COGENERATION OBSERVATORY AND DISSEMINATION EUROPE

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CHP Siekierki

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District heating sector in Poland

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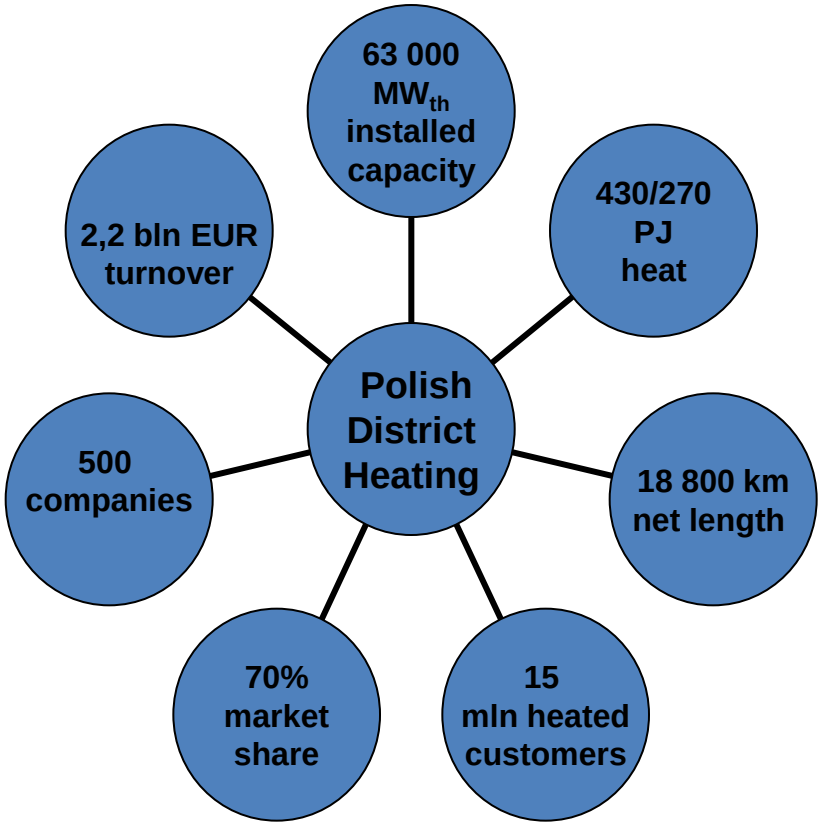
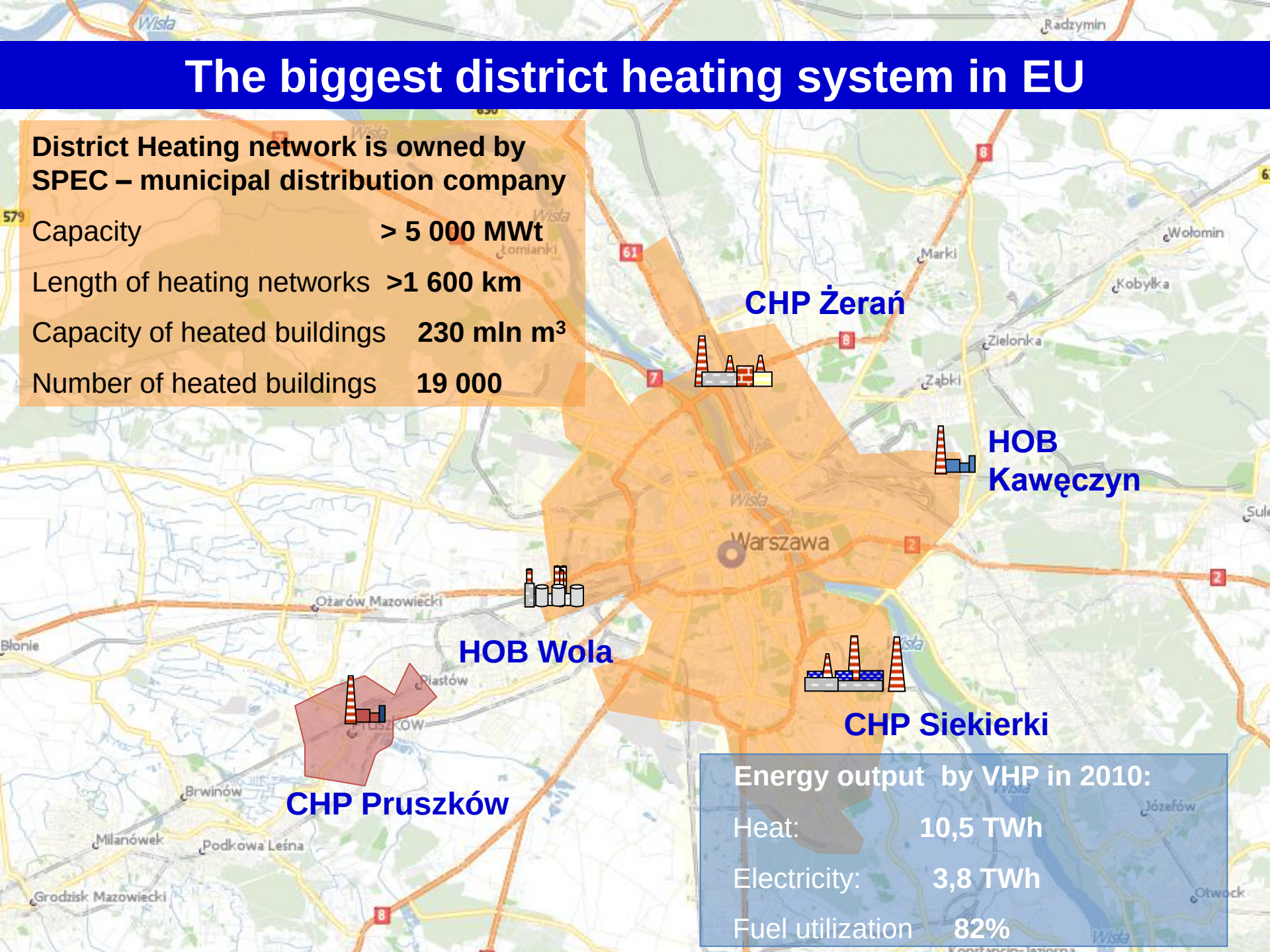


