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Rationale for Using Heat Pumps for Heating Buildings

One of the effective ways to save fuel and energy resources is the use of clean renewable energy sources, and above all, the solar energy stored in the ground, water, air.

Heat pumps are used as converters of thermal energy from the energy source with low temperature to energy carriers with higher temperature.

The heat pump can produce thermal energy, using low potential heat of secondary energy resources and renewable energy sources.

Low-temperature fluids, such as freon, ammonia and other refrigerants are the working body in the heat pump.

In a real economy perspective heat pumps have heating in the main areas of the economy: housing and utilities sector, industry, the resort and sports complexes, and agricultural production.

Their main function is to produce heat (heating, hot water supply of buildings), as well as to produce cold, which is used in air conditioning systems.

However, for each heat pump heating system there is a limit of the outside temperature at which the system consumes as much energy (in terms of standard fuel) as the boiler unit.

With a further reduction of the outside temperature heat pump is more energy-consuming than the boiler.

As a result, in practice, heat pumps are connected with existing heating systems of buildings.

These combinations are applied at peak loads on heating and hot water supply.

There is a need to determine a rational correlation peak and duration of the nominal load on the heating system, under which it is inappropriate to use a bivalent (heat pump + boiler) heating system of the building.

It is possible to achieve a significant (at least 25%) fuel saving for production of heat and electricity consumed in the system, without considering additional major capital expenditures due to the denial of unjustifiably used boiler.

A version of a comprehensive determination of efficient ratio and nominal duration of peak loads on the heat pump heating system of the building is proposed, where the peak heater is necessary to be used.