International Journal of Academic Engineering Research (IJAER)
ISSN: 2643-9085
Vol. 5 Issue 4, April - 2021, Pages: 49-51

Use of Pumps in Heat Supply Systems.

[1]Sadiyev Umid Abdusamadovich and [2]Normo'minov Musajon Tajixuram o'g'li,

[1]PhD, Irrigation and Water Problems Research Institute, Tashkent.
[2]student, Namangan Institute of Civil Engineering, Namangan.
musajonnormuminov@gmail.com

Annotation: *This article deals with the use of foreign technology and the introduction of pumps in heat supply systems in order to further improve and enhance heat supply systems in the territory of the Republic of Uzbekistan.*

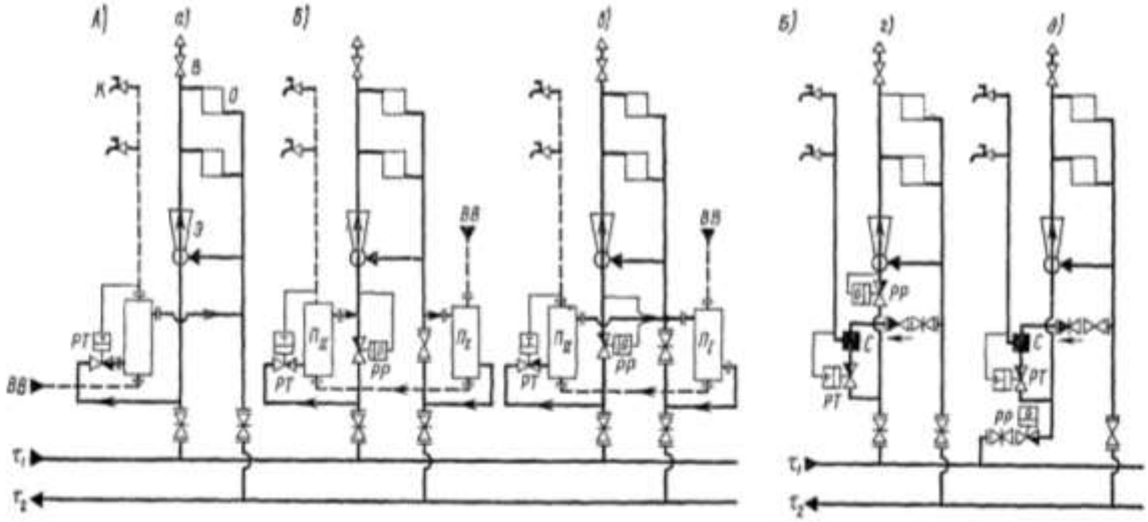
Keywords: *Energy, electricity, feasibility, steam, pressure, gas, IEM, hydride, pipe, pump, source, QMQ, GSHP, heater, system, combination, DSHP, parallel, stepped, saving , temperature, efficiency, preference.*

Introduction: Energy is one of the leading sectors of the country's modern industrialized economy. Energy includes concepts such as production facilities, the use of electricity and heat, liquefied petroleum gas, and other types of energy carriers. The main direction of energy development in our country is the centralization of energy supply to industry, agriculture, cities and towns. This direction will help to solve important economic issues to increase labor productivity by strengthening the technical and economic potential of the country and energy security. Electricity is used in industry, agriculture, transportation, and long-distance transmission. The year 1818 can be considered as the beginning of the centralization of heat supply worldwide. This year, for the first time in the UK, Trengold heated a group of greenhouses using a high-pressure steam system from a boiler 127 meters away. In 1830, steam from a steam engine was first used in a steam heating system in Germany. Good feasibility studies have been performed in the United States on the centralization of heat sources for mechanical energy and heating. In 1878, the first district heating system was built for 210 buildings in Lockport, New York, using steam from steam engines. Initially, the length of the underground steam pipelines was 2 km. At the same time, in Bantedt, New York, a large group of buildings were heated by pump-water in combination with hot water supply. In 1900, a centralized steam heating system in Dresden, Germany, provided heat to 12 consumers at a distance of 1,050 m. The vapor pressure was 0.8 MPa.

