TFE project in Polen (Gliwice,Ostroda)

DBDH members meeting – 3 June 2025


Development Plan

TFE Poland

Demokracji 5, 14-100 Ostróda, Polen

Lars Gullev, Founder & CEO
Gullev DH Advisory

TFE – PROJECT POLAND

Aim of the project:

- Assist Polish utilities in their efforts to produce the Development Plans (DP) that in detail describe the transition from today to a sustainable and efficient DH system.
- Combining Danish and Polish expertise, to improve the content of DP and accelerate the process to reach investments.

To accelerate innovation and knowledge transfer, the project works on two specific DP:

- A typical Polish DH system to ensure that the results are useful and easily transferable to other DH utilities in Poland (PEC Gliwice)
- A front -runner utility to inspire others with their progress (MPEC Ostroda).

GULLEV ADVISORY

Gliwice

Ostroda

TFE – PROJECT POLAND

The project had a strong focus on collaboration.

- Not only between partners in the project, but also with and among utilities, associations, and authorities in Poland, and with the Danish Energy Agency (DEA) including their Energy Governance Partnership (EGP) programme.

The project partners were:

- A Polish municipality (Gliwice)
- The Polish DH association IGCP
- The Royal Danish Embassy in Warsaw.
- Danish technical consultant (Artelia A/S)
- Danish utility (VEKS)
- DBDH supported the project as a project consultant.

TFE – PROJECT POLAND

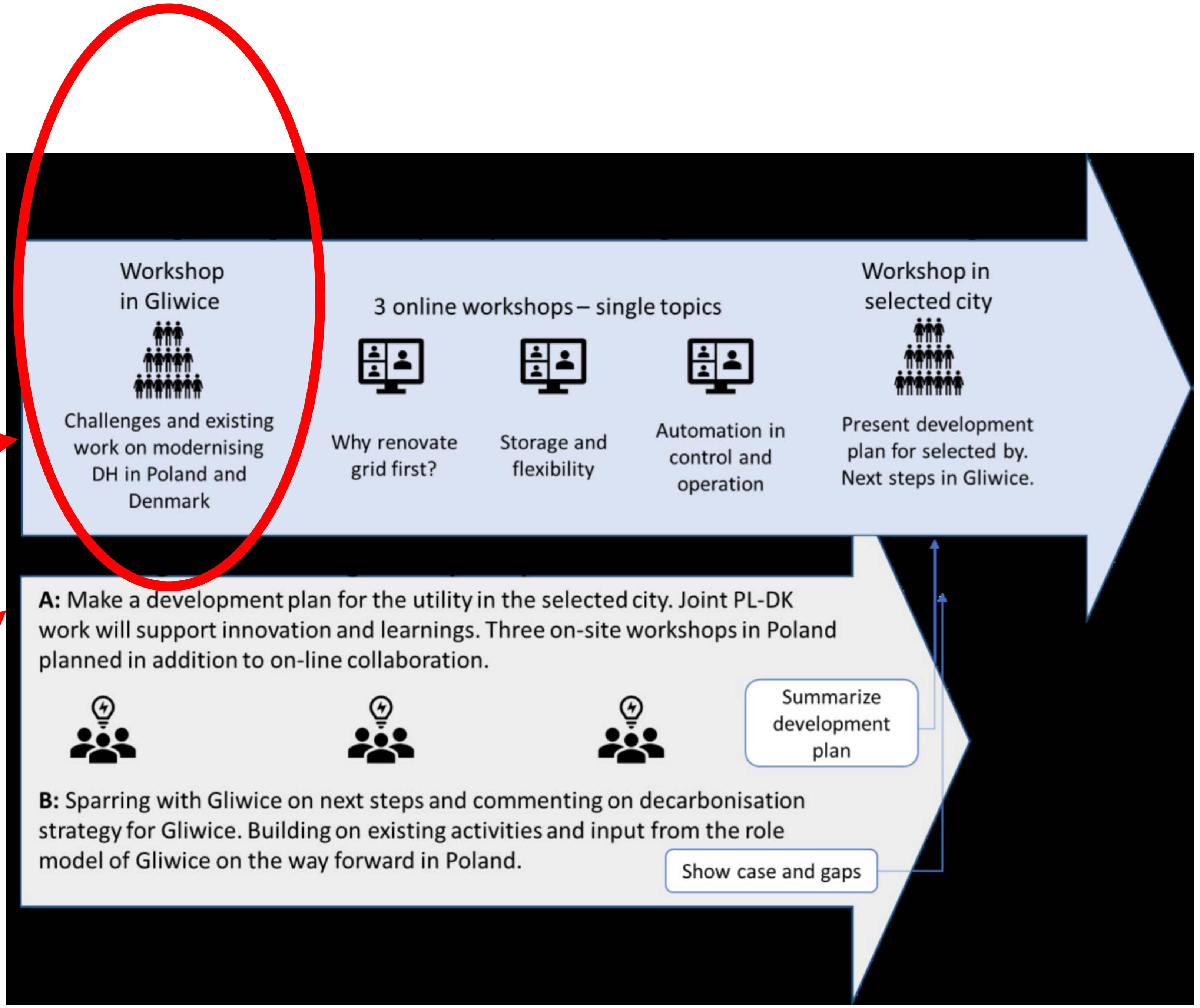
Project activities

The project activities are organised in two work packages:

- WP1:
  - Knowledge-sharing about development plants in Poland – going into details and a lot of dialogue.

