

Summary

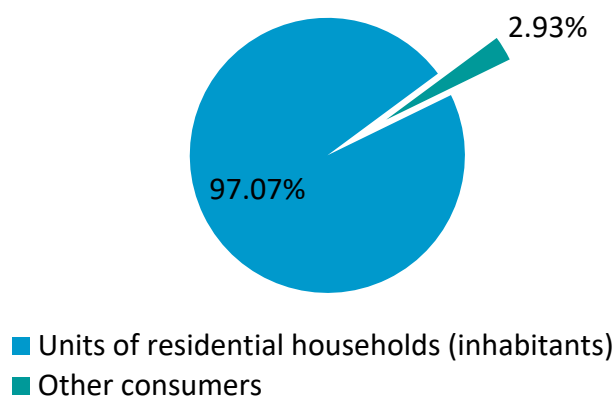
Kaunas with almost 300.000 inhabitants is the second largest city in Lithuania. It is a large centre of business, science and industry.

AB Kauno Energija is the municipal District Heating (DH) system operator in Kaunas. The company was established in 1963. During 56 years of operation, the status of the company changed several times, however, the current AB Kauno Energija was registered in 2000. AB Kauno Energija is the second largest (by number of customers, amount of heat supplied and by turnover) district heat production and supply company in Lithuania. The company shares approx. 20 % of Lithuanian DH supply market.

The Company generates and supplies heat to customers in the cities of Kaunas and Jurbarkas and in Kaunas district (Akademija town, Ežerėlis town, Domeikava village, Garliava town, Girionys village, Neveronys village, Raudondvaris village, hereinafter referred to as Kaunas district).

As at 31 December 2018, the Company supplied heat to 3,500 businesses and organizations as well as to 115,990 households, in total – to 119,490 customers. Square footage of buildings served is 8940973 m².

Repartition of Company's heat consumers by groups



Company's generation capacities consist of:

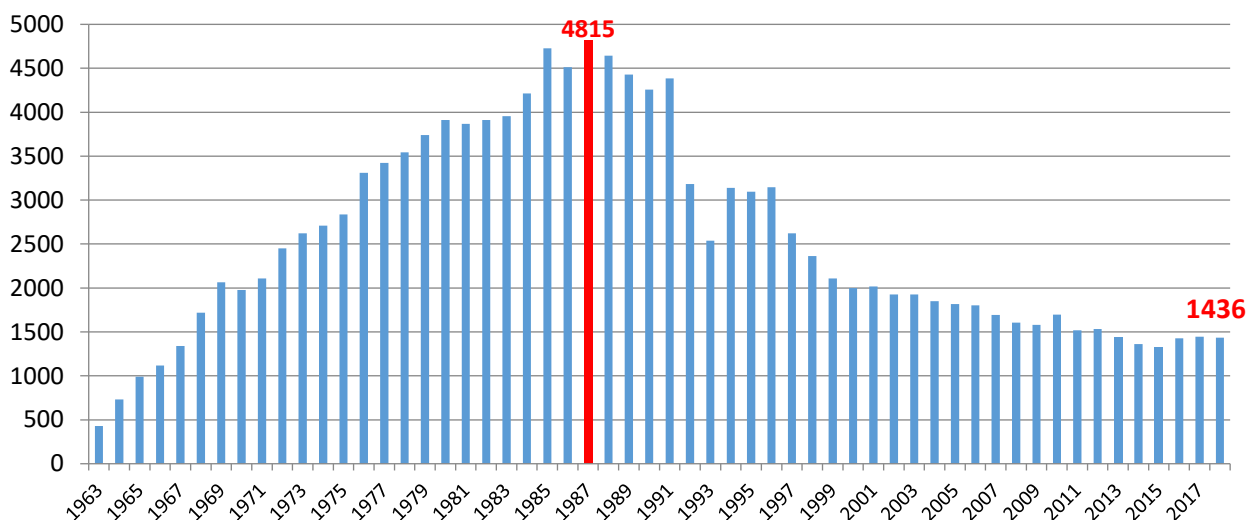
- Petrašiūnai power plant (314,6 MW_h + 8 MW_e),
- 4 boiler-houses in Kaunas integrated network (151,06 MW),
- 7 district boiler-houses in Kaunas district,
- 1 boiler-house in Jurbarkas city (34,8 MW),
- 13 boiler-houses of isolated networks,
- 35 local gas burning boiler-houses in Kaunas city,
- 1 local boiler-house with wooden pellets in Kaunas city.

