**Integration of low-temperature renewable energy sources in District Heating and Cooling**

Concept note for the workshop: Belarus

Date: 3-4 February 2021

1. **Background information**

Heating is the largest energy end-use sector, accounting for over 50% of global final energy consumption worldwide. Most of this energy is generated by burning fossil fuels, which makes the sector an important contributor of greenhouse gas emissions and air pollution.

District heating systems have emerged as an efficient way of supplying heating and cooling to buildings. On average, globally, the share of renewable energy in district heating and cooling systems is about 8%. Biomass has been the easiest renewable energy source to be integrated in DHC systems. The evolution of more energy efficient buildings has led to the development of low temperature DHC systems. These systems are expected to facilitate the integration of low-temperature renewable energy sources such as geothermal and solar thermal in combination with heat pump technology, waste heat, etc. into space heating.

In the framework of the *Energy Solutions for Cities of the Future* project, a project supported by Germany’s International Climate Initiative (IKI) and that promotes the decarbonization of energy systems in cities, IRENA plans to organize a workshop in Belarus under the umbrella of the [Global Geothermal Alliance](http://www.globalgeothermalalliance.org/). The workshops will aim to promote the application of locally available renewable energy sources, including geothermal, in district energy networks with a focus on medium-size cities or districts (population between 30,000 and 1 million). The workshop aims to increase the knowledge of policy makers at the national and local levels, urban planners, utilities, etc., on the options and available tools to facilitate the integration of low-temperature renewable energy sources such as geothermal and solar thermal in district energy networks. The workshop will build on IRENA’s upcoming publication, a guidebook for policy-makers on “*Enabling the integration of low temperature renewable energy sources in district heating and cooling networks*”, which is being developed in collaboration with the Aalborg University and with the support of an advisory group of district heating and cooling practitioners. The key topics addressed in the guidebook include strategic planning for heating and cooling; challenges and solutions for integration of renewables into existing or new buildings and networks; and enabling regulatory conditions, business models, and financing.

1. **Rationale**

Belarus has a high penetration rate of district heating with about 70% of the population connected to district heating systems. About 80% of the energy for district heating in 2015 was supplied from imported natural gas (Euroheat & Power, 2017).

The government of Belarus is in the process of reconstructing and upgrading the aging district energy networks to improve energy efficiency in heat production. At the same time Belarus is aiming to provide reliable and sustainable energy for the national economy while reducing energy import dependence. In addition, the country is phasing out subsidies for electricity, heat and gas, which is expected to make the energy sector more market-focused and attractive for private investment (IEA, 2020).

In this context, renewable energies (RE) hold enormous untapped potential and could play a key role in supporting Belarus to meet the above objectives.

1. **Objective and target group**

The workshop aims to equip district heating and cooling stakeholders, including policy-makers at the national and local levels, urban planners, district energy operators/utilities, etc. with knowledge on the options and tools for integrating low-temperature renewable energy sources in district heating and cooling networks. These include but not limited to the following groups:

* Relevant national government representatives
* City mayors
* City managers
* City planners
* District heating utility representatives
* District heating and cooling industry representatives (including operators, equipment manufacturers, distributors, installers, etc).
* Relevant representatives from academia

1. **Partners**

The workshop is organised by IRENA in collaboration with Aalborg University, and with the support of the State Committee for Standardisation of the Republic of Belarus. The University is collaborating with IRENA in developing guidelines for policy makers on integrating low-temperature renewables in district heating and cooling systems. The contribution of State Committee for Standardisation includes delivering opening remarks; advising on the development of the agenda; identifying and facilitating the participation of the national and local policy-makers, representatives from the industry and key speakers from the country.

1. **Format of the workshop**

The workshop will be conducted virtually via zoom over a period of 2 days. Each day will be composed of two sessions of about 1.5 hours each. The workshop will entail the presentation of the findings of the *“Guidebook on the integration of low-temperature renewable energy sources in district heating and cooling networks”* by Aalborg University. Specific topics relevant to district heating and cooling in the country will also be presented. Guest speakers from government, industry and academia may also be invited to present selected topics.

The workshop will be conducted in an interactive manner to allow for discussions between the speakers and the participants.

Interpretation services will be available during the workshop (English-Russian-English).

1. **Agenda**

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| **Day 1: 3 February 2021** | | |
| **Session I: Introductory session (1h 30 minutes)**  **Moderator: Amjad Abdulla, IRENA** | | |
| **(Moscow Standard Time - GMT+3)**  10:30 – 12:00 | Introduction and Opening (10 minutes)   * Welcome remarks * Opening remarks   Overview of district heating and cooling in Belarus  (15 min)  Analysis of the conditions for the large-scale use of renewable energy sources in housing and communal services (15 Minutes)  Enabling low-temperature renewable district energy in cities (30 min)  Q & A (20 Minutes) | Gurbuz Gonul, IRENA  Mikhail Malashenko, Department for Energy Efficiency, Belarus  Vladimir Sednin, Belarus National Technical University  Prof. Vadim Kitikov, Institute of housing and communal services  Prof. Brian Vad Mathiesen, Aalborg University |
| **Break** | | |
| **Session II: Strategic heating and cooling planning (1h 30 minutes)**  **Moderator: Jack Kiruja, IRENA** | | |
| 14:00 – 15:30 | Key success factors for strategic heating and cooling planning (35 Minutes)  Energy saving policy in heat supply including renewables under the State National Energy Saving Programme 2021 (20 Minutes)  Planning for the integration of solar thermal and thermal storage into district heating and cooling (15 Minutes)  Q & A (20 Minutes) | Nis Bertelsen, Aalborg University  Mikhail Malashenko, Alexander Danilenko; Department for Energy Efficiency, Belarus  Sije Gorter, SOLID solar energy systems |
| **Day 2: 4 February 2021** | | |
| **Session III: Enabling frameworks conditions, financing and business models for the integration of renewable and waste heat sources in district heating and cooling (1h 30 minutes)**  **Moderator: Jack Kiruja, IRENA** | | |
| 10:30 – 12:00 | Experiences and innovative approaches to Ownership structure, financing, and regulation of district heating networks (35 Minutes)  Problems and prospects for attracting investments in private sector to implement renewable energy projects in heat supply in Belarus (20 Min)  Experience in implementation of World Bank projects and operation of the revolving fund for bioenergy (15 Minutes)  Q & A (20 Minutes) | Søren Roth Djørup, NORCE  Filinovich A.G, IEC Energy Company GmbH  Victor Knysh, RUE “Belinvestenergysaving |
| **Break** | | |
| **Session IV: From conventional to efficient and renewable-based district heating and cooling (1h 30 minutes)**  **Moderator: Mikhail Malashenko Department for Energy Efficiency, Belarus** | | |
| 14:00 – 15:30 | Technical challenges and solutions for the integration of low-grade heat sources into existing networks and buildings (35 Minutes)  Perspectives for application of solar energy (solar collectors) at district level in Belarus (20 Minutes)  Prospects for the utilization of low-temperature heat flows based on heat pumps technology in Belarus (15 Minutes)  Q&A (20 Minutes) | Susana Paardekooper, Aalborg University  Vadim Seleznev, Department of Energy Efficiency, Belarus  Vladimir Romaniyuk, Belarus National State Technical University |
| **Conclusive session (30 minutes)**  **Moderator: Jack Kiruja, IRENA** | | |
| 15:30 – 16:00 | Perspectives for district heating and cooling (30 Minutes)  Closing | Brian Vad Mathiesen, Aalborg University / Mikhail Malashenko, Department of Energy Efficiency, Belarus  IRENA/Belarus |