- WP2:
  - Working on specific development plans

The main activities and participants are illustrated in the figure to the right.



TFE – PROJECT POLAND

MoU between DBDH and MPEC Ostroda

HM King Frederik X, Denmark, headed January 2024 a business visit to Warsaw on his first official visit abroad.

DBDH and MPEC Ostroda , on this occasion, signed a Memorandum of Understanding (MoU) that will assist the utility in their green transition of the district heating systems.

From being 80% dependent on coal from Kazakhstan, the utility aims to transform to biomass and natural gas and reduce dependency on coal to 20% in only two years!

TFE – PROJECT POLAND

Sparring activities in Gliwice

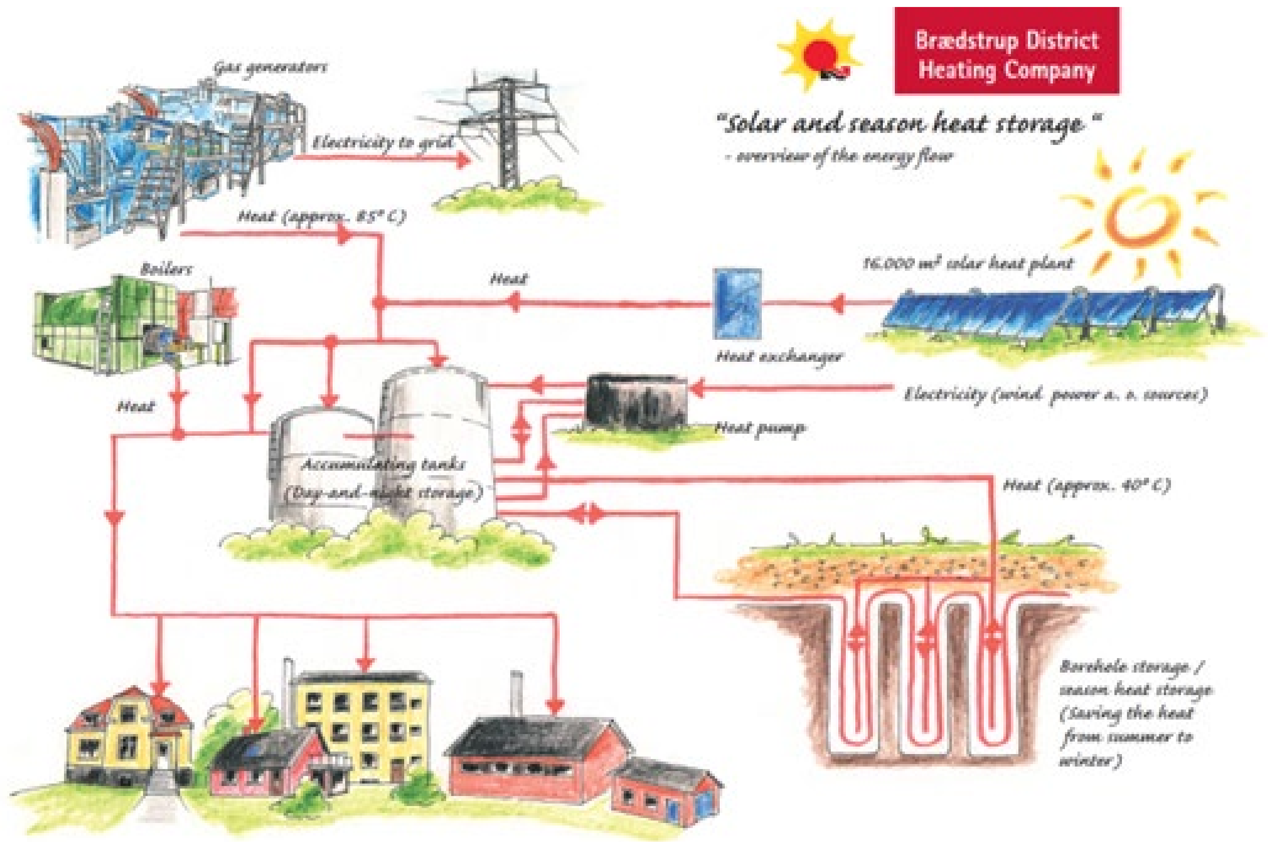
- Strategic energy planning based on “Strategic Heat Plan, Capital Region, DK” – 33 municipalities, two regions 10 utilities (DH, natural gas, electricity, electricity, waste).

- Low Temperature District Heating (LTDH) based on experience from Albertslund , DK.

- System Integration based on “Case Brædstrup”.

- Excess heat from industries – contracts between industry and DH company based on “Case CP Kelco”.