Total installed heat production capacity of the company consists of 588 MW (including 41 MW capacities of condensational economizers). 87,5 MW of them work on biofuel. The rest of them are gas burned capacities.

The company owns and maintains more than 452,6 km of up to 900 mm diameter DH pipelines in Kaunas, Kaunas district and Jurbarkas city. Average age of these pipelines exceeds 38 years. Approx. 27 % of them are renovated using polyurethane insulated pipes.

At the time of establishment, the heat demand in Kaunas was approx. 430 GWh per year. The maximum energy demand in Kaunas was reached in 1987. At that time approx. 4815 GWh of heat was consumed. Later, as the industry started to shrink, as energy resources became more expensive, heat consumption started to decrease and now accounts for only about one third of the former peak demand.

DH sales of Kaunas DH company, GWh



In 2003 the main heat and electricity production facility of AB Kauno Energija – Kaunas CHP was sold to Russian gas company Gazprom, so from that time up to 2012 AB Kauno Energija was likely a heat distribution company.

Up to 2012 mostly natural gas was used for heat and electricity production in Kaunas, Kaunas district and Jurbarkas city. Emissions of CO₂ were 29055 tonnes in 2012. The heat price for customers due to the price for natural gas reached its peak – 9,1 ct/kWh without VAT in 2012. The costs for heat and hot water for households exceeded 20% of average salary.

What has been done during the last few years?

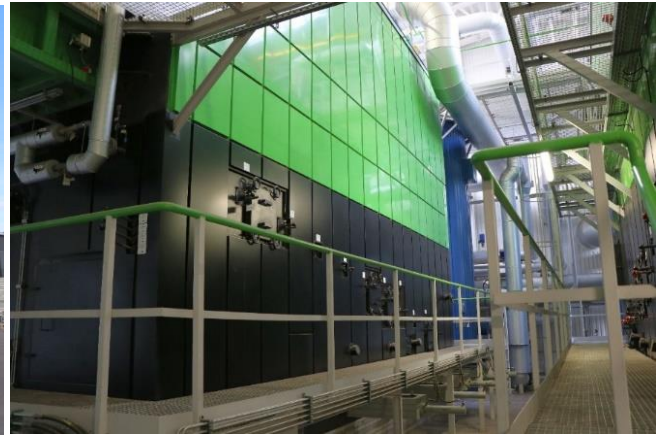
In 2012, amendments to the Law on Heat Sector of the Republic of Lithuania and changes in regulation came into force and they allowed favourable conditions to invest in construction and reconstruction of heat production facilities, thus allowing competition in heat production sector.

AB Kauno Energija invested in reconstruction of its own heat production facilities and network pipelines more than 52,2 million Euros, incl. 8,9 million Euros of EU funds support in 2013 – 2017. The company invested in latest technologies (the reconstruction of heat generation facilities installing economizers, new biofuel burned boilers, automation of boiler-houses, systems of electronic services, system of remote reading of heat meters and data transmission, customer service using “one stop” principle, etc.). All these investments help the company make heat production and transmission process more effective, reduce the CO₂ emissions and reduced prices of heat sold significantly.

In five years, the company built 9 biofuel firing water heating boilers with total capacity of 85,3 MW operating in Kaunas integrated network, 2 boilers in small towns of Kaunas district and Jurbarkas city.



Installation of 2 biofuel-based boilers with total capacity of 30 MW (incl. 6 MW flue gas condenser) instead of old steam boiler BKZ-75, construction of biofuel storage in Petrašiūnai CHP plant. Investment – 6,218 million Euros, incl. 1,74 million Euros of EU support.



Installation of 2 biofuel firing boilers with total capacity of 20 MW (incl. 4 MW flue gas condenser) in Inkaras boiler-house and reconstruction of the building. Investment – 5,792 million Euros, incl. 1,74 million Euros of EU support.



Installation of 2 biofuel burned boilers with total capacity of 21 MW (incl. 4 MW of flue gas condenser) in Šilkas boiler-house and reconstruction of the building. Investment – 3,006 million Euros, incl. 1,31 million Euros of EU and Lithuanian Environmental Investments Fund support.



Installation of 1 biofuel burned boiler with total capacity of 5 MW in Jurbarkas boiler-house and reconstruction of the building. Investment – 1,0 million Euros.