The biggest district heating system in EU

District Heating network is owned by SPEC – municipal distribution company

Capacity	**> 5 000 MWt**
Length of heating networks	**>1 600 km**
Capacity of heated buildings	**230 mln m³**
Number of heated buildings	**19 000**



Energy output by VHP in 2010:

Heat:	**10,5 TWh**
Electricity:	**3,8 TWh**
Fuel utilization	**82%**

CHP Siekierki overview

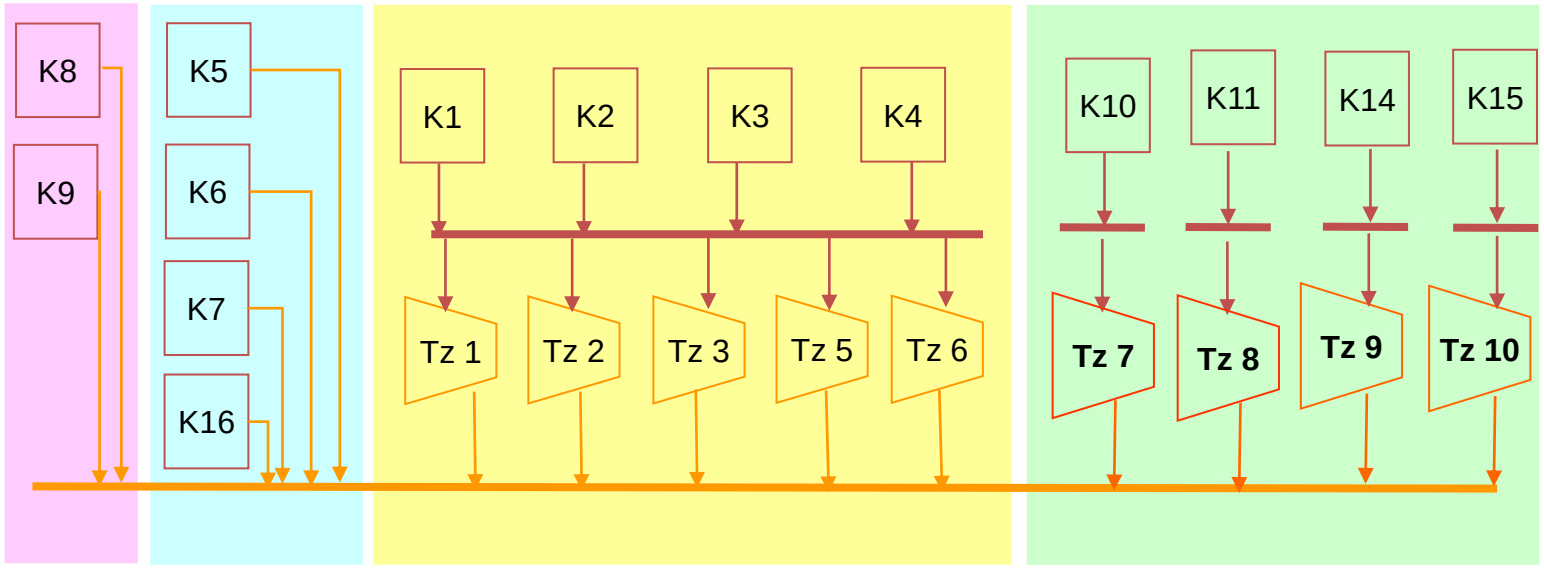
Installed capacity:

- Thermal - 2 078 MWt
- Electrical - 620 MWe

Production in 2010

- Thermal energy - 5 550 TWh
- Electrical energy - 2.5 TWh
- Coal consumption - 1.4 M Mg

CHP Siekierki overview



232,6 MW_t **652 MW_t** **420,3 MW_t** **773,3 MW_t**

179 (145) MW_e **441 (377) MW_e**

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Key investments 2001 - 2010

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- Reconstruction of K-2 boiler at CHP Siekierki equipped with DeSOx installation
- Reconstruction of old turbines at CHP Siekierki (two turbines)
- Environmental investments
  - Ash reduction emission based on electrostatic precipitators modernization on all cogeneration units – meeting emission level of 50 mg/Nm^3 (standard = 100 mg/Nm^3)
  - DeSOx program at CHP Siekierki – realization before 2012
  - DeNox program for CHP Siekierki – realization before 2014
- Heat accumulator at CHP Siekierki improving cogeneration ratio
- Biomass co-combustion installation

