the customer's own heating equipment.
- No risks for fire or gas-explosions.
- Payment required only for the actual design heat capacity based on current use – no oversized local boiler.
- Local availability of a non-fossil heat supply without major customer investments.



# The Danish Example

- Consumer controlled DH-system - coops.  
Video from Hvidovre DH Cooperative
- Non-profit operation.
- Energy integrated systems.
- Innovative systems.
- Competitive without typical market players.





# Community benefits

Production 2020: 7.4 Billion kWh with a profit of 1,5 cent/kWh = € 111 Million

	Local Ownership 20%, Long Distance Owners 80%	Local Ownership 60% Long Distance Owners 40%	Local Ownership 100%
Local Income Million €	19.73	58.67	98.67
Local Tax Million € 25% (80% taxed)	3.95	11.73	19.73
Local Company Tax Million €	0.1	0.06	0

# Results

- Approx. 400 DH-entities in DK.
- 340 are consumer controlled.
- 10,181 employees in the DH sector creating 9,905 local jobs – 1,865 employed in DH entities (2016).
- Total turnover: € 2,44 billion (2016).
- Contribution to GNP: € 2,3 billion (2016).





# Conclusion

- Consumer controlled and owned DH systems deliver efficient, secure and cheap heat.
- Consumer controlled and owned DH systems are more flexible in the overall energy system since they don't focus on the bottom line but on the heat efficiency and heat price for the benefits of the consumers.
- DH benefits the society.

# Thank you!

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