

Summary

Ltd. “Salaspils Siltums” is a modern heat supply company that provides district heating in Salaspils and Saulkalne. The company’s activities are aimed at a long-term and environmentally friendly development so that customers would be provided with a reliable heat supply for the lowest possible price.

Solar energy as a fraction of 90% of renewables in energy production is now not just a number, but an existing reality in district heating, provided by ‘Salaspils Siltums’. First solar collector field for centralized heating in Latvia and the largest one in Eastern Europe together with an accumulation tank and a new wood chip boiler house ensures 95% efficiency, reduced heat losses and minimal damage to the environment.

The project implemented in Salaspils is a successful example of how Latvian cities, by attracting co-financing from EU funds, can modernize their heat supply systems in order to reduce the consumption of fossil fuels and provide citizens with more environmentally friendly heat energy and a cleaner environment. As a result of this project, Salaspils has managed to become the first city in Latvia where solar energy is used in the district heating system. What is more, it is also one of the largest solar district heating systems in Eastern Europe.

Within the project 1720 solar collectors with a total active area of 21762 m² were installed, an 8000 m³ accumulation tank was built and a new wood chip boiler house with a total capacity of 3 MW, equipped with a flue gas condenser, was set up. The fraction of renewables has accelerated up to 90%, from which 20% is achieved by means of solar energy, thus considerably reducing CO₂, NO_x and other harmful emissions into the atmosphere.

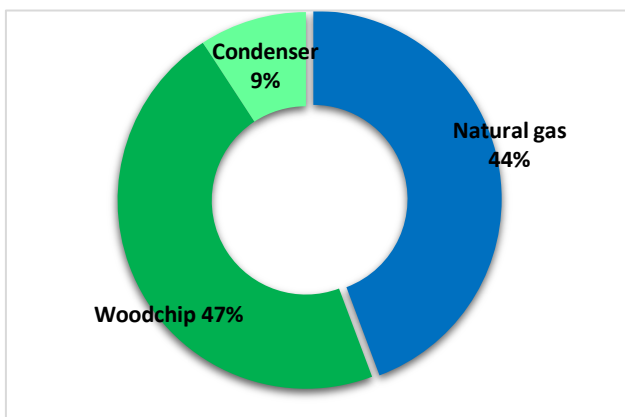


Figure 2. 2018 fuel diversification

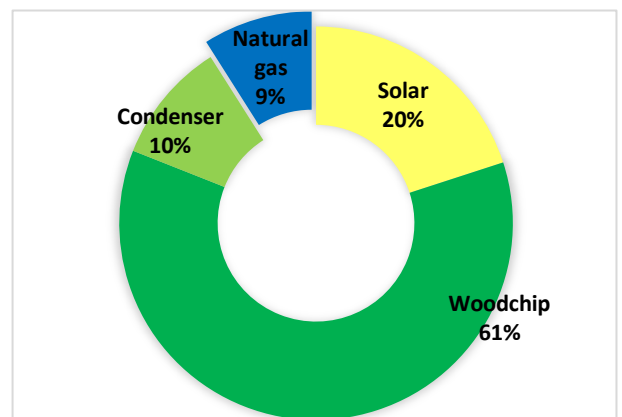


Figure 1. 2019 fuel diversification

The integration of the project started in 2017 in cooperation with ‘Arcon-Sunmark’, Danish manufacturer of solar thermal devices. Active construction had been continuing for 2 years until the solar field produced its first units of energy in September 2019. Now solar energy is a primary energy resource, which ‘Salaspils Siltums’ is trying to use to the maximum. When the energy of the sun is insufficient, we generate heat with a wood chip boiler, a condenser installed on which, provides heat recovery from gases. 28 meters high storage tank ensures the accumulation of surplus heat for several days in order to use in when the demand is higher.

This is the only solar thermal energy park of its kind in Latvia so far, and since the beginning of the project, heating companies from other cities have also been intensively interested in it.

Description

Ltd. “Salaspils Siltums” is district heating provider owned by the district self-government, located in Latvia, Salaspils. The company was founded on the site of the former Salaspils boiler house in 1996. “Salaspils Siltums” provides district heating for 85% of Salaspils residents, that is approximately 17000 consumers. The total length of heating networks is 20,6 km. Installed heat capacity is equal to 35,18 MW and annual amount of thermal energy made is 60 000 MWh. The system scheme can be seen in Figure 1.