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Emission reduction

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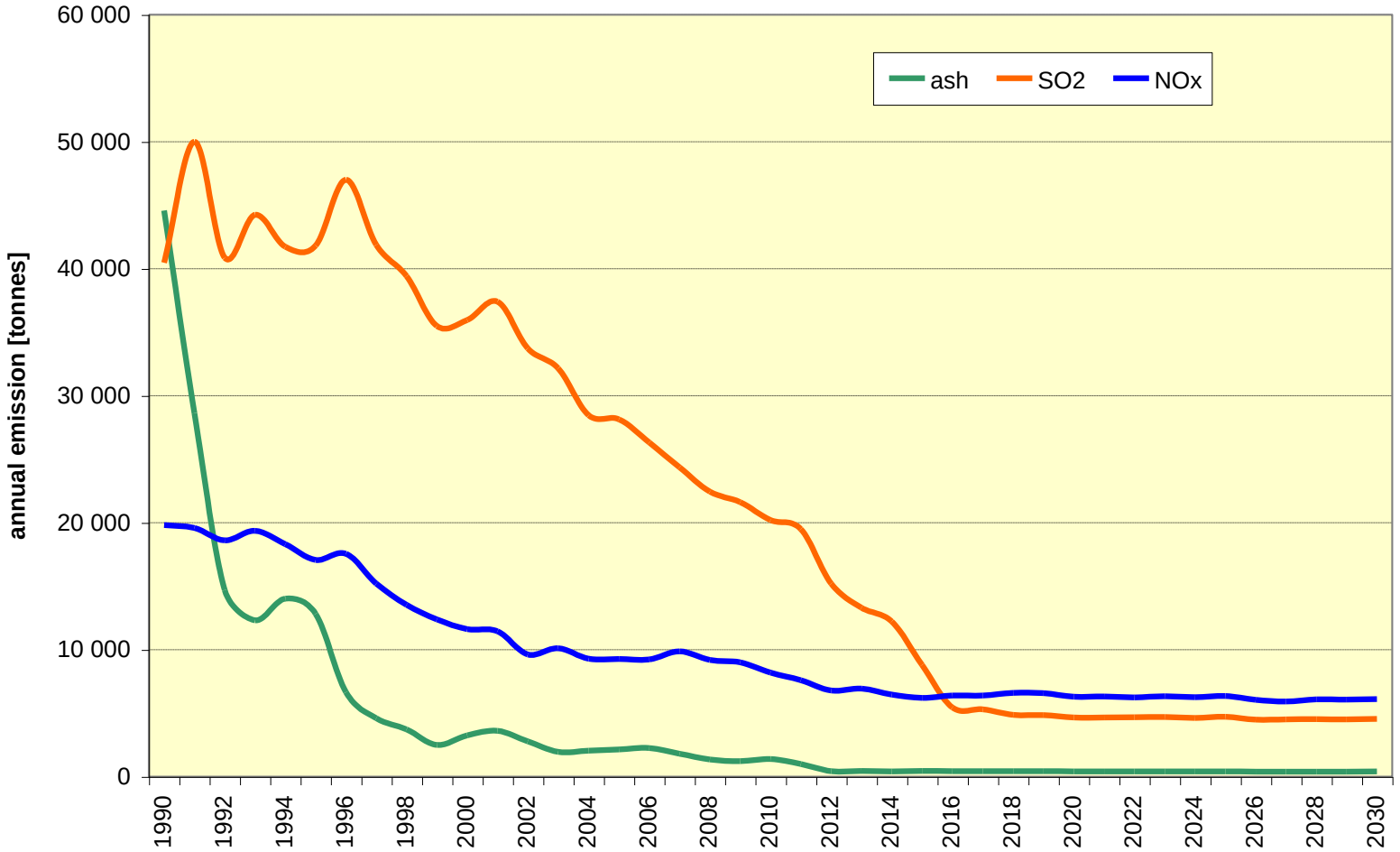

Heat accumulator

Parameter	Unit	Value
Capacity	m^3	30 000
Tank's height	m	43
Tank's diameter	m	30
Insulation width	mm	500
Loading / unloading	t/h	4 500
Temperature of hot water	st. C	40-99
Operating mode	-	not under pressure
Protection from corrosion	-	steam pillow

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FGD plant in CHP Siekierki

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• Max flue gas flow	3,1 mln Nm^3/h
• SO_2 concentration after FGD	200 mg/Nm^3
• SO_2 reduction	80%
• FGD technology	wet

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Basic characteristic of FGD

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- FGD with two absorbers (50% / 50%), with connections between flue gas canals, assuming boilers:
  - Steam Boilers - 3 x OP 430, OP 380,
  - Water Boilers - 3 x WP 120, WP 200

- Supporting installations involving existing boilers and new unit

- New stack, common for existing boilers and new unit – triple fluepipe, height 200 m.

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Biomas co-combustion

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Co-combustion installation at CHP Siekierki

- Kind of biomass: wood chips, agricultural crops
- Yearly biomass usage: up to 60 000 t/a

Electricity production from biomass in VHP: 130 000 MWh/a

VHP target for the year 2015:

500 000 t/a

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New power unit 480 MW in CHP Siekierki

Nominal gross electric capacity	-	480 MW
Thermal capacity	-	500 MWt
Net electric efficiency	-	44.7 %

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