Importance and Perspectives of District Heating Supply in Siauliai

Siauliai aims to preserve and develop the district heating supply as it not only provides the consumers with heating supply at most attractive prices, but also allows increasing the use of renewable energy sources by reducing greenhouse gas emission to the environment.

Siauliai is a city of Northern Lithuania with about 100 thousand residents. It is often referred to as the city of the sun dating back to the Battle of the Sun which occurred on 22 September 1236. However, for the majority of the city's residents heat during the cold season is brought to the homes not by the sun, but by the municipal PLLC Šiaulių Energija, which will celebrate its centenary in a few years. Its main activity is the production of heating energy, centrally supplying it for heating and for preparation of hot water, and also generating electricity. Šiaulių Energija supplies heating to the consumers of Siauliai city, Kursenai town and surrounding settlements, with the total residents of about 44,000. There are also institutions among consumers, but the major part of them, almost 80 %, are natural persons.

This 0ompany has been operating since the start from operation of Baciunai power plant on 29 June 1923. It was the first large power plant in Lithuania at that time, and there was the start of the entire energy system in the country. The transmission line connecting Baciunai power plant with Siauliai city was the first high voltage line in Lithuania.

In 1955 started a new era in the history of the company – the first thermal network was built to energy settlement of Rekyva. It was the beginning of district heating supply in Siauliai.

Siauliai became the city using biofuel in 2012, when Siauliai cogeneration power plant (figure 1) became operational (37 MW of thermal power and 11 MW of electricity power). This project is the largest in the history of the company, both in scope and value exceeding €30 millions.

Figure 1. Siauliai cogeneration power plant (Source: Saulius Jankauskas)

In the competition Lithuanian Product of the Year 2012 organised by the Lithuanian Confederation of Industrialists, Šiaulių Energija's project was awarded a gold medal in the ecological and environmental protection industry group „Production and Supply of Heating and Electricity Using Cogeneration and Local Renewable Resources".

Increasing the share of renewable fuels in the production of heat, in 2014 the company started operating a biofuel boiler house with a capacity of 25 MW. In October 2014, heat price of Šiaulių Energija was almost 27 % lower compared to the start of the heating season in 2013. The price of heat for consumers decreased by another 1.3 % in 2015, following the reconstruction of the Tilvytis boiler house in Kursenai into the biofuel boiler house.

Currently Šiaulių Energija owns 15 boiler houses, 13 of which are fully automated and one cogeneration plant. The installed heat generation capacity of equipment of all boiler houses heat generating plants, including the capacity of installed heat condensing economizers, is 338.26 MW. The largest is the Southern boiler house with the capacity of heat production equipment of 246.535 MW and combined with cogeneration power plant 283.707 MW.

Reducing CO_2 emissions by more than six times

Experts warn that if the world burns fossil fuel at such rates as they do now, the temperature growth could reach the dangerous level. The district heating system allows large-scale and relatively rapid conversion of fossil fuel such as natural gas into renewable sources. In 2019, over 77 % of the heat supplied by Šiaulių Energija for the consumers was produced using biofuel; the rest was produced from natural gas. This was caused by timely and targeted investments in the heating sector, which allowed the transition from fossil fuels to biofuels. Already today the company has achieved the optimum ratio of domestic and imported fuel for heat production, which is specified in the National Program for the Development of the Heat Sector 2015–2021 approved by the Government of Lithuania.

Siauliai cogeneration power plant produces heat and electricity. The company sells electricity to Lithuanian Electricity Networks, as well as uses it for heat production and for own use. The annual production of Siauliai cogeneration power plant is about 62 GWh of electricity.

Until 2012, before the introduction of biofuels, the CO_2 emissions of the company were about 100,000 t a year, and after the pollution abatement measures had been implemented, CO_2 emissions had decreased to 15,000 t a year. Decrease in CO_2 emissions was also influenced by decreased production, increasing number of renovated houses, modernisation of heat supply networks, installation of condensing economizer (for gas boilers) and others.

