# DIGITAL DISTRICT HEATING

## Climate Contribution

10. November 2020

Head of Development, Kim Behnke, Danish District Heating Association

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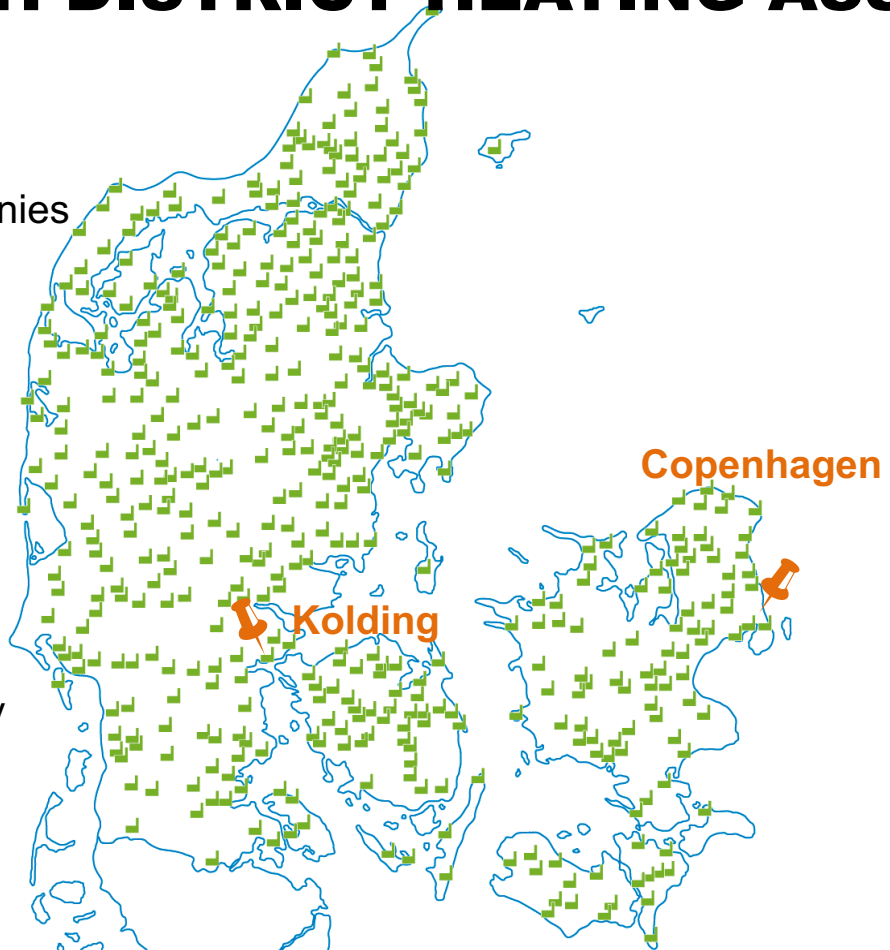
**400**
Heating companies

**1.8 mill.**
Buildings with district heating

**20,000**
New costumers a year




**62%**
Renewable energy

**9%**
Price reduction in past years

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# FROM GREEN TO BLACK ENERGY


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# NOW FROM BLACK TO GREEN ENERGY

## District Heating – part of the solution;

- Ready for several UN goals: 7, 9, 11, 12 and 13
  - Clean Energy, Innovation, Sustainable Cities, Responsible Consumption and Climate Action.
- Contribute to the Danish 70% carbon reduction goal
  - Delivering some 44% of the lack towards 2030
- Compliance with the Climate and Energy Agreement from June 2020
  - Green Heat for 500,000 homes
- Helping Cities with their Climate Goals
  - District Heating is already at 62% RE