Installation of 1 biofuel burned boiler with total capacity of 5 MW (incl. 1 MW of flue gas condenser) in Noreikiškės boiler-house and reconstruction of the building. Investment – 1,8 million Euros, incl. 0,67 million Euros of Lithuanian Environmental Investments Fund support.



Installation of 1 biofuel burned boiler with total capacity of 4,3 MW (incl. 0,8 MW of flue gas condenser) in Ežerėlis boiler-house and reconstruction of the building. Investment – 1,32 million Euros, incl. 0,52 million Euros of Lithuanian Environmental Investments Fund support.

Reconstruction of network pipelines



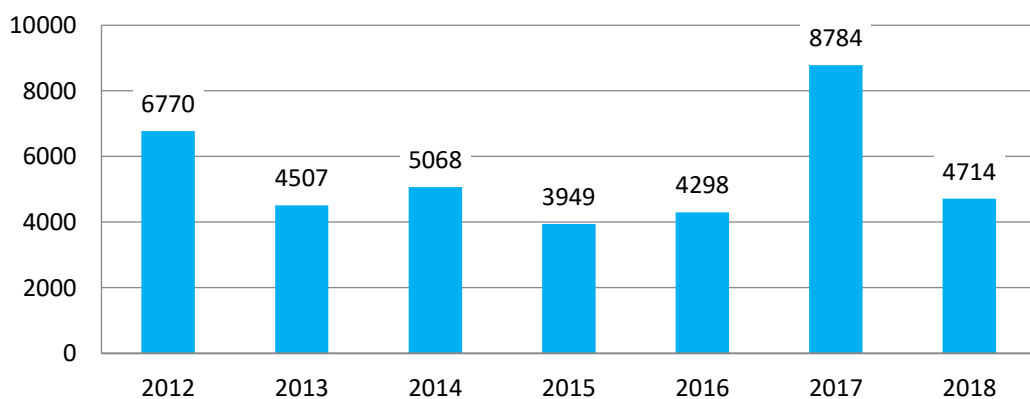
Company's trunk pipelines are an average about 38 years old. Hydraulic testing identifies their weakest points. Every year, about 200 points where cracks occur are identified during the tests. Upon discovery of defects, pipes are exposed and promptly repaired.

Trunk pipelines of heating networks are reconstructed in the most worn out places using support from the EU Structural Funds. New industrially (polyurethane foam insulation in polyethylene shell) insulated pipes not requiring concrete channels are mounted in the reconstructed sections of the heat supply network. Heat loss is reduced up to 65% in reconstructed sections, while the pipelines no longer pose a threat of rupture and ensure reliable heat supply to consumers.

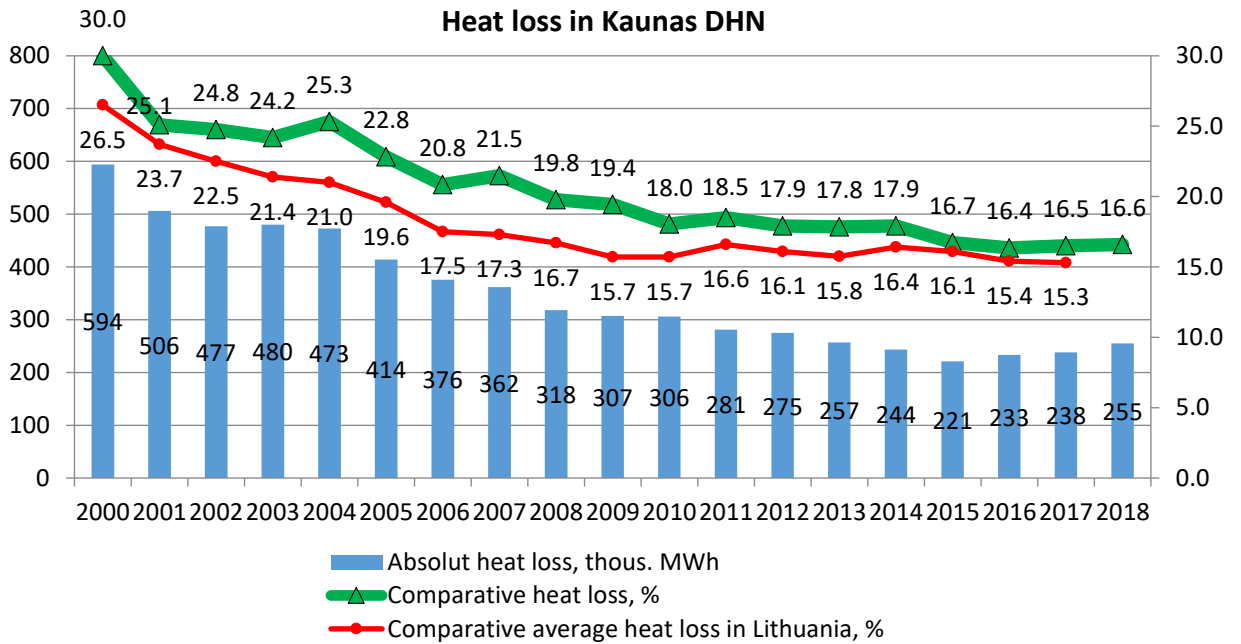
AB Kauno Energija implemented 16 trunk pipelines building and reconstruction projects in 2012–2018 with the total value of more than 14,4 million Euros, including 7,2 million Euros of EU support.