In the period of 2005-2007, the company has received the crystalline acknowledgement of the Lithuanian Environmental Investment Fund for its initiative to reduce environmental pollution; won the Environment Protection Company of the Year 2012 nomination in National Responsible Business Award ceremony; won the gold medal in the Lithuanian Product of the Year 2012 competition at the Lithuanian Confederation of Industrialists. In 2013, the Lithuanian Business Support Agency acknowledged the company for "Turning Ideas into Reality"; in the elections "European Sails 2013" of the Ministry of Finance of the Republic of Lithuania, the project of the company "Design and Construction of Siauliai Cogeneration Power Plant" became the winner of the nomination "For

Progressive Business"; n 2014 at the awards "For Business Merit" organised by the Lithuanian Ministry of Economy, the Company won in the nomination "Social Innovator".

Further activities reducing greenhouse effect causing factors

In 2019, Šiaulių Energija carried out eleven heat transmission networks reconstruction projects, for which more than €12 million were used. According to the preliminary data, the Company's revenue was €23.5 million in 2019.

The length of underground heat transmission networks of different diameters owned by the company is of about 150 km, which makes their reliability extremely important. Currently Šiaulių Energija is investing in the reconstruction of heat transmission networks in order to prevent pipeline ruptures and accidents in the heat pipelines in the future. Worn-out pipelines are replaced with new polyurethane factory-insulated pipes characterised by longevity and reduced heat loss. Reducing the latter also reduces the amount of heat produced and environmental pollution by combustion products.

By the decision of Siauliai City Municipality Council, since 1 December 2016 Šiaulių Energija has been appointed as the administrator of the implementation of the Siauliai City Municipality Energy Efficiency Improvement Program in apartment buildings. The most effective way to save heat is to renovate the apartment buildings. Not only it reduces heating costs, but it also contributes to a more efficient use of energy sources while reducing the factors causing greenhouse effect.

The amount of the heating bill may differ by up to four to six times in different homes during the same month. This difference is caused due to the different amount of heat used for heating of the buildings. If the heating consumption for apartment per square meter is 20-25 kWh and more per month, the experts advise to seriously consider renovating the apartment building. The experience of already implemented projects shows that after renovation (modernisation) of an old apartment building, after renovation of the heating system, alteration of various constructions, and other energy efficiency improvement measures the payments for heating for residents are reduced by about 40%.

Figure 2. Currently, the Company administers renovation (modernisation) projects of 20 apartment buildings and credit agreements of 23 apartment buildings. (Source: Marina Visockienė).

Recycling and planting trees

As the centenary of Šiaulių Energija activities is approaching, which will be mentioned in 2023, it is safe to talk about the traditions of the company during its long years of work. The 90th anniversary celebrated in 2013 marked the beginning of an initiative aimed to greet the company's 100th anniversary by welcoming one hundred young oaks.

The first oak tree planted in the territory of the company was donated by the Lithuanian Business Support Agency together with an acknowledgement for "Turning Ideas into Reality". In the same year of 2013, several oak trees were planted next to the first one by the management staff of Šiaulių Energija. As the years go by, new trees are planted every fall by other employees of the company. Almost 70 oak trees are already planted in the territory of Šiaulių Energija.

The company takes care not only of new trees, but also of collecting and recycling useless trees that have become obsolete. In the beginning of January 2020, after the winter festivities, the eighth Christmas Tree Collection campaign organised by Šiaulių Energija took place in Siauliai city and region. Former Christmas trees collected during the process are turned into eco-friendly biofuel, which is used to heat homes of the company’s consumers. This tradition is a great way to educate the younger generation: children are encouraged from an early age to conserve the environment and not waste any resources that are still suitable for recycling.

