

*Prepared by:
Mariana Varkaliene
Dalia Krapavickaitė*

Biomass-based Heating Solutions: transition from gas to biomass

Introduction

Ukrainian-Lithuanian “Kurk Lietuvai” project management team Mariana Varkaliene and Dalia Krapavickaitė work under the umbrella of Central Project Management Agency (CPVA) on developing of Lithuania’s middle-term and long-term plans in assisting Ukraine’s recovery in energy sector. The chosen direction for future engagement is **district heating system (DHS) and biomass ecosystem**.

This decision was made based on stakeholders' and experts' input from consultations and relevant data. In this area we are organizing focus group discussions, and our goals are:

- To draft project proposals for Lithuanian projects in Ukraine;
- To prepare recommendations for the Government with proposed incentives and financial instruments necessary for such projects to be implemented.

The topics where Lithuanian expertise and Ukrainian needs overlap, and on which the drafting of proposals will be based, are these:

1. Afforestation
2. Administration of Forestry Resources: biomass supply management system
3. Biomass-based Heating Solutions: transition from gas to biomass

And, separately,

- Developments on financial instruments to support private sector involvement.

For the discussions, an analytical summary, consisting of implemented project examples and required projects, defined by municipalities is provided below.

Ukrainian DHS Context

While exploring potential directions of Lithuania’s involvement into recovery of Ukraine in the energy sector, the main supporting guide was the Ukrainian Energy Strategy 2050 that indicates a key role of renewables as the main source of energy generation in Ukraine along with maneuverable generation.

When it comes to DHS, Lithuanian experience shows that the way to achieve desired percentage of renewables and the decarbonization goals is to increase the use of biomass.

As an example of transition from gas to biomass: in the city of Dubno, Rivne region, 32% of gas consumption was replaced by wood fuel at the end of the previous heating season (2022).

Main current challenges for potential project:

- Three different prices for natural gas for different consumers: subsidized price for gas, especially for households’ consumers, makes biomass less attractive;
- Certifications of the biomass and domination of agricultural biomass (and lack of accessibility to wood biomass) in some regions;
- Reliable partner (municipality) as the main factor in ensuring continuity of the project implementation, since often the municipalities lack the resources, such as technical expertise and funds for investment in long-term development;

As a part of the “Kurk Lietuvai” project several meetings with Ukrainian institutions were organized with the aim to address the identified topics for the planned focus group discussions. Here are the key points from those meetings:

UA Ministry of Energy

- In the long term, sees the priority of reducing the dependence on gas, need for diversification and for the increase of biomass consumption;
- Supports working with municipalities and municipal objects;
- Recognize the need for the law that would provide biomass market regulation;
- Proposes to consider waste management-based (RDF), co-generation (CHP) energy sources.

UA Ministry of Environment

- Afforestation is high on the agenda, as well as resource administration digitalization;
- Reforms of administrative companies responsible for joint forestry management in Ukraine is at the stage of finalizing. As a result, instead of 24 departments, 9 regional offices of forestry were formed, and 158 state forestry enterprises was united into a single [SFE "FORESTS OF UKRAINE"](#);
- Has a goal to process timber in Ukraine, no export;

Ministry of Recovery (Infrastructure)

- District heating systems were low quality, outdated, inefficient, not profitable, now many destroyed by war;
- The Ministry (and the Mayors) acknowledge the benefits of district heating systems for small towns and villages;
- See the potential in the long-term, however skeptical of the short-term possibilities.

State Agency of Energy Efficiency (SAEE)

- Underscores the issue of municipalities lacking the resources to facilitate implementation of such projects;
- Preference for co-generation due to the forecasted energy security issues;
- Currently working on biomass certification with EU experts, aimed to ensure accountability and sustainability;
- Working on a registry with heating service providers;
- Working on the exemption of business entities burning biomass from paying CO2 emissions tax.

Ministry of Agrarian Policy and Food

- Growing interest in afforestation. Due to reduced amount of usable lands for farming (occupied lands), need for recovering the degraded lands is present, and afforestation is seen as the only best option for recultivation;
- Most of problematic lands are privately owned;
- State-owned lands accessibility is limited, municipal-owned may be accessible;
- Ukraine has limited experience in experimenting with different energy crops.

Lithuanian experience relevant to Ukraine

Notably, the Lithuanian biomass market and exchange managed through Baltpool is of high interest to Ukrainian stakeholders. However, the legal framework is only being developed, and the most efficient driver for such reform is the ecosystem and the market itself. While the transition to renewable, namely wood biomass fuel in current conditions is widely considered to be inevitable, it is acknowledged that the number of market players must grow for Ukraine to be prepared for such change.