Water heat supply began to develop in the early twentieth century with the introduction of large-scale production of electric drives. In 1924, in St. Petersburg, Russia, Professor V.V. Dmitriev and engineer L.L. At Ginter's initiative, a heating network was installed to transfer heat from the city's 3rd power plant to consumers. This station was the epitome of future heating IEMs. L.L. contributed to the development of the idea of district heating. Ginter, M.O. Greenberg, V.V. Dmitriev, A.A. Krauz, J.L. Taner-Tannenbaum, V.M.CHaplin, B.M. Jacob, E.YA. Sokolov, B.L. SHifrinson, S.F. Kopyov, A.V. Xludov, E.F. Scientists and engineers such as Brodsky and N.M. Zinger made significant contributions. Heat supply is a major sector of the economy. It consumes about 20% of the fuel produced and produced in the country every year. District heating is usually based on the use of large district boilers. For example, there are currently 10 thermal power plants and 1 Tashkent Thermal Power Plant (TPP) in Tashkent. Their annual heat production capacity is 15401 thousand Gcal. ga teng. The total length of heating networks is 1442 km. including 244 km of main pipelines. Tashkent Thermal Power Plant-TashIEM was built to supply heat and electricity to the Tashkent Textile Combine and has been operating since 1939. It was the basis for the creation of a centralized heat supply in Central Asia. In Uzbekistan, district heating has been developing mainly since World War II. [1]

Methodology: Heating of hot water heating systems is carried out by means of central boilers and heating centers. The main source of heat for water heating systems are local water heaters, which are installed in a heated building (local heat supply) or in a separate building. Types of boilers Depending on the heat capacity produced, the type of heat carriers, they can be local and centralized boilers, such as water or steam boilers, small, medium and large boilers. In the development of heating equipment, local boilers should be gradually replaced by centralized heating units. It uses high-temperature water (IEM), which is produced in thermal power plants, central heating units.

The type of heat carrier is adopted to organize the normal temperature conditions according to the QMQ, depending on the expediency of the heat supply of the building.



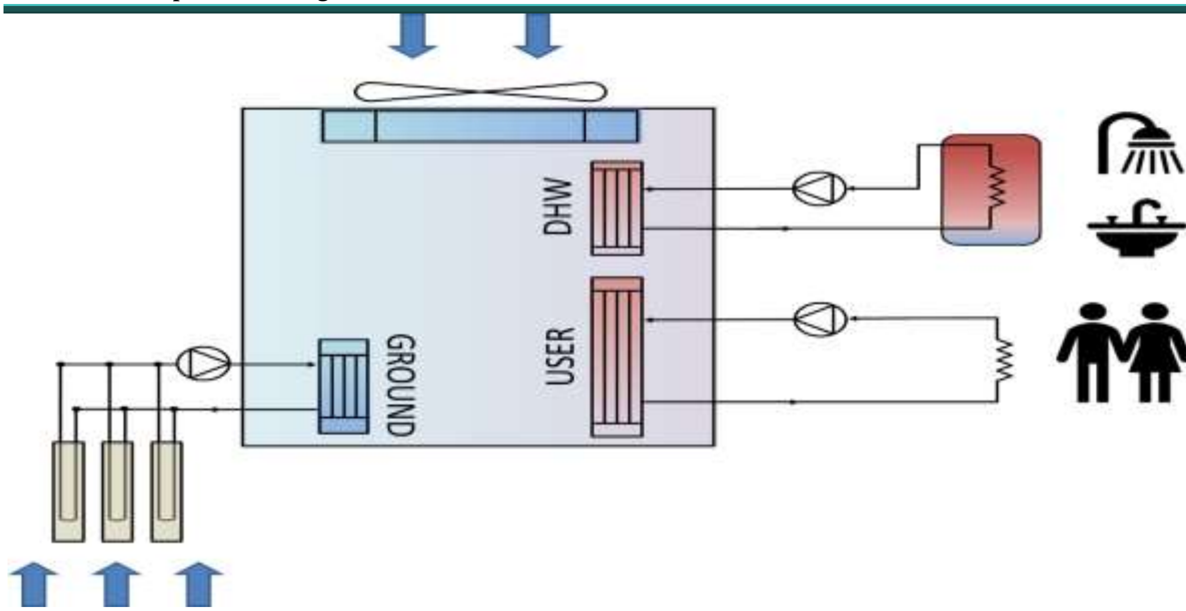
Connection diagrams of local hot water supply systems in two-pipe water heating systems:

In A-closed systems: parallel connection of a-heater; b-heater two-stage series connection; v-heater two-stage mixed connection; In B-open systems: g-adjustable direct connection of heating and hot water supply without connection of heat consumption; d-adjustable direct connection of heat consumption to heating and hot water supply; K-water distribution tap; V-air crane; O-heating device; E-elevator; P-heater; S-mixer; VV-water supply; RR, RT-consumption and temperature regulator; PI, first and second stage of PII heater.