Price of heating is one of the lowest

For some consecutive years, the administration of the company has called one of the lowest heat prices in Lithuania for its consumers as a great success and a real achievement. It resulted from timely and targeted investments in the heat sector, which allowed the transition from fossil fuel to biofuel. After the implementation of cogeneration power plant, biofuel boiler house and other projects, the heating price for consumers decreased by 52 % (comparing the prices in September 2012 and March 2020, figure 3).

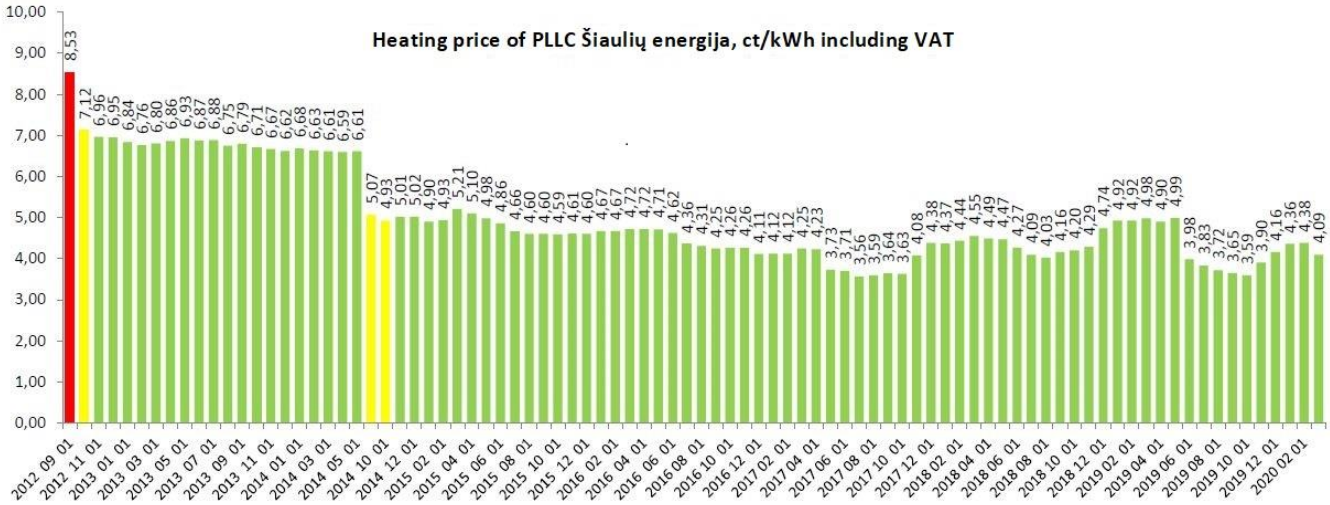

Figure 3.

According to the data collected by the Lithuanian Hydrometeorological Service, the year of 2019 in Lithuania was the warmest year during the whole period of meteorological observations. Although this heating season was warmer than usual and the consumption of heating was lower due to higher outdoor air temperature, the heating price of Šiaulių Energija for consumers was one of the lowest in Lithuania throughout the year in 2019 and the lowest among metropolitan cities in a half of year.

One of the lowest heating prices in the country among the nearly 50 Lithuanian heat suppliers announced by the National Energy Regulatory Council and the lowest among the metropolitan companies in 2019 was during the heating season, i.e. when the consumers demand for heat is the highest: in January-March and October-December (figure 4).