DHS projects criteria

Based on further consultations with the stakeholders and analysis of the information gathered by other means, the following criteria are viewed as reasonable and recommended for potential project preselection and implementation.

- Cost-effective solutions for modernization or installation of a biomass boiler house with installed capacity from 1MW to 20 MW
- Reasonable location of a source of biomass to DHS capacity unit (~ 50 km)
- Municipally owned district heating company as a beneficiary
- Priority in the target group for the heat supply – municipally and state-owned consumers (hospitals, schools etc.)
- Project to be included in strategic development & sustainability plan of the community (in case there is one)

Overview of ongoing/implemented projects by international donors

Project examples¹

Lutsk District Heating

1. 5MW biomass boiler and 314 IHSs (Individual Heating Substations)
2. Lutsk (Volyn region)
3. Italian contractor Amarc DHS SRL
4. E5P
5. EUR 4 million grant initially, 0.4 million grant top-up approved later

Chernivtsi District Heating

1. 269 IHSs
2. Chernivtsi
3. Egis (France)

¹Referred Information on the project:

1. What is being done
2. Where (region)
3. Who is implementing and/or subcontracting if information available
4. Source of financing
5. Project's budget

4. E5P
5. EUR 3.52 million grant

Lviv District Heating

1. Replacement of DH networks, installation of SCADA system, construction of a new biomass-fired CHP + 409 IHSs
2. Lviv
3. Contractor Axis Industries
4. E5P
5. EUR 20 million loan + EUR 10 million grant

Ternopil District Heating

1. Supply and installation of IHSs, co-financing the new biomass boiler + replacement of DH pipelines, reconstruction of boiler houses replacement of large distribution pumps and co-financing of the new biomass boiler
2. Ternopil
3. AMARC
4. E5P
5. EUR 5 million grant + EUR 10 million loan

Zhytomyr District Heating *

1. 76 IHSs and replacement of circulation pumps, installation of biomass-fired CHP
2. Zhytomyr
3. Contractor Polytechnik, Austria
4. E5P
5. Grant ?

*Likely the DH Company will launch a re-tender for the CHP part.

Horishni Plavni District Heating

1. Substituting a part of current DH production based on gas to renewable fuels, primarily sunflower husk: installation of 7 MW biofuel boiler in the main boiler house
2. Horishni Plavni
3. Nefco
4. E5P grant, Sweden grant, Nefco loan
5. Up to EUR 1.5 million, EUR 0.2 million, up to EUR 5 million

CHPs in Zhytomyr **№1** (implemented)

1. CHP - 1.2 MW electric and 7.1 MW of heat
2. Zhytomyr
3. GIZ
4. Switzerland + local budget
5. EUR 10 in total (7.5 million EUR by Switzerland)

CHPs in Zhytomyr №2

To be implemented in Q4 2023 within the same cooperation as **CHPs in Zhytomyr №1**

Suggested projects from Ukrainian municipalities (Covenant of Mayors)

During the consultation phase we have reached out to Ukrainian stakeholders, which include central government representatives, municipalities, non-governmental sector, and expert groups. Apart from the general research on perspectives of bioenergy in the DHS of Ukraine, some project suggestions aimed at transition from gas to biomass and that fit into the proposed criteria were shared by Ukrainian municipalities through the assistance of representatives of [the Covenant of Mayors office in Ukraine](#). While some of the suggested projects are at the stage of initiation, others include feasibility studies and reference to technical solutions.

Two examples – in Korosten (Zhytomyr region) and Mykolayiv will be used for projects proposals shaping in FGs. *The files with detailed information on suggested projects are attached to the follow-up correspondence with the participants of the FGs.*

More suggested projects are expected from municipalities in West, North-West and Central part of Ukraine, where the necessary preconditions for faster transition from gas to biomass in DHS exist.

Building partnership for more comprehensive mid-term involvement into energy recovery, different possible setups – call for action

Options:

- Project proposals for the LT Government financing: Project would be administered by CPVA
- Loans: financial instruments provided by INVEGA
- Tenders announced by Nefco: LT companies as subcontractors
- Co-financing from the UA municipalities
 - o Our role: connecting with the municipalities, international partners, facilitating inter-institutional cooperation, providing information on possible projects.

The involvement of different international actors in the energy sector of Ukraine is increasing, however, it is still at its early stages. Building experience, connections on the ground, preparing lessons-learned through implementation of small-scale but high impact projects may open doors for future collaboration with international funds and organizations that have a lack of experience and expertise. It will also ensure the trust of Ukrainian counterparts in the unwavering persistence of Lithuanian colleagues to invest in the country, this way ensuring business relationships based on trust and commitment.