It is advisable to send a small amount of hot water with a high temperature to deliver a large amount of hot water from the thermal power plant to consumers located far from the boilers of IEM and large district residential areas. Therefore, we will be able to raise the temperature of hot water in the pipeline directly to remote consumers to 1500C, and for transit hot water pipes to 1800C. [2]

When it comes to space heating and cooling using shallow geothermal energy as a renewable energy source, ground source heat pump GSHP systems have become one of the most efficient renewable technologies currently available for heating and cooling. These systems use the ground as a seasonal heat source or heat sink to provide heating and cooling to the buildings, respectively. However, they involve the use of refrigerants that can affect the ozone layer depletion and global warming during the cooling cycle of the heat pump.

A possible approach to energy saving in GSHP devices is to combine it with another heat source in the form of hybrid systems. In the case of heating the dominant areas, the sun is combined with thermal energy. A good consideration of this combination of sources is to combine GSHPs in heating and cooling systems with a cooling tower or dry cooler, using the environment as an additional heat source. It is also possible to combine GSHPs with thermal energy storage. To further reduce the size of the installation, its cost, and simplify operation, some researchers have tried to develop a dual source heat pump (DSHP), two different sources: water and air direct pump. settings were included in the heat pump design. The authors developed a DSHP using groundwater and air sources. They found that the performance factor improved by 2 to 7% compared to a system that used only a groundwater source, and by 4 to 18% compared to a system that only used an air source. They noted that high performance of the system can be achieved when using variable speeds for the compressor and circulating pump. [3]



Analysis and results: *Hybrid systems that combine earth and air as heat sources have two main advantages. On the one hand, given the cost of an air heat exchanger (cooling tower or dry cooler), an earth heat exchanger can reduce the overall cost of the system. On the other hand, if the performance of the system is optimized, the possibility of using the most sufficient heat source can lead to a much higher seasonal performance and, consequently, a reduction in energy consumption. The efficiency of a heat pump is expressed as a performance factor or a seasonal performance factor. The higher the number, the more efficient the heat pump will be and the less energy it will consume. When used for space heating, these devices are typically more economical than conventional electric resistance heaters.*

Discussions: *Hybrid (or twin source) heat pumps: when the outside air is above 4-80C Celsius (up to 40-50 Fahrenheit depending on the groundwater temperature) they use air; when the weather is colder, they use a soil source. These twin-source systems can also retain summer heat by draining groundwater through an air exchanger or through a building heater-exchanger, even if the heat pump itself is not running. This has a secondary advantage: it performs the function of low cost for cooling the air and (if the groundwater is relatively stable) lowers the temperature of the ground source, which improves the energy efficiency of the heat pump system by about 4%.*

In conclusion, *as a result of the application of this foreign technology in the territory of Uzbekistan, we are convinced of energy efficiency and efficiency, regardless of the season in our country. Also the system mode is a heat pump designed to meet all operating modes, i.e. heating, cooling-in winter and summer, so heating and cooling are distinguished by full intermediate seasons. I think that if we use these technologies not only in Uzbekistan, but in all countries, we will save a lot of electricity and reduce the damage to the environment.*

References:

1. Rashidov YU.K., Saidova D.Z. Heating, Gas Supply and Ventilation Systems Handbook. Tashkent, TAQI 2002 146 b. [1]
2. M.K. Tursunov, X.A. Matniyozov, SH.M. Mansurova “HEAT SUPPLY SYSTEMS” [2]
3. José M. Corberán, Antonio Cazorla-Marín, Javier Marchante-Avellaneda and Carla Montagud “Dual source heat pump, a high efficiency and cost-effective alternative for heating, cooling and DHW production” [3]
4. QMQ 2.04.07.99 “Heat supply”. State Committee for Architecture and Construction of the Republic of Uzbekistan. Tashkent 1999.