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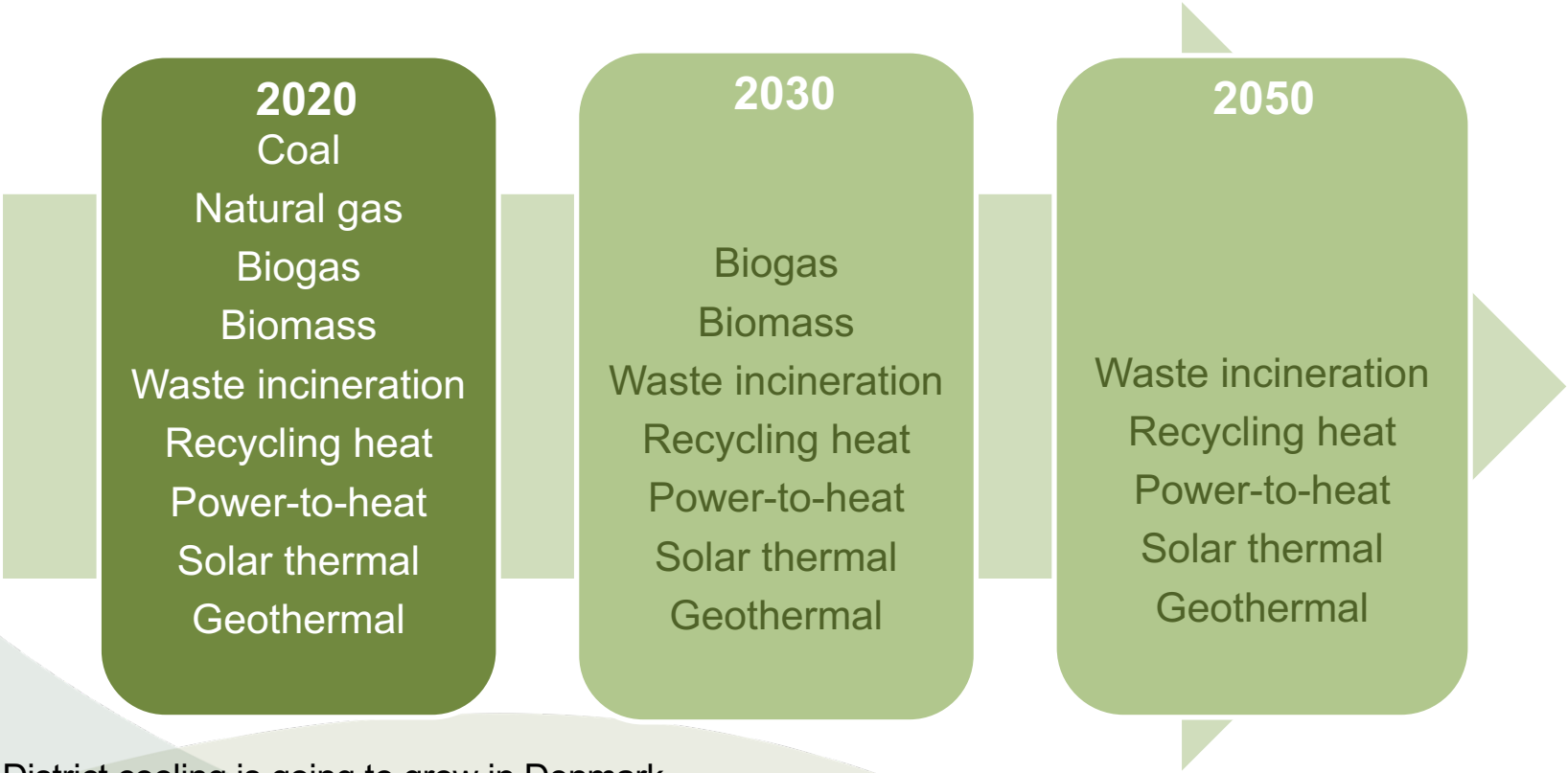
# THE GREEN TRANSITION – DISTRICT HEATING




District cooling is going to grow in Denmark

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# LONG TERM ENERGY GOALS

## The District Heating Sector is aiming at;

- Key role in the Sectorial Integration
  - Power, Biogas, Waste incineration, Water, Wastewater, PtX and Recycling Heat.
- Digitalization of District Heating
  - Utilization of Big Data for large optimization
- Development of District Cooling
  - Expected massive growth in the future
  - Optimization between District Heating and Cooling
- Storage of large quantities og energy (not only electricity)
  - Thermal Storage is cost-effective and not complicated.