- “ProjectZero ” – Sønderborg, DK



TFE – PROJECT POLAND

THREE WEBINARS - 1

System Integration

- “Danish chicken slaughterhouse (Danpo)” - Excess heat from the heat pump that supplies cooling to the slaughterhouse is used in the district heating system – Artelia, DK.
- “The story about an orange – CP Kelco” – VEKS, DK.
- “How to integrate solar, local resources of biomass and heat storage in a district heating system” – Egedal, DK
- “A new DH company is born” – Bjæverskov , DK

TFE – PROJECT POLAND

THREE WEBINARS - 2

Automation in operations

- “How to upgrade a 3GDH network to 4GDH network by reducing the flow temperature” – Albertslund , DK.
- “Automation in operation – How to reduce flow temperature step by step in existing district heating networks” – Grundfos, Poland.
- “Mixing -loops” - OPEC Gdynia, Poland.
- “Automation in operation – Using data from energy meters for more than billing the customers” - Kamstrup, Poland.

TFE - PROJECT POLAND

THREE WEBINARS - 3

Heat pumps, storage and flexibility

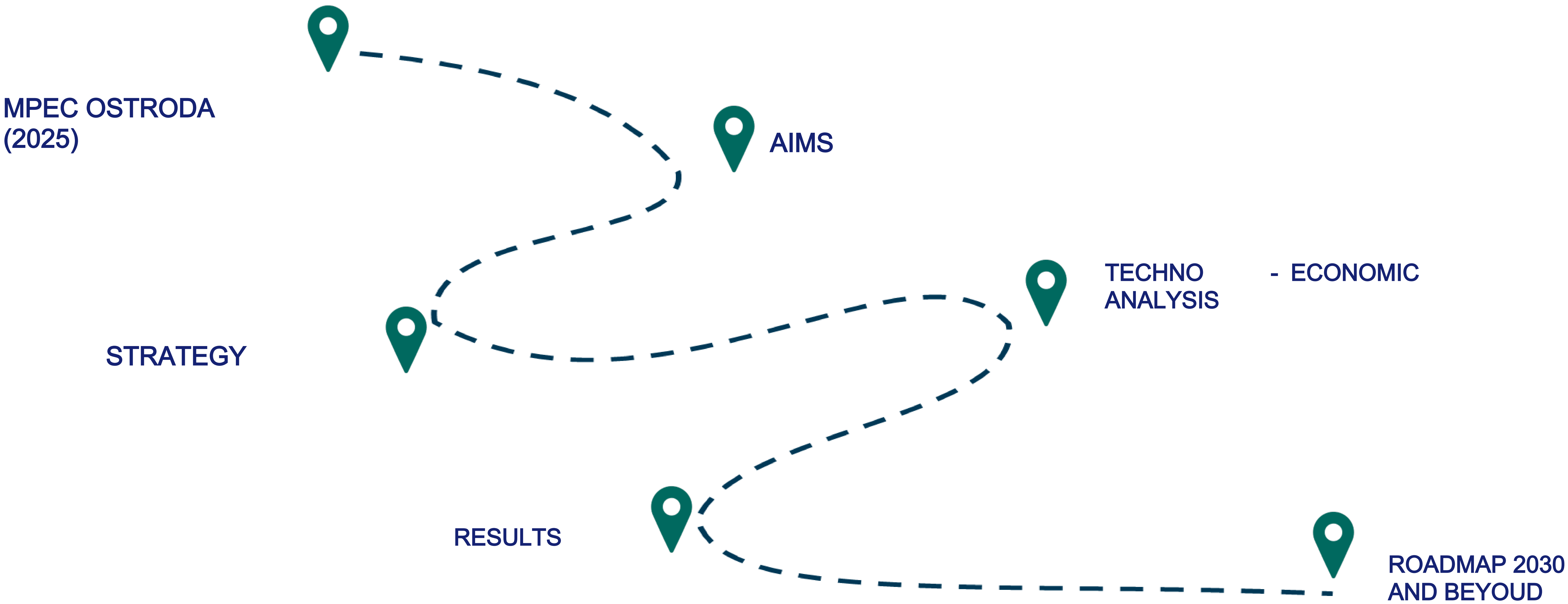
- "Danish experiences with electrical heat pumps in district heating" – Fenagy , DK.

- "Thermal Storage Systems: Types, Capacity, and Integration with Heat Production – Artelia, DK

- "Optimal planning of energy systems with thermal storages" - EMD International, DK.