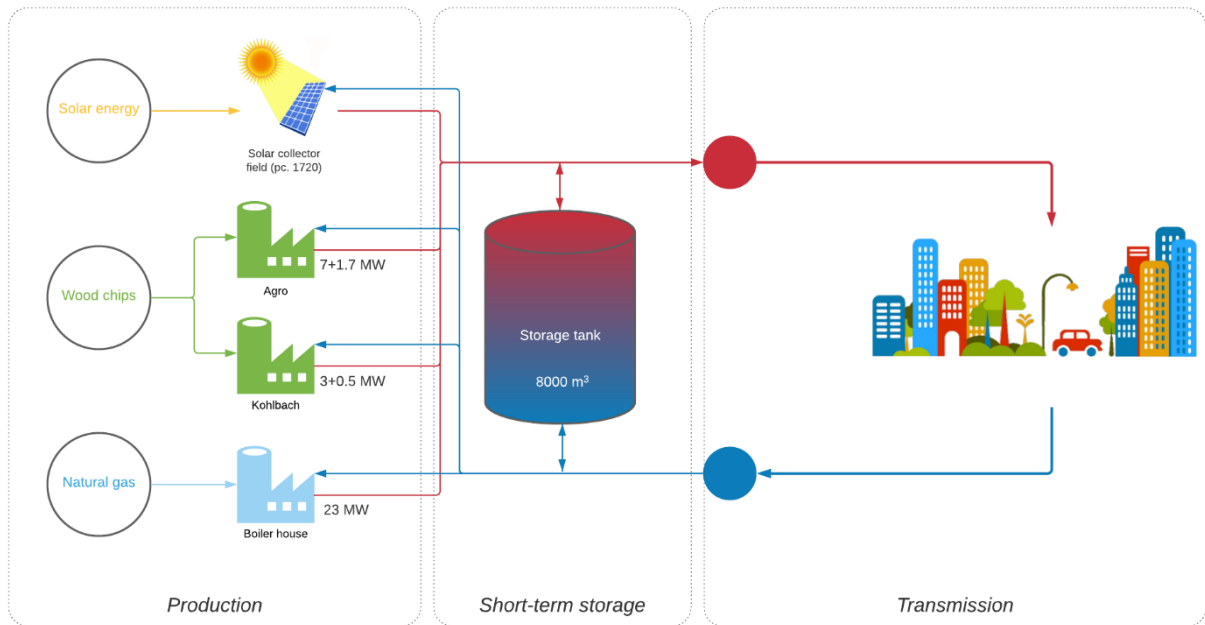


Figure 3. “Salaspils Siltums” production system

The rapid technological development and modernization of the enterprise began in 2010, when old and obsolete boiler house, where sulfur-containing fuel oil was used as fuel, was replaced by three new gas water heating boilers. To continue, majority of obsolete heating mains were replaced with industrially insulated pipes in a three-year period. In addition, an electronic data reading system was introduced, which has been enabling operative control of heat energy production, consumption and losses in heating mains.

In order to abide by the European Climate Law of net zero greenhouse gas emissions by 2050 and EU 2030 target in the Law, as well as National energy and climate plan of Latvia 2021-2030, “Salaspils Siltums” has commenced and actively continues the usage of renewable energy sources. Thereby, in 2012 new biofuel (wood chips) boiler with a capacity of 7 MW has been put into operation. From that moment on, gas began to be used only as an auxiliary resource to cover peak loads, so that the company has been able to reduce CO₂ emissions by 80% in 2016 compared to 2011. As a complementary result of the implemented modernization measures, the the tariff at which heat energy is delivered to consumers does not depend to such an extent on gas price fluctuations on the market. In this way, the heat tariff from 2010 to 2016 was reduced by 23%.

