Municipal enterprise «Zhytomyrteplokomunenergo» of Zhytomyr city council

Zhytomyr, Ukraine
2020

DHS Zhytomyr

- Location: **Zhytomyr, Ukraine**
- Ownership: **municipal**
- Grid: **207 km** (owned by the municipality)
- Customers: **1,952 buildings**
- Production: **563,299 MWh** (2017)
- Boiler output: **789 MW** (204 boilers)
- Type of DHS: **hot water**
- Current fuel: **natural gas**
- Potential renewables nearby: **biomass**

Source: DHS Zhytomyr web-site, tke.org.ua

Investment plans (2020-2025): **Biomass CHP unit with ORC technology, complex modernization of network subsection**, installation of new natural gas boilers, replacement of pipelines, and installation of individual heating units.

For more information:

http://www.keepwarmeurope.eu/country-pages/ukraine/

The concept of Zhytomyr District Heating Modernisation Program

The goal is to modernize and improve exisiting DH system based on energy efficiency and economic efficiency principles, as well as reduce energy resource consumption for heating and associated air emissions.

Expected results:

- ✓ Reduction of natural gas consumption by 15 million m^3 per year;
- ✓ Reduction of electricity consumption by 23.5 GWh per year;
- ✓ Reduction of heat energy losses by 114,600 Gkal per year;
- ✓ Reduction of air emissions (SOx, NOx, PM);
- ✓ Optimization of operational expences;
- ✓ Improvement of the quality of heat supply services.

DHS modernization funding sources

EBRD – District Heating in Zhytomyr city project

Cooperation with EBRD started in 2012 and amended project scope has been approved in 2017. Investment — EUR 17 million, including:

- ✓ EUR 7 million – first stage of finance from EBRD;
- ✓ EUR 3 million – first stage of finance from Clean Technology Fund;
- ✓ EUR 5 million – E5P grant;
- ✓ EUR 2 million – own (municipal) finance.

State Secretariat for Economic Affairs (SECO) – Energy Efficiency project in Zhytomyr city project

Cooperation with SECO started and investment in DH modernization component is CHF 12.65 million, including:

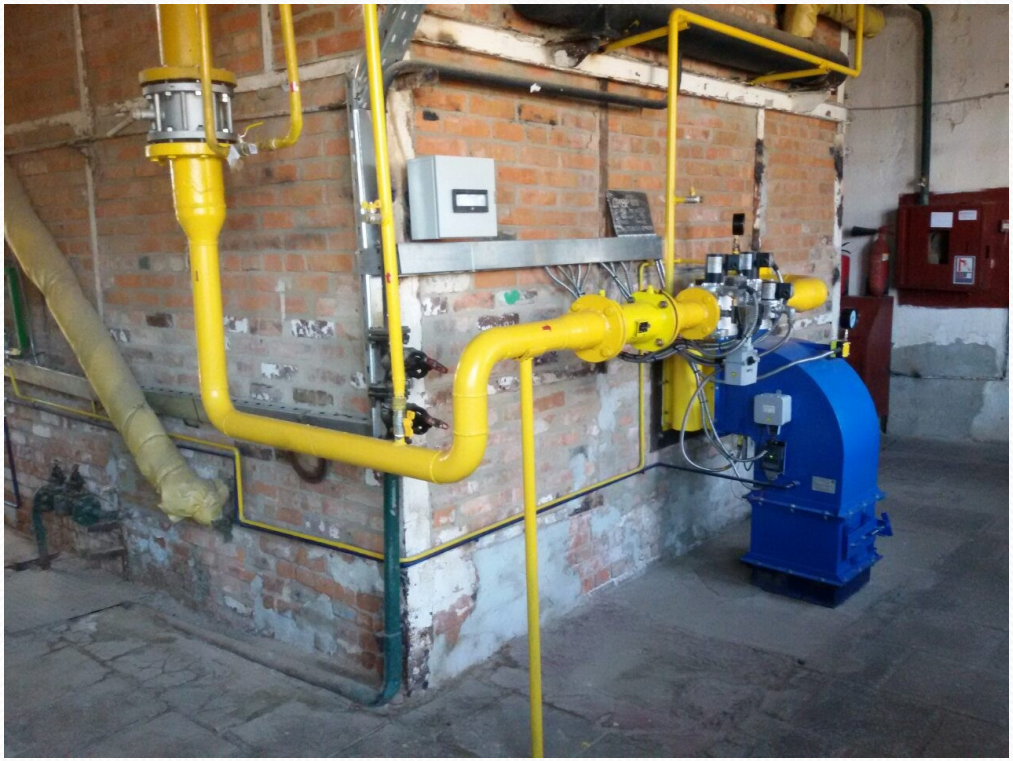
- ✔ CHF 9.65 million – grant from SECO, and
- ✔ CHF 3 million – own (municipal) finance.