TFE - PROJECT POLAND

DEVELOPMENT PLAN OSTRODA - AGENDA/JOURNEY



NAVIGATING GREEN TRANSITION

TFE - PROJECT POLAND

STATUS 2025

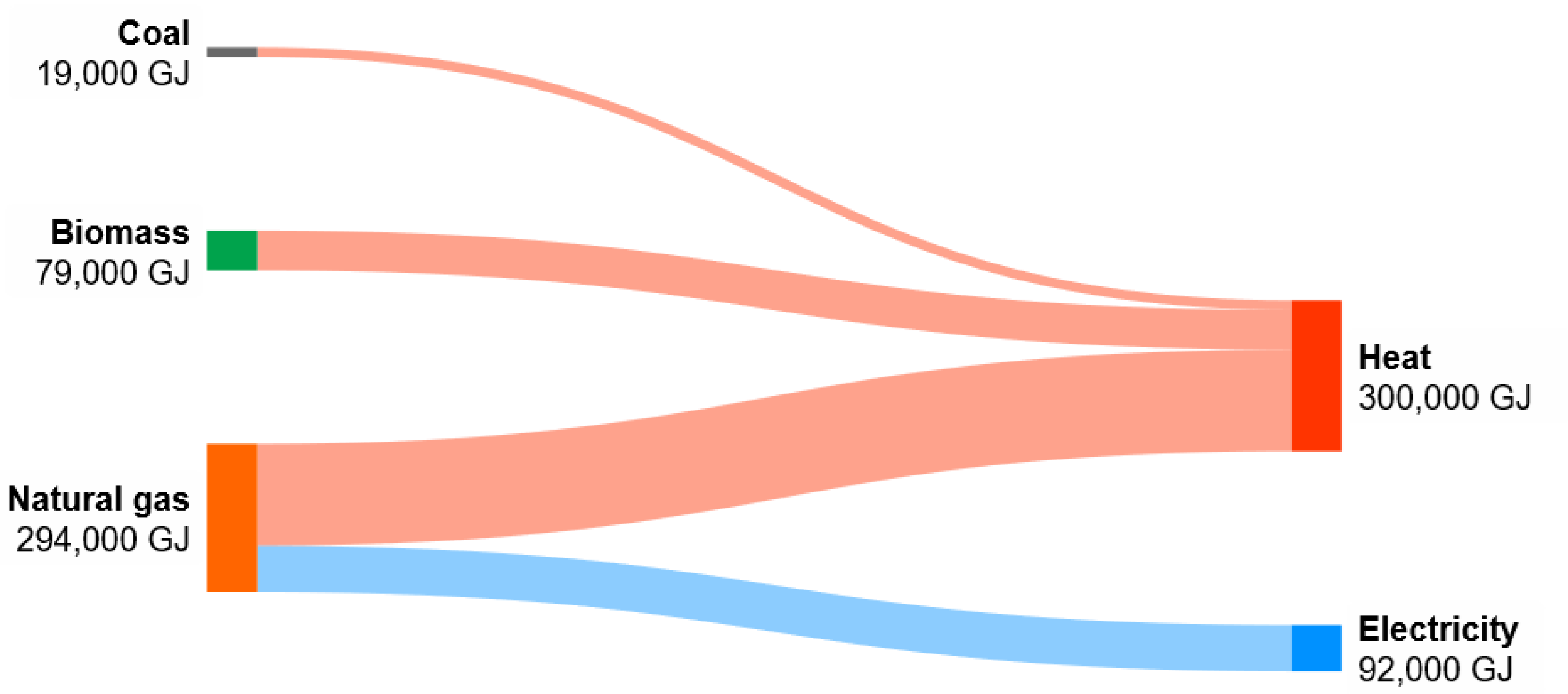
2018:
- 100% based on coal.

2019
- Two gas engines introduced.

April 2024
- Biomass boiler taken into operation.

December 2024
- Natural gas boiler taken into operation.

The price of heat has been highly influenced by the energy crisis from 2021 -2023, but since then MPEC Ostróda has managed to lower the price by 18%