The main retrofitting that is considered within this entry is project “The transition to the use of renewable energy resources of the heat source at 31A Miera Street, Salaspils”, within the framework of which the largest solar collector field in Eastern Europe with a total area of 2.17 hectares was installed, an 8000 m³ accumulation tank was built and a new chip boiler house with

a total capacity of 3 MW, equipped with a flue gas condenser, was set up. In compliance with this, the fraction of renewable energy sources used for heat manufacturing has increased up to 90%, from which 20% is achieved by means of solar energy. The total energy performance indicator has reached 95%, that has led to the diminution of the heat tariff for 12,7% more comparing with the year 2016. Emission factor has decreased for more than a half.

The main reason of deployment of the project was the striving for the increase in energy independence and transition to renewable energy sources, that was no more possible using obsolete technical equipment. "Salaspils Siltums" regularly follows up actual worldwide novelties in district heating field and monitors tendencies of reducing the negative impact on the environment.

It was a long way from idea to the real implementation of such a large-scale project in order to reach company's sustainability and energy efficiency goals. As a motivator was also to conform European Climate Law of net zero greenhouse gas emissions by 2050 and EU 2030 target in the Law, as well as National energy and climate plan of Latvia 2021-2030. Studying a specific area theoretically, and also looking at the example of foreign colleagues in implemented projects improved our innovation planning process. By exploring other experiences, we could determine, which set of technical structures is needed in our particular case. Hence, solar collector field, accumulation tank and new wood chip boiler house were decided to set up.

Choosing solar panels as a new source of renewable energy was due to the fact that currently it was the optimal solution in terms of investments and energy efficiency. The average intensity of solar radiation in Latvia is 1100 kWh / m² per year, the average heat produced of the solar field is around 12,000 MWh per year.

The accumulation tank with 8000 m³ capacity is an integral part of solar system for a conservation of surplus heat. It was considered necessary to have unit that ensures the balance between production and demand. Accumulation storage tank provides system flexibility and higher efficiency.

The new wood chip boiler house with the flue gas condenser was planned to ensure the maximum efficiency from accessible renewables with no deleterious emissions released into the atmosphere. Flue gas condenser provides heat recovery from gases reducing the number of resources required for production.

In order to increase the energy efficiency of administrative building, project of installing PV solar panels onto the roof was developed in 2017.

The concept elaborated by "Salaspils Siltums" was implemented together with Arcon-Sunmark, a Danish supplier of solar thermal devices, and Filter, a heating and cooling company based in Latvia.

In order to make preliminary check of system efficiency, in August 2017 "Salaspils Siltums" has purchased solar PV panels with intention to obtain electricity from solar energy. Thus, 86 solar panels with a total capacity of 25 kWh were installed on the roof of the company's administrative building.

The successful result of the PV panels motivated to move on according to the plan. 1720 large-scale flat plate collector panels, of 12 m² each, were delivered by Arcon-Sunmark, being produced in Danish factory in Skorping. Panels have a foil between the glass cover and absorber to reduce convection losses. Danish colleagues delivered the steel mounting system, the piping for the solar field and the glycol and the control unit. Before installation of solar collectors there

were several preparations: profound preliminary research, development of technical documentation, strict adherence to all stages of the project. The development of the project started in 2018, building process continued 7 months. The implementation of the project was completed in September 2019. However, full use of the system started in 2020.

The main responsibility of installation of the accumulation tank and wood-chip boiler, together with combination the new heat supply structure with the old one, was the responsibility of Filter. An agreement about the regular inspections and maintenance of the new system was concluded as well, so that the supply of the city with environmentally friendly heat is uninterrupted and stable.

In this way one of the largest solar district heating systems in Eastern Europe - 1,720 solar collectors with a total active area of 21,672 square meters have been installed on an area of 6,5 hectares.

The development and implementation of project took two years, started in the year 2017 and finished in 2019. 7.25 million euros have been invested in the implementation of the project, receiving co-financing from the European Union Cohesion Fund of 2.701 million. The company provided the remaining financing with its own investment and a bank loan of 2.8 million euros.

The solar field has been designed in a way that sunlight alone is enough to meet demand for hot water in summer at average irradiation levels. This allows to avoid operation of energy-producing installations at a low load. Using hot water storage tank, solar heat generated during the day together with unused heat accumulated from other resources, is used when needed, avoiding the use of fossil fuels.