Total length of annually reconstructed and installed pipelines, m

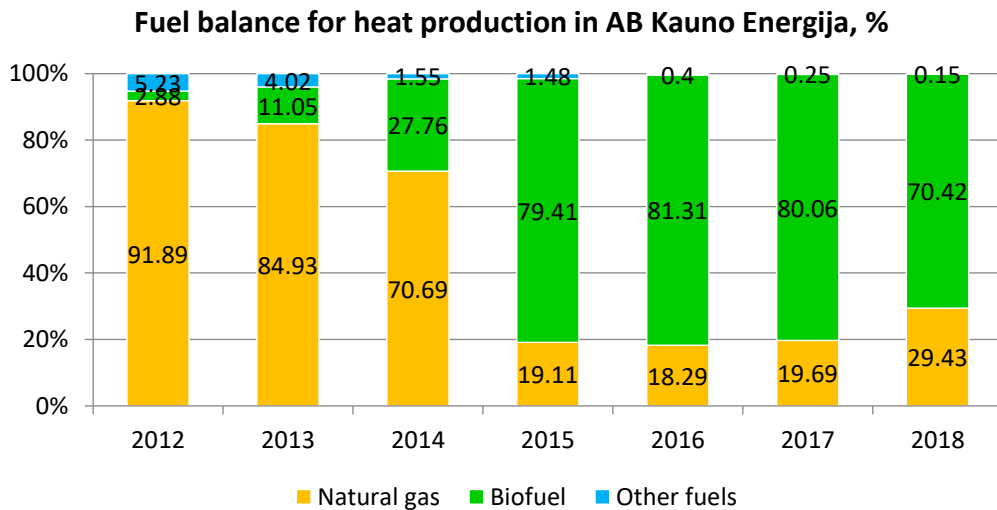


Reconstruction of network pipelines helps to reduce heat supply losses.



Absolut heat supply losses slightly increase due to the expanding DH network and increasing own production. Comparative heat losses remain almost the same.

Reconstruction of heat production facilities and network pipelines has dramatically changed a fuel balance of AB Kauno Energija:



Independent heat producers (IHP)

A considerable contribution in Kaunas was made not only by AB Kauno Energija, but also by 9 IHP who built 9 heat production facilities and power plants using biomass in Kaunas and Kaunas district.

According to the law, the heat supplier generates the required amount of heat to meet the needs of heat consumers using existing heat production facilities. Where there is at least one independent heat producer in the heat supply system, the estimated amount of heat required to meet the needs of heat consumers must be produced and / or purchased by means of a heat auction. Starting from