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# GREEN HEATING FOR ALL BY 2030




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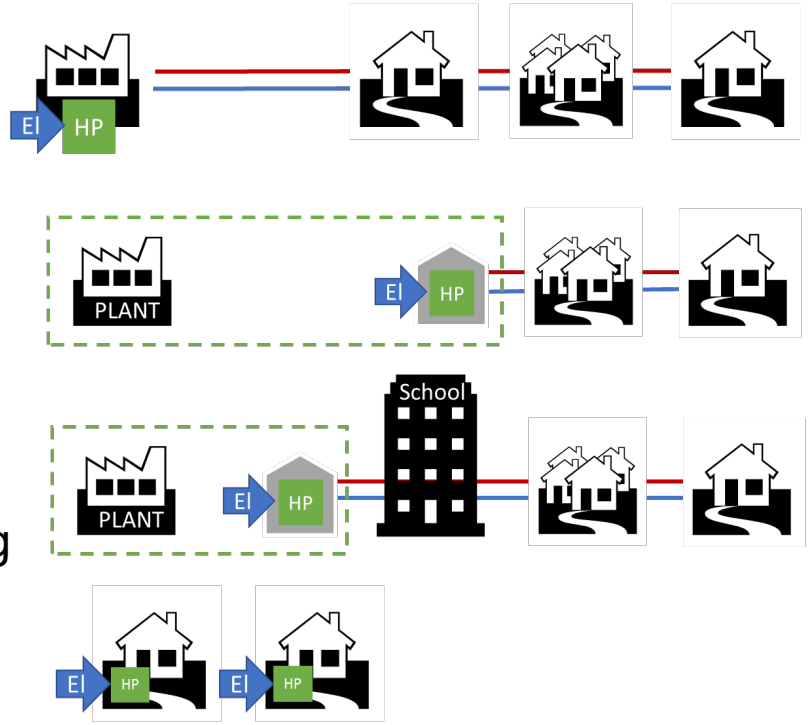
# HEAT PUMPS AND HEATING SOLUTIONS

**District Heating** – Large Heat Pumps at the Plant. Distribution of heating by pipelines in a grid.

**Local Heating** – Medium size Heat Pumps placed local for supply of heating to a smaller group of homes. There are grid connected. An other possibility is large municipality buildings ex School plus a group of homes. Projects larger than 250 kW is District Heating with a local grid.

**Individual Heating** – Small Heat Pump in individual homes. No grid connection.

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# THE ROAD TO GREEN HEATING FOR 500,000





## No fossil fuels for heating by 2030

- **District Heating** conversion to Green Heating using sustainable fuels and integration of all relevant homes and buildings. Phase out of natural gas areas.
- **Local Heating** is a new option based on large municipality buildings and integration of neighboring buildings for a local satellite solution – District Heating when above 250 kW. Phase out of natural gas.
- Oil boilers conversion to **District Heating** in utility areas. Otherwise to individual heat pumps with **Individual Heating** solution.
- Gas boilers conversion to **District Heating** in new utility areas. Some places with a large common heat pump or individual heat pump.
- Wood pellets stow might also change to a heat pump as **Individual Heating**.

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# INDIVIDUAL HEAT PUMPS – NOT IN CITIES

- In cities and dense population District Heating is the optimal solution.
- Individual Heat Pumps for heating or cooling is not the right way in dense settlements.
- It looks terrible and has a low efficiency.

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# THE ROAD FOR DIGITALIZATION

## Why Digitalization?

- To be more cost-efficient and reduce carbon emissions
- Consumer empowerment and engagement
- Optimizing the District Heating systems
- Reduction of thermal losses
- Thermal storage
- Multiple sources of heat recycling
- Sustainable heat generation from RE-fuels
- Sectorial Integration with power, gas, water utility and….


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# DIGITAL APPROACH

## The District Heating sector is ready;

- 750,000 tons $CO_2$ reduction from usage of metering, automatization, renovation and optimizing.
- 7 to 20% reduction of heat losses in the heating system.
- 800 Million DKK in annual savings.
- Intelligent control (Machine Learning) will reduce the energy consumption additionally.
- **Don’t forget Cybersecurity!**
  **- Security by design.**