20% of the total heat demand per year and up to 90% during summer season are now being produced by means of solar energy.

Together with putting into operation the new wood chip boiler house, the company has achieved the high fuel diversification development level, that ensures the transition from purchased heat produced with fossil energy resources to a heat source that uses renewable energy resources for heat production.

PV Solar panels installed for internal use of the company, ensure that part of the electricity is generated for the administration and manufacturing buildings using solar energy as well.

The project implemented in Salaspils is a successful example of how Latvian cities, by attracting co-financing from EU funds, can modernize their heat supply systems in order to reduce the consumption of fossil fuels and provide the population with more environmentally friendly heat energy and a cleaner environment. As a result of this project, Salaspils has managed to become one of the first cities in Latvia, where solar energy is widely used in the district heating system. It should also be noted, that our solar system is one of the largest solar district heating systems in Eastern Europe. It is a story both about daring to create an idea and developing it, and at the same time - about successful and skillful project management, because the planned work was completed before the start of the heating season.

Being the pioneers in using solar energy for DH in Eastern Europe imposes a certain responsibility, as henceforth "Salaspils Siltums" becomes an example for other energy providers and is eager to share its experience.

This project has proved that solar energy in the geographical position of Latvia is quite enough to meet the demand for heat on the scale of the whole city. We have proven that our country has a huge potential for the widescale adoption of such renewable heat sources due to the large amount of free space for installing collectors on the outskirts of cities. Incredible assistance

renders the exchange of experience with European partners, since only the open idea sharing is a clue to the rapid, productive and complex development.

“Salaspils Siltums” follows not only European energy standards, but also world environmental values. The new project implementation made it possible to contribute the worldwide pursue of reducing the greenhouse gas effect, decreasing significantly CO₂, NO_x and other harmful emissions into the atmosphere, thereby contributing towards UN Sustainable Development Goal 13 – Climate Action (SDG 13). In this way, Salaspils Siltums managed to lower the amount of emissions for about 20% and in the last decade we have decreased CO₂ emissions for about 90% . This is an other huge step towards the carbon neutrality, and inspired by the success, we are not going to stop there, but confidently follow on to new successes in the field of green energy production.

In accordance with SDG 7, “Salaspils Siltums” has reduced CO₂ emissions by 90% compared to 2012 and if so far, we had achieved good results in terms of carbon neutrality, then with this project we have made already a step towards to carbon-free production, which at the same time allowed us to reduce the price of thermal energy. Implementation of this project was a win-win!

The implementation of this project allowed us to introduce two main innovations into our plant, which are thermal energy storage tank and solar collector field, and these technologies has provided us nothing but benefits, that conforms SDG 9. These innovative technologies have given us opportunity to manage our production in more scenarios, thus enabling our system to be managed in the most effective regime in any situation, whether it’s season or offseason.

Since more than 80% of Salaspils residents are connected to district heating provided by Salaspils Siltums, 80% of heating energy demand on the territory of our city is environmentally friendly (especially comparing with obsolete individual system approaches as gas, oil boilers, etc.). We make our best efforts to offer the highest quality service to our clients, thus increasing the number of connections every year.

Residents of our city and surrounding areas have benefited from cleaner air and reduced heat and hot water charges for 12,7 % comparing with the year 2017. Thanks to tariff reduction, district heating has become more affordable, thus prompting to abandon alternative unsustainable energy sources.

It is known that by expanding district heating grid these days is one of the most successful ways to become carbon neutral, and we are glad to educate our citizens to think green. We regularly inform our existing and potential clients about the benefits of district heating and the technologies we use. Salaspils Siltums keeps up with the times, so we are permanently sharing up-to-date field related information on our webpage and social networks via graphical and other visual means in an understandable way for anyone.

“Salaspils Siltums” states that one has to think sustainably and acts here and now. Now Salaspils has received a global recognition and is proud to be a pioneer on the way to new sustainable solutions.

Photos of the implemented project



Figure 4. Solar collectors



Figure 5. Bird's eye view of the solar collector field



Figure 6. Bird's eye view of the solar collector field, boiler house and storage tank



Figure 7. Boiler house and storage tank in action