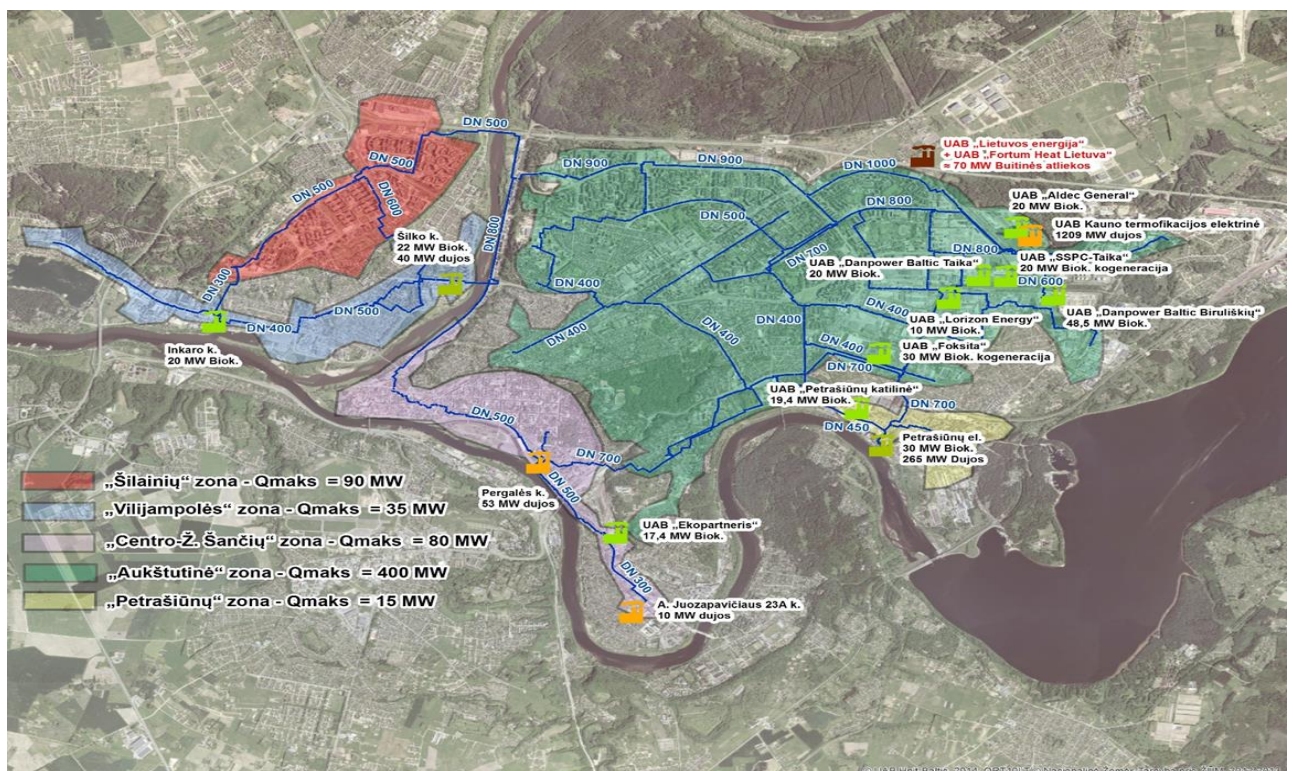
May 2018 the auctions are organized by the Energy Exchange operator BALTPPOOL UAB. Electronic auctions are conducted in accordance with the Heat Auction Regulation approved by the National Energy Regulatory Council (NERC).

The heat is purchased every month in a way of auction from 11 IHP operating in Kaunas and Kaunas district:

- UAB „Danpower Baltic Taika“ (20 MW, biomass),
- UAB „Danpower Baltic Taika elektrinė“ (CHP, 20 MW_h + 5 MW_e, biomass),
- UAB „Danpower Baltic Biruliškių“ (48,5 MW, biomass),
- UAB „Lorizon energy“ (10 MW, biomass),
- UAB „Petrašiūnų katilinė“ (19,2 MW, biomass),
- UAB „Aldec General“ (20 MW, biomass),
- UAB „ENG“ (6,5 MW, biomass),
- UAB „Ekopartneris“ (17,5 MW biomass),
- UAB „Foksita“ (CHP, 30 MW_h + 5 MW_e, biomass).
- UAB „Ekoresursai“ (2,9 MW, biogas),
- UAB Kauno termofikacijos elektrinė (CHP, 1200 MW_h + 160 MW_e, natural gas).

Total biomass heat capacity of IHP consists of 198 MW. UAB Kauno termofikacijos elektrinė (Kaunas CHP) operates just as reserve capacity in case of emergency.

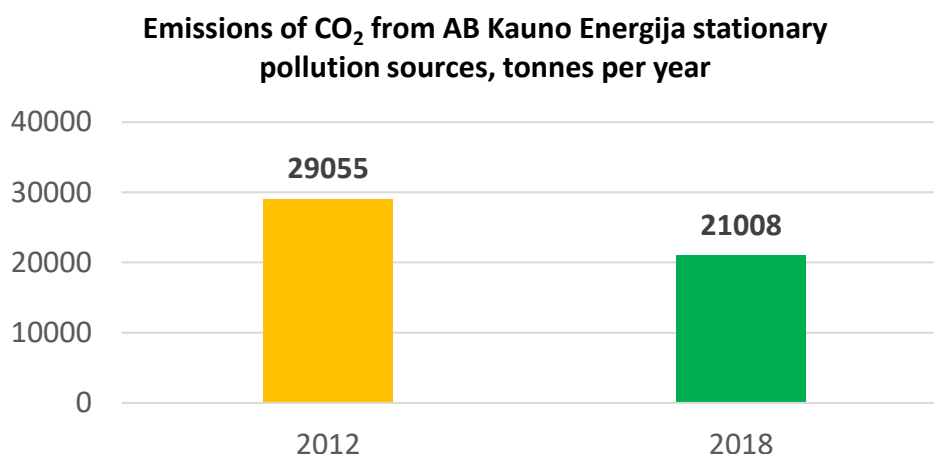
Locations of AB Kauno Energija and IHP heat production facilities