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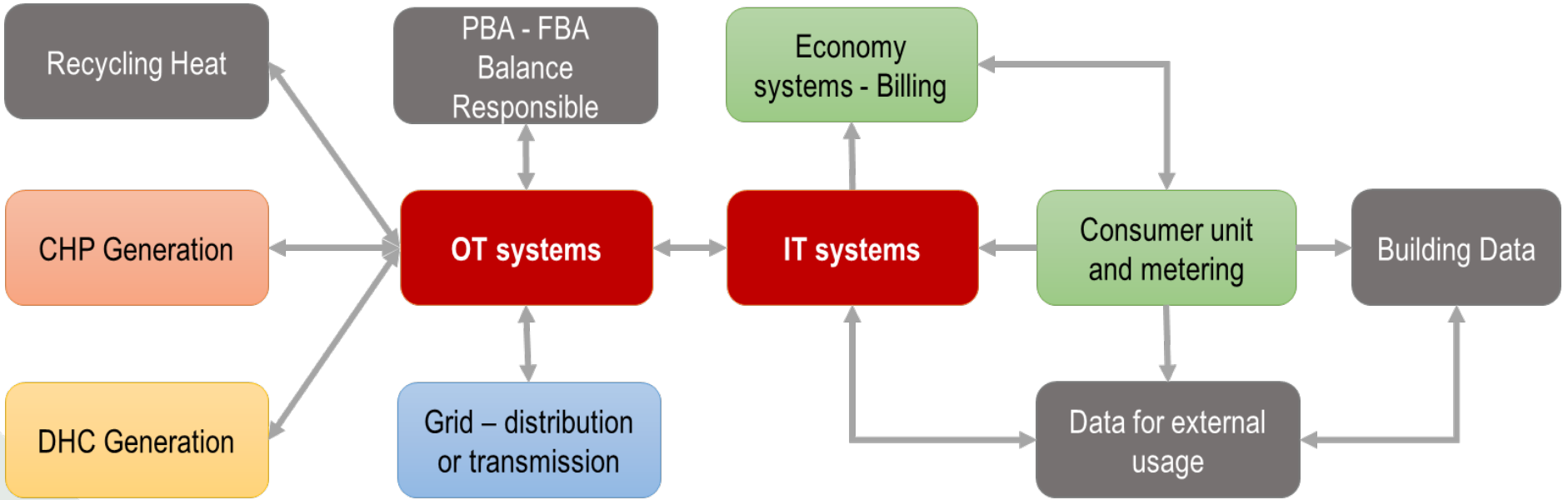
# DIGITALIZATION OF THE DISTRICT HEATING




Prevention of cyber attack and better cyber security – co-ownership of the new ENERGI CERT

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# HOW DO WE DO IT?

# CITIES PROJECT – THANK YOU

## R&D by excellence;

- Danish District Heating Association has enjoyed the collaboration with the CITIES Project - Centre for IT Intelligent Energy Systems.
- CITIES has shown the value of long term and persistent R&D
- There are so many valuable lessens learned.
- Now we must enhance the implementation in the many large investments the District Heating sector are now facing.

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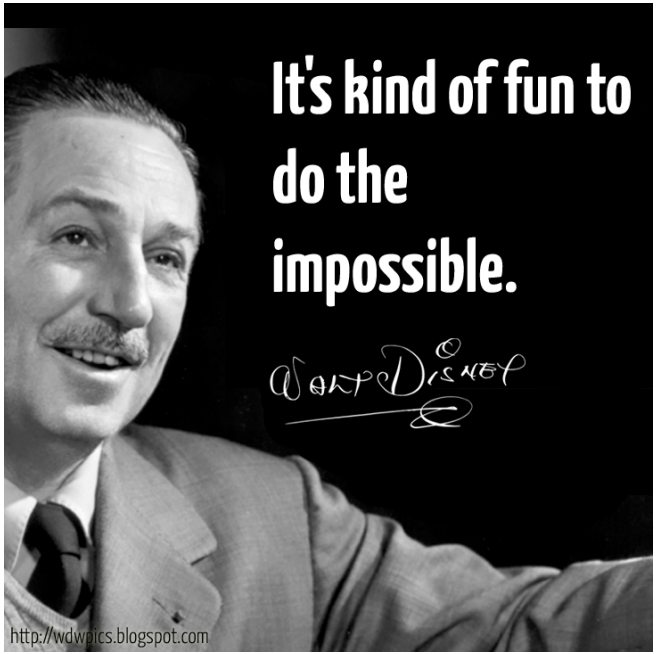
# NEXT STEP

## Optimization with benefit

- Most meters are now digital and with remote reading.
- Digital meters are not just for billing.
- Data must be utilized in the optimizing of the daily operation.
- It’s all about benefit – for the District Heating company – and thereby for the consumer.

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# THANKS FOR YOUR ATTENTION

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