Implemented measures: pipelines replacement

Replacement of both underground and above-ground pipes with reduction of pipe size from 800 mm to 630 mm

Implemented measures: boilers modernization

Installation of new natural gas burners and automation and control system – RK8 boiler house



Implemented measures: pumping equipment

Installation of new pumping equipment – RK8 boiler house

Installation of CHP with ORC technology

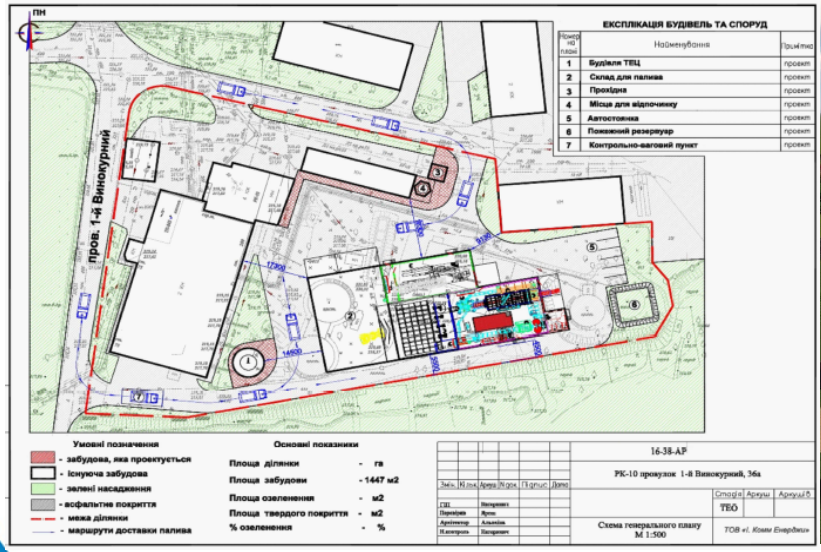
Reconstruction of RK-10 boiler house with the installation of biomass based (wood chips) CHP unit using ORC technology. Electric capacity – 1 MW, heat capacity – 4 MW.

Investment – EUR 5.34 million

Scenarios	Subsidized price	Baseline	Market price
Assumed natural gas price, EUR per 1000 m^3	270	371	480
Simple payback period, years	6.2	4.9	4.1
IRR (20 years)	18.3%	25.0%	32.1%
NPV (20 years)	13,996,649	20,395,951	27,335,571

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Implementation period: 2016-2021



Boilers replacement at 7 First Vilskogo lane boiler house

Centralization of heat supply networks with installation of new natural gas boilers with connection of additional heat load from boiler house RK-4. Pipelines replacement.

Investment – EUR 0.56 million (DHS investment program).

Scenarios	Subsidized price	Baseline	Market price
Assumed natural gas price, EUR per 1000 m^3	270	371	480
Simple payback period, years	7.3	5.4	4.7
IRR (20 years)	16.2%	25.3%	31.1%
NPV (20 years)	386,626	826,972	1,120,076

Boilers replacement at 4 Karetnyi lane boiler house

Centralization of heat supply networks with installation of new natural gas boilers and connection of additional heat load from boiler house at 25 Kyivska str. Pipelines replacement.

Investment – EUR 0.46 million

Scenarios	Subsidized price	Baseline	Market price
Assumed natural gas price, EUR per 1000 m^3	270	371	480
Simple payback period, years	7.4	5.6	4.4
IRR (20 years)	11.9%	17.1%	22.4%
NPV (20 years)	167,527	365,258	579,684

Modernization of heat networks connected to PK-6 boiler house

Centralization of heat supply systems with pipelines replacement and installation of new pumping equipment. Connection of additional heat load to RK-6 boiler house.

Investment – EUR 3.4 million

Scenarios	Subsidized price	Baseline	Market price
Assumed natural gas price, EUR per 1000 m^3	270	371	480
Simple payback period, years	11.4	9.8	8.6
IRR (20 years)	6.9%	9.2%	11.6%
NPV (20 years)	-18,552	548,270	1,162,951

Primary investment drivers:

- Internal development plans
- network and equipment conditions
- available financing sources

Strategic background documents:

- Sustainable Energy Action Plan of Zhytomyr city for 2015-2024
- National energy efficiency, renewable energy and climate policy

Stakeholder involvement:

- Leading: Zhytomyr city council
- Other: international financial organizations, customers, contractors

Required resources:

Financial investment:
9.8 million EUR
Other: **equipment and materials, energy resources, incl. biomass**

Results:

- RES heat increase: **158,909 GJ per year**
- Primary energy savings: **101,322 GJ per year**
- Emissions: **- 17,472 tonnes CO2e per year or 13%**
- Internal rate of return: **7-32%** depending on intervention and assumed natural gas prices

Want to support our modernization projects?

Contact us using the information below!

Thank you!