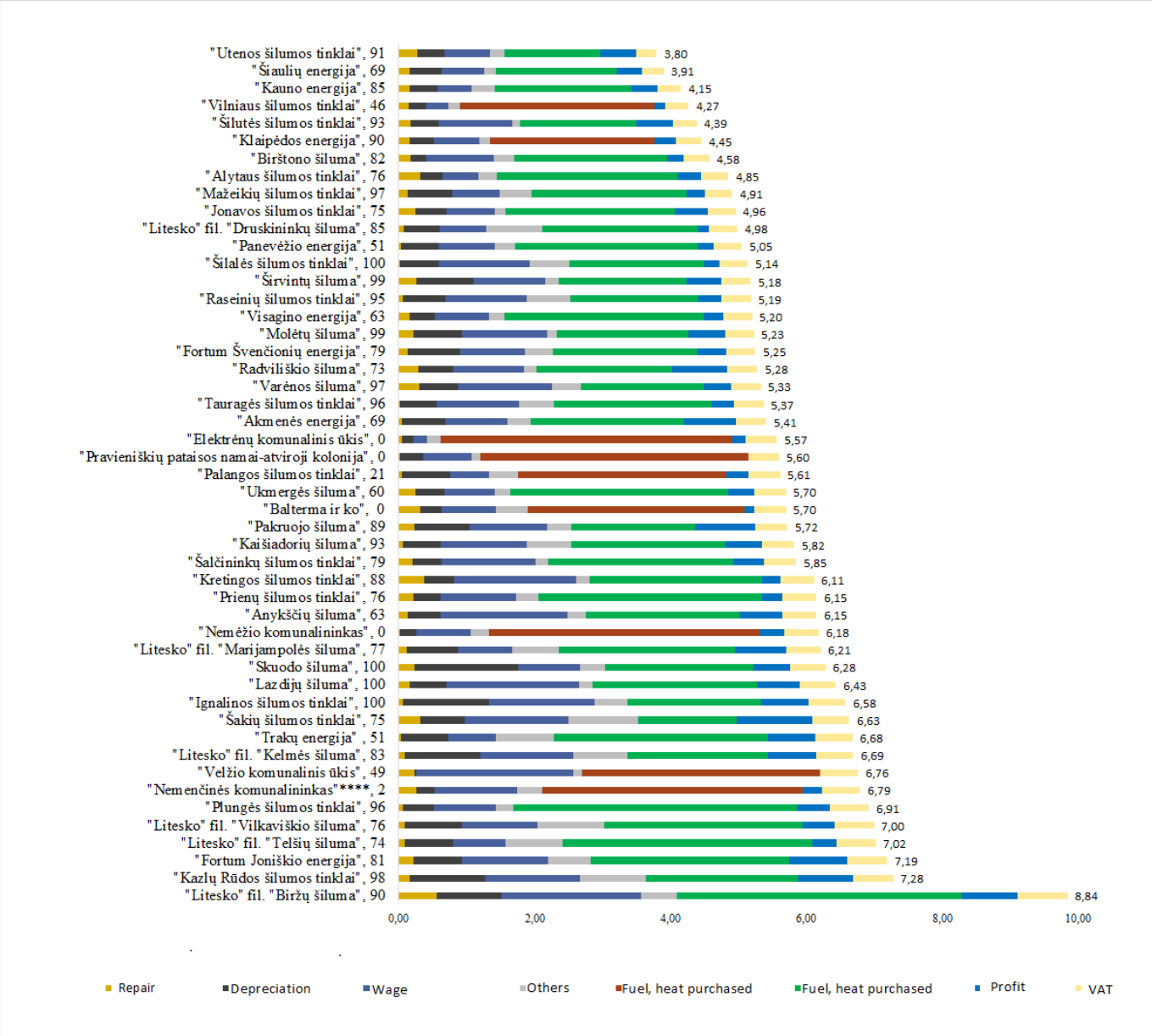

Figure 4. Heating prices in October 2019, ct/kWh including VAT (Source: Data collected by National Energy Regulatory Council)

The future is for ecologically clean types of energy

The fact that Šiaulių Energija already produce most of the heat from biofuel is definitely an important achievement. The further aim of Siauliai city is to diversify the energy sources for district heating production, i.e. solar energy, pumps of the heat, waste energy. The clean energy selection consists of energy efficiency, renewable energy, and law-making plans for the energy market model. This requires a strategic approach, political will and close cooperation between state institutions. The use of renewable biofuel for energy production is a very important, but not the end-goal, the future belongs to ecologically clean kinds of energy. The future vision of Šiaulių Energija is the most attractive prices for services, maximum reliability, and minimum pollution.

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