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ABOUT CURRENT PROBLEMS OF IMPROVING THERMAL ENERGY EQUIPMENT OF HEAT SUPPLY SYSTEMS

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Introduction. The district heating (DH) system in Ukraine is reducing its efficiency due to shortcomings in state policy in this area, wear and tear of networks, outdated equipment, and more. All this has led to the fact that many cities have already gotten rid of DH systems. However, the experience of European countries proves that it is DH systems that are the most effective if they contain innovative technological solutions and are stimulated by the state.

Purpose of this work is to consider the possibilities of increasing the efficiency of heat supply systems in the face of new challenges associated with war and climate change.

The common part. Since the late 1990s and before the war in Ukraine, we have lost about 45 % of centralized heat generation [1]. People are abandoning it and switching to autonomous heating. It has become economically inexpedient for communities that own heat and power utilities to maintain boiler houses and 70 % – 80 % worn-out DH systems. At the same time, new houses are not connected to DH. The more houses are disconnected, the more expensive the service becomes for those who remain in the DH system.

In wartime, this is unacceptable, as operators become more vulnerable to enemy fire, and consumers are less and less protected from sudden heat outages in winter [2]. Also, without DH, the country's transition from fossil fuel consumption to renewable energy sources will become virtually impossible, as it will require significantly larger financial investments and technical solutions.

Therefore, DH is the cheapest mechanism for achieving low-carbon and climate-neutral heating of cities, so it is impossible to abandon DH.

At the same time, radically different processes are taking place in the world. DH is not available in all European countries, as it requires huge initial investments, but countries that have DH are developing it and using effectively.

There are four generations of DH systems in the world: 1G – steam DH, 2G – Soviet DH, 3G – Scandinavian technologies (thermal points, heat meters), 4G – intelligent energy systems, which Europe is switching to [3]. Currently, 5G

is being developed – low-temperature networks, ultra-low-temperature and heating networks with a temperature close to the ambient temperature (heat pumps heat the coolant with a temperature of 10 °C to the desired temperature).

Currently, three generations of DH systems are used simultaneously in Ukraine – 2G hydraulic elevators; 3G heat points, 4G SCADA distributed generation systems. However, the most effective technology is energy distribution using a centralized network with distributed generation in it.

Our country is developing a national energy and climate plan. One of its goals is to achieve 40% use of alternative energy sources in heating. This task is difficult, since Ukraine currently relies on fossil fuels for heating. Therefore, Ukraine needs to rely on cooperation with international partners.

In particular, the experience of the EU and the USA in the use of heat pumps and technologies that ensure maximum efficiency of their use. The combination with geothermal solutions can provide the population with inexpensive heating in winter and effective cooling in summer, and contribute to the energy security of the country, because geothermal energy is constant.

The Ministry of Development of Communities, Territories and Infrastructure of Ukraine has developed a new State Target Economic Program for the energy modernization of heating and power utilities until 2030 according to best international practices [4].

The development of the heat supply sector in Ukraine will take place in three directions. The first involves the transition from centralized to moderately centralized heat supply with the development of decentralized sources, cogeneration or other installations using waste heat, in particular heat pumps. The second is increased investment, reduced losses in networks and energy efficiency on the part of the consumer. The third is the use of alternative energy sources.

Conclusions. The availability of DH simplifies and reduces the cost of the transition to climate-neutral heating. On the one hand, Ukraine has international obligations regarding decarbonization, and on the other hand, we must take care of the country's energy security. The use of heat pumps will increase the quality of DH and reduce its cost for consumers.

References

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