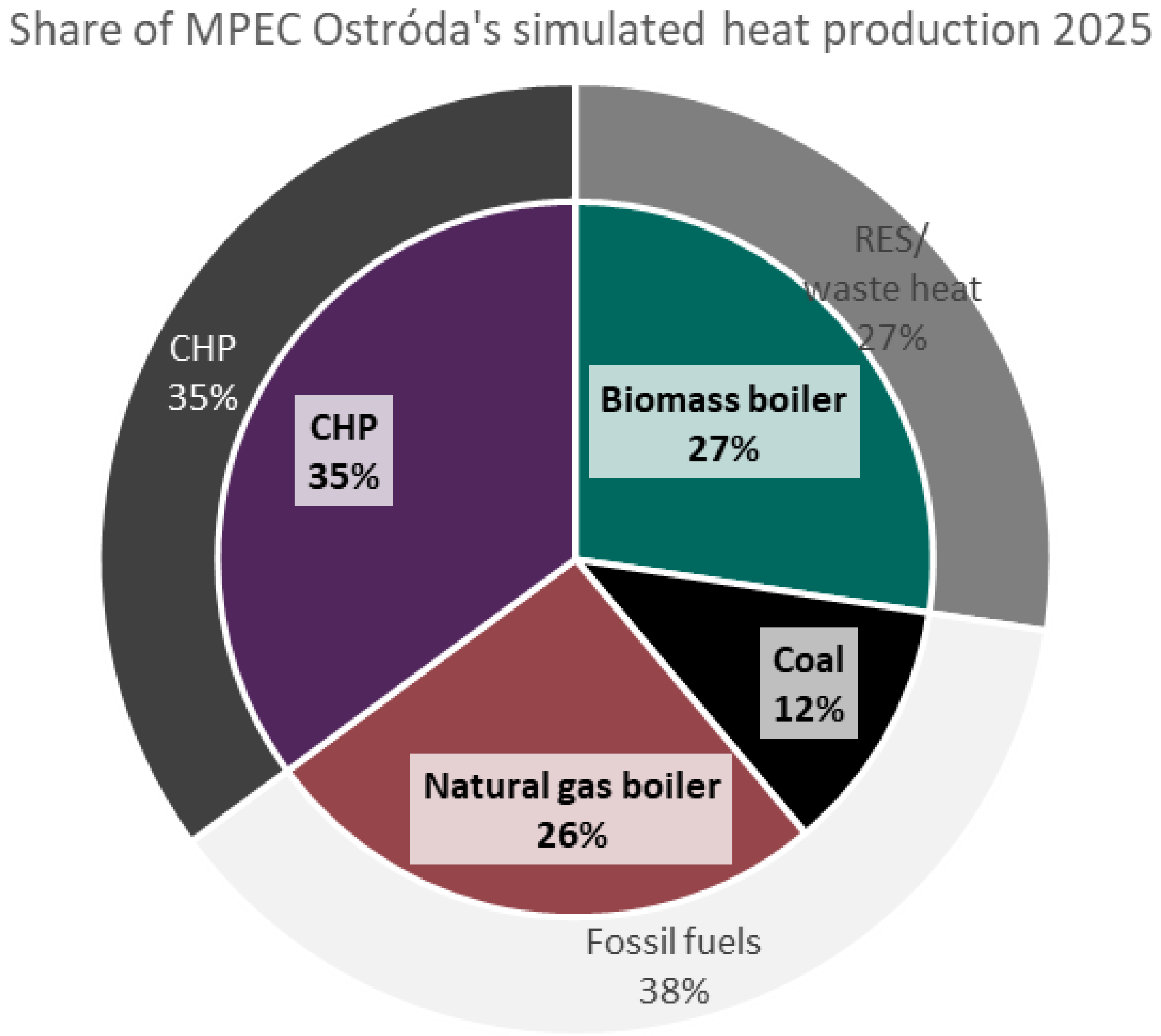
TFE - PROJECT POLAND

STATUS 2025

- MPEC Ostróda were formerly dependent on coal. Today heat (and electricity) is produced from a mix of natural gas, biomass and coal.

- A calibrated simulation model of MPEC Ostróda’s production is made to simulate future scenarios. Simulation tool: EnergyPRO.

- Baseload is covered by CHP, biomass boiler and natural gas boiler while the peak load is covered by coal boilers.



TFE - PROJECT POLAND

EU ENERGY EFFICIENCY DIRECTIVE (EU/2023/1791)

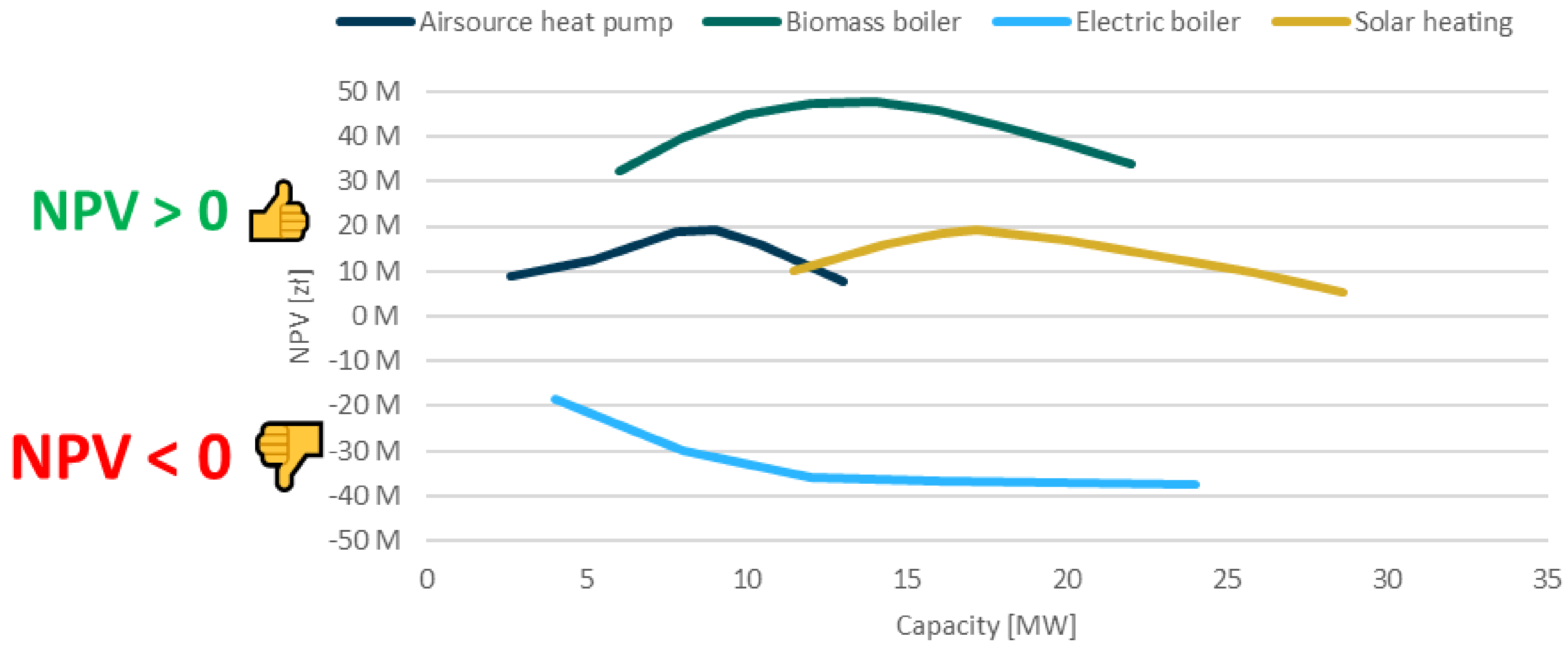
Time	Criteria	
≤ 31 December 2027	either	Min. 50 % of RES
		Min. 50 % of waste heat
		Min. 75 % of CHP
		Min. 50 % of a combination (RES, waste heat and/or CHP)
≥ 1 January 2028	either	Min. 50 % of RES
		Min. 50 % of waste heat
		Min. 50 % of RES and waste heat
		Min. 80 % of high-efficiency CHP
		Min. 50 % of a combination (RES, waste heat and high-efficiency CHP) and min. 5 % RES
≥ 1 January 2035	either	Min. 50 % of RES
		Min. 50 % of waste heat
		Min. 50 % of a combination (RES and waste heat)
		Min. 80 % of a combination (RES, waste heat and/or high-efficiency CHP and min. 35 % RES
≥ 1 January 2040	either	75 % of RES
		75 % of waste heat
		75 % of a combination (RES and waste heat)
		Min. 95 % of a combination (RES, waste heat and/or high-efficiency CHP and min. 35 % RES
≥ 1 January 2045	either	Min. 75 % of RES
		Min. 75 % of waste heat
		75 % of a combination (RES and waste heat)
≥ 1 January 2050	either	100 % of RES
		100 % of waste heat
		100 % of a combination (RES and waste heat)

