Demonstration of sustainable heating in bigger multi-family buildings in Ukraine

LIGHTHOUSE PROJECT FACSHEET

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Since 2023, Greenpeace and the City of Trostyanets in the Sumy Region of Ukraine have been collaborating on the implementation of the City's Masterplan for Green Reconstruction and sustainable development. The overarching goal is to enhance the city's energy resilience and promote environmentally responsible reconstruction and energy use.

This two-year project aims to demonstrate the feasibility of installing solar panels and heat pumps in 113 multi-family residential buildings across the city. It also supports the creation of a subsidy scheme to facilitate the transition of Ukraine's residential energy systems to renewable sources. While similar demonstration projects already exist for public buildings, this initiative marks a pioneering effort in the private residential sector, particularly for large multi-family housing complexes.

The project

The project was developed in March 2024 through a collaboration between Greenpeace, the City of Trostyanets, and their partners, iC consulenten Ukraine (iC) and CES Clean Energy Solutions GesmbH (CES). Its overarching objective is to support the city's strategy to become fossil-free and to serve as a blueprint for sustainable and forward-thinking reconstruction across Ukraine.

- The pilot residential building consists of five floors, a basement, and an unheated attic, with a heated area of approximately 2,500 m^2. It houses 60 apartments and accommodates around 150 residents.
- Following severe damage during the Russian occupation in spring 2022, the building required major renovation. Reconstruction and thermal insulation works were carried out with support from a government program administered by the Service for Restoration and Development of Infrastructure in Sumy Oblast.
- Construction began at the end of 2023 and is completed by the end of 2025. In spring 2024, the City of Trostyanets and the Service for Restoration agreed that the building's heating system would be powered by sustainable energy sources, implemented through this Greenpeace-led project.

The heating sector in Ukraine

The Ukrainian heating sector strongly relies on fossil fuels, 70 percent alone based on gas. The supply is organised by about one third district heating and another 30 percent combined heat and power plants. With the constant Russian attacks and energy infrastructure, the district heating sector has become some of the worst emissions, emitting around 11.8 million tons of CO2 per year.

In early October 2025, Russian attacks took 60 percent of Ukraine's gas production offline, which caused severe problems for many Ukrainian households again in this winter. As a result, the start of the 2025 heating season was delayed in several cities, leaving many multi-apartment buildings without heat and forcing residents to rely on electric heaters, stoves, or improvised solutions. This situation highlights the urgent need to modernize Ukraine's heating infrastructure, diversify energy sources, and increase resilience.

The City of Trostyanets

- Trostyanets is a city of approximately 20,000 residents located in the Sumy Oblast of northeastern Ukraine. Just 35 kilometers from the Russian border, it lies close to the frontline. During the Russian invasion of Ukraine, the city sustained significant damage to its infrastructure.
- **Mayor Yuriy Bova** has spearheaded a strategy for the city's sustainable reconstruction. Over the past year, both the city and the surrounding region have once again become targets of Russian attacks, making daily life increasingly difficult. Despite these challenges, residents returned after the Russian occupation and the number of people who live in Trostyanets continues to increase.

A building with a story

The five-story residential building in central Trostyanets, Sumy Oblast, stands next to the local train station. Built in the 1980s, it housed dozens of families, many of them railway workers. Life changed abruptly on February 24, 2022, when Russian forces occupied the city.

The station square became a Russian military firing position, with GRAD rocket systems and self-propelled artillery placed directly beneath the building's windows to shell Ukrainian towns. Residents were used as human shields to deter counterattacks.

Thanks to local efforts, most occupants were evacuated. Once few civilians remained, Russian troops began destroying the building with incendiary shells, setting it ablaze. One resident tried to save his home, but the fire consumed it. By the time Trostyanets was liberated, the building was a charred ruin.

An expert assessment later confirmed the structure could be saved—and not just restored, but reimagined as a model of sustainable living. In 2025, it will become the first building n Ukraine to use water-based geothermal energy, powered entirely by heat pumps, with rooftop solar panels further supporting its green energy supply.

The sustainable heating system

This project is the first in Ukraine where heat pumps serve as the sole source of heating and hot water supply for a multi-apartment building. It combines air-source (ASHP) and ground-source (GSHP) heat pumps to provide heating and domestic hot water (DHW) using low-potential energy sources.

Five water tanks serve as separate thermal storage for heating and DHW, each system totaling about 2,000 liters. The system includes a ground-source heat pump with a heat capacity of 70 kW supported by 2 air-source heat pumps of 19 kW each. Together, they provide a combined heating output of approximately 108 kW, ensuring coverage of peak demand. The DHW system also features a heat exchanger with a peak capacity of 218 kW.

To manage peak loads, the DHW system includes a high performance heat exchanger. A rooftop solar power plant will boost system efficiency by partially offsetting the DHW heat pump's electricity use, with panel capacity calculated based on the compressor's summer-mode consumption.

The total project cost for the heating system is €218,000. The return on investment will be calculated and presented in a separate report. >> More info on heat pumps in general.

Project Partners that helped to shape the idea or to make it happen at the end by financial support or consultancy on the implementation.

Green Planet Energy is the biggest financial supporter of the implementation of the heating concept in the selected building (with 100.000 €) and was a big supporter with deep expertise on the general technical approach.

Environment Foundation Greenpeace supported the project from the start by funding the feasibility study and contributing 60.000 € toward the heating system's implementation. Additionally, the foundation will help develop a financing mechanism to scale the approach across Ukraine.

iC consulenten Ukraine & CES clean energy solutions (Kyiv/Vienna) were partners since the initial phase of the project, laid the base for the reconstruction strategy with their "Masterplan" for the City and also supported the implementation of the heating system with consultancy.

Sahara was selected as the contractor for implementing the heating system. Despite operating in a highly challenging and high-risk environment, the company carried out the work with exceptional reliability.

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