A total share of heat produced by IHP and supplied to the customers in 2018 consisted of 872.9 thousand MWh, i.e. 60.8%. Almost 39.2% of heat supplied to consumers in 2018, was produced in AB Kauno Energija heat production facilities.

It's indicated in EU Directive of renewable sources and in Lithuanian national legal acts, that a part of renewable sources in total end energy consumption must consist not less, than 23 per cent until the year 2020, and the part falling on heating – up to 40 per cent. Meanwhile in Kaunas this indicator exceeds 80 per cent already.

The replacement of natural gas with renewable biofuels reduced CO₂ emissions from 29055 tonnes in 2012 to 21008 tonnes in 2018.



It was mainly because of decarbonisation of the DH sector that Kaunas, Kaunas district and Jurbarkas city has long achieved the EU's target of reducing carbon emissions by 20% by 2020.

Environmental policy

In carrying out their activities, Kaunas heat producers, both AB Kauno Energija and IHP seek to prudently use natural resources, install less polluting technologies, and follow the environmental legislation and apply preventive measures to minimize the negative impact on the environment.

In order not to adversely impact the environment and comply with the pollution limits, vibration and noise values, AB Kauno Energija is guided by the requirements of the Kyoto Protocol, the Helsinki Commission (HELCOM) and environmental constraints of Helsinki Convention, as well as the European Parliament and Council Directive 2001/80/EB of regulating energy emissions and Lithuanian environmental normative document LAND 43-2013. Other legal acts for the use of natural resources, and releases and emissions of air pollutants to the environment in its activities.

The measurement laboratory of stationary air pollution sources of AB Kauno Energija, having the permit issued by the Environmental Protection Agency, continuously monitors the emissions to the atmosphere from stationary sources. Company's Petrašiūnai power-plant, Inkaras, Šilkas, Ežerėlis, Girionys and Noreikiškės boiler-houses use biofuel, thus reducing atmospheric pollution. Multicyclones for flue gas cleaning from particulates are installed in Šilkas, Ežerėlis, Girionys, Noreikiškės, Inkaras boiler-houses and Petrašiūnai power-plant. Their working efficiency is checked

every year. These facilities never exceeded the permissible limits established in integrated pollution prevention and control permits.

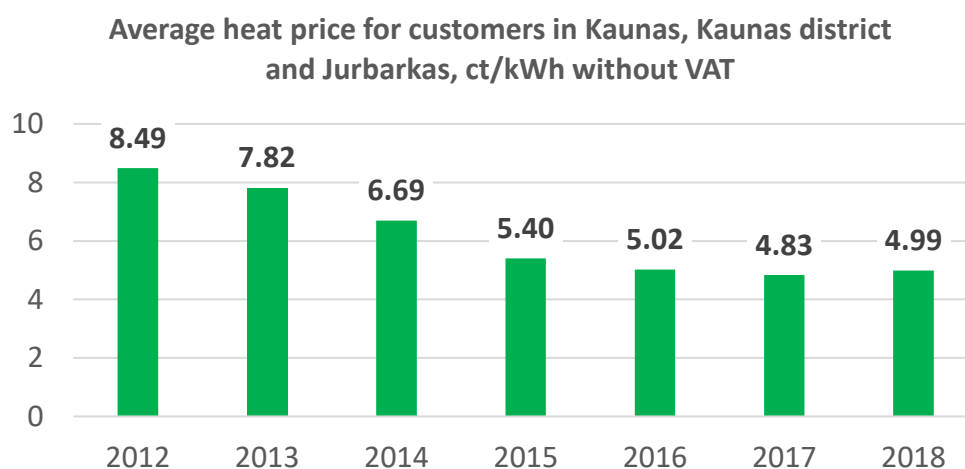