- MPEC Ostróda meets the criteria of 2027 by having 62 % combined RES and CHP.
- The criteria of 2028 can be obtained by meeting the criteria of “high -efficiency CHP”:
  - >10 % Primary Energy Saving (PES)
  - <270 gCO_2 per 1 kWhheating+cooling
- Criteria of 2035 are applied for this project.
- Local aims

TFE - PROJECT POLAND

TECHNO - ECONOMIC ANALYSIS

- All productions units (capacity, efficiency etc.).
- Economic (fuel costs, taxes and tariffs, O&M, incomes etc..)
- Local conditions (ambient temperatures, solar radiation etc.).
- Hourly simulation of annual production and costs.
- Optimizes production based on the hourly price of each production unit.
- Investment costs.
- Combining the investment with the annual operational costs, a net present value (NPV) can be calculated and compared for each investment.



TFE - PROJECT POLAND

TECHNO - ECONOMIC ANALYSIS

Technology catalogue

- Heat pumps
- Electric boiler

- Biomass boiler and CHP
- Solar thermal collectors
- Geothermal energy

- Excess heat

- Thermal energy storage

Capacity

Investment costs

O&M costs

Operation time

Efficiency

Fuel costs

→ **Net Present Value (NPV)**

Evaluation and simulation →

Site area

Availability

Sustainability

Flexibility/ security of supply

TFE - PROJECT POLAND

RESULTS

Heat Pump
10 MW_{heat}
Air/water
Natural refrigerant

Excess/waste heat
0,5 MW
Further investigated
for more capacit

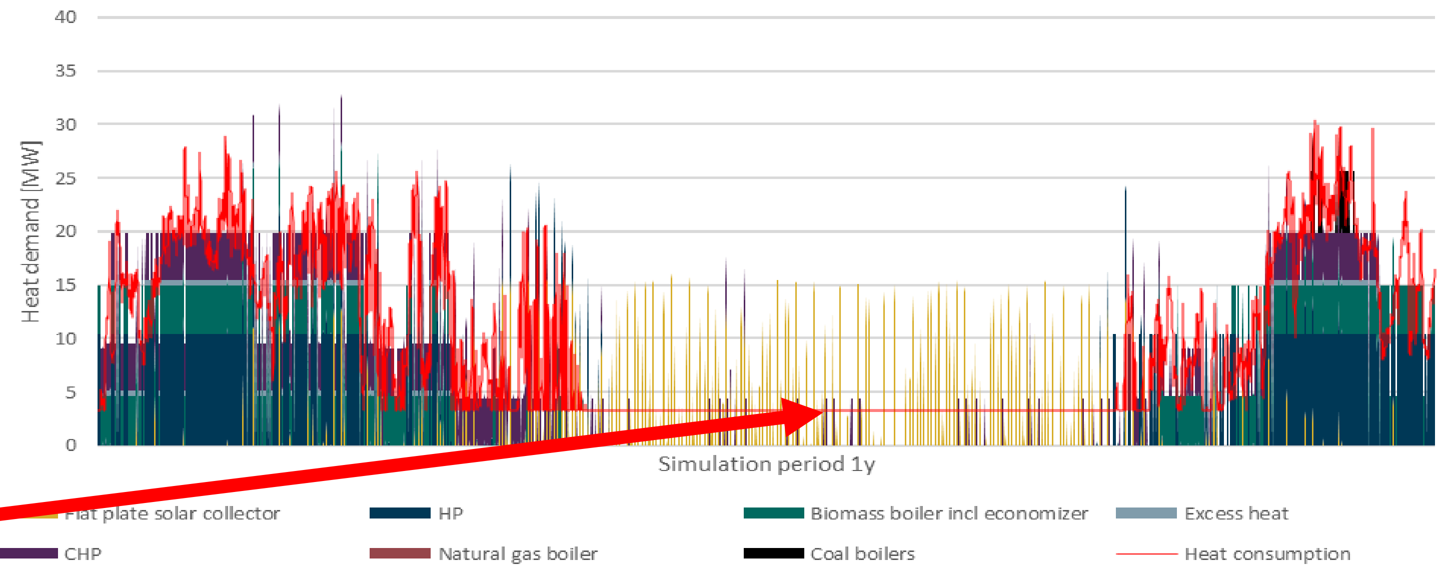
Solar thermal collectors
23,850 m^2 effective solar
panel area
10 ha of land area

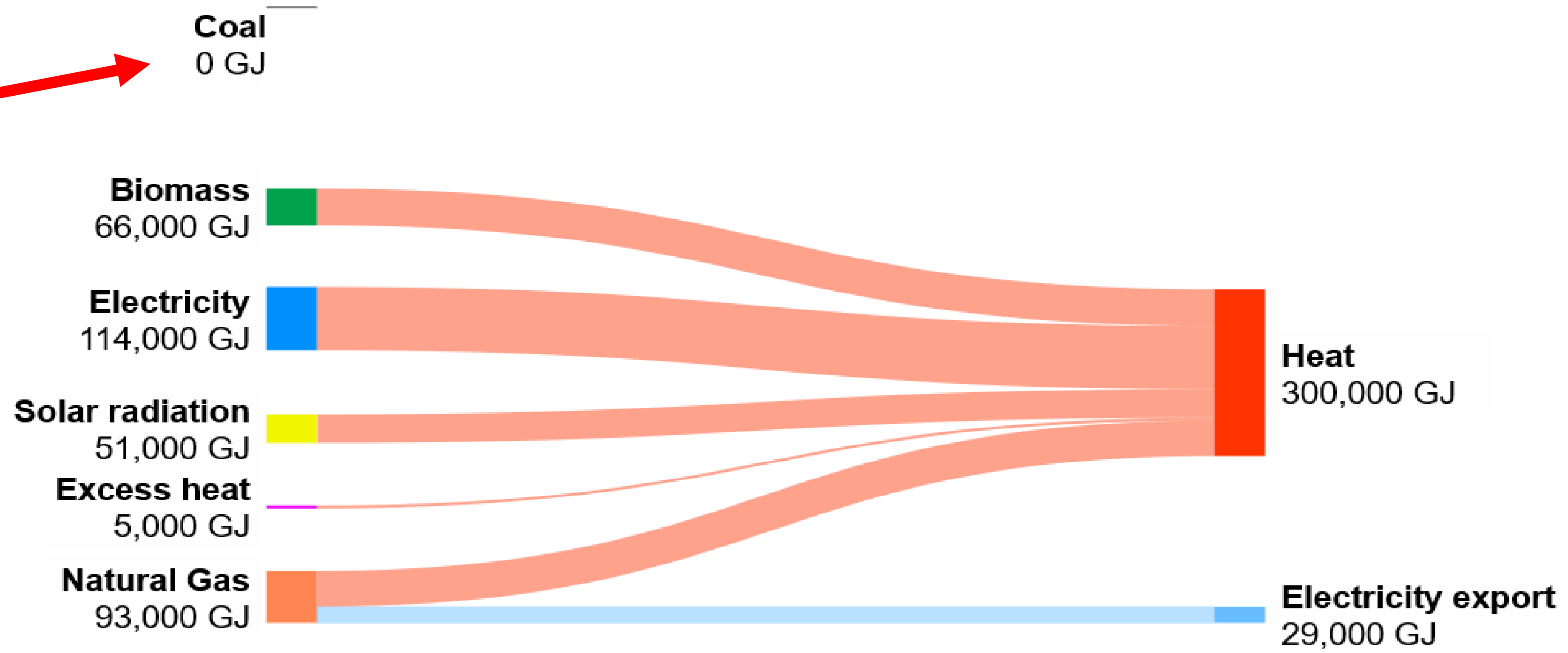
Thermal storage
4,000 m^3 (CHP, HP and biomass)
4,500 m^3 (Solar thermal collectors)

TFE - PROJECT POLAND

RESULTS – MODEL SIMULATION 2030

- All technologies are producing a significant shares of the overall heat production
- Solar heat will produce all the heat needed during the summer
- Coal is completely phased out
- Electricity is produced in the hours where it is profitable to operate the CHP





TFE - PROJECT POLAND

RESULTS – MODEL SIMULATION 2035

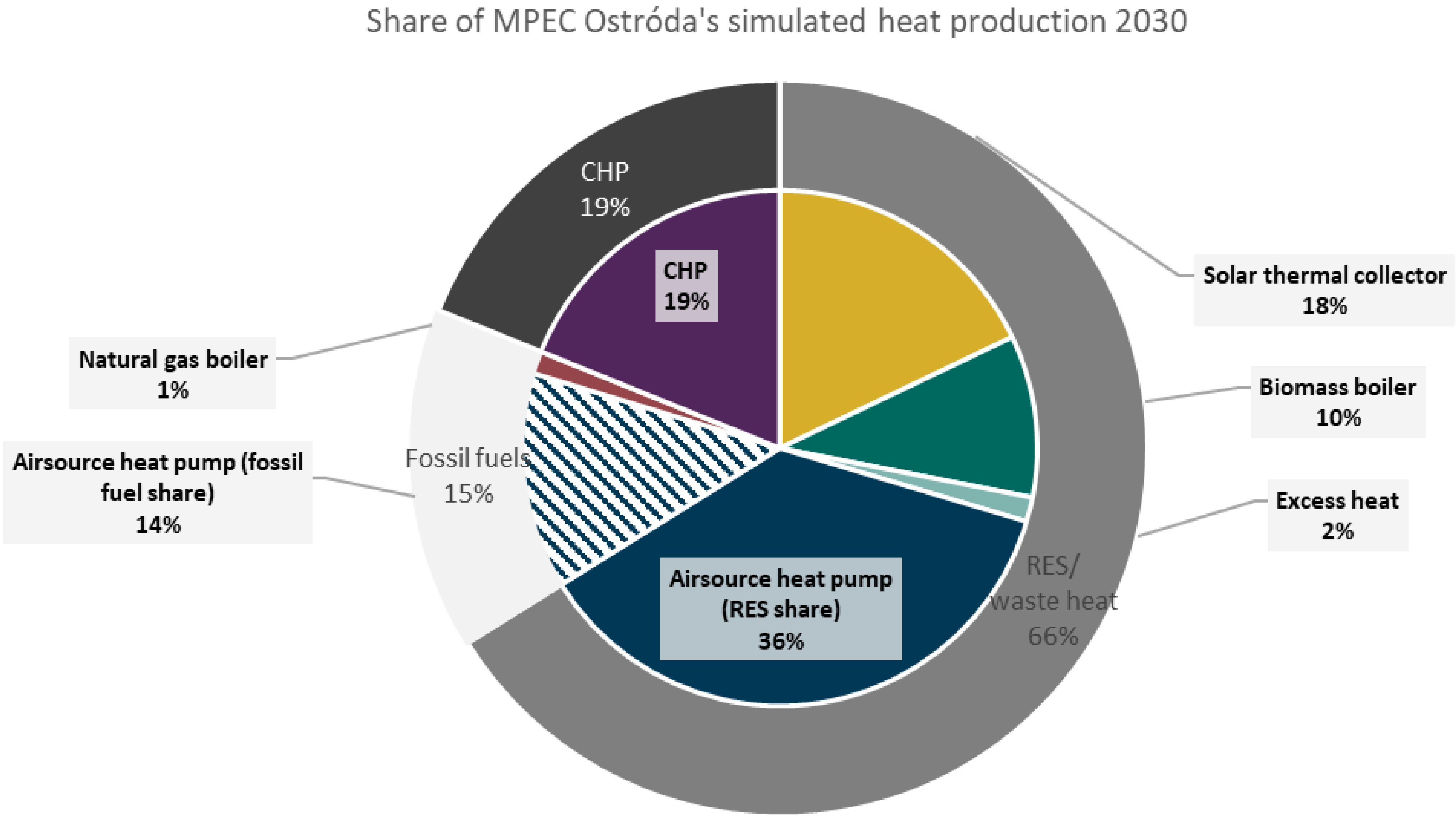
- EU EED 2035 requirements of 2025 are fulfilled
  - RES > 50 % (66 %)
  - RES & high efficiency CHP > 80 % (66+19=85 %)

- Baseload will be covered by the biomass boiler, CHP and heat pump except for the summer where the solar thermal collectors will cover the heat demand.

- The wide range of fuels will increase security of supply and provides flexibility regarding fuel prices.

- Thermal storages will increase flexibility even more.

- The solar thermal collectors will make MPEC Ostróda independent of fuels during the summer period.



TFE - PROJECT POLAND

ROADMAP 2030 AND BEYOND

- 2026:
  5 MW of heat pump capacity and 4,000 m^3 thermal storage will provide enough for the last coal to be phased out.

- 2027 -2028:
  Additional 5 MW heat pump based on the initial experiences of heat pump investment.

- 2029 -2030:
  Solar thermal collectors and 4,500 m^3 storage are installed.

- Development plan should be revised with regular intervals (e.g. every second year) as prerequisites will change over time.

- It is EXPECTED that the heat demand will increase in the future due to new connections.

2025
- 1 MW Solar PV
- 0.5 MW excess heat

2026
- 5 MW Airsource HP (prepared for additionally 5 MW, see 2027-2028)
- 4,000 m^3 thermal storage

2027-2028
- 5 MW Airsource HP

2029-2030
- 23,850 m^2 (17.2 MW) solar thermal collectors
- 4,500 m^3 thermal storage

Thank you!

NAVIGATING GREEN TRANSITION

Contact:
Lars Gullev
Mail: larsgullev55@outlook.com
Phone: + 45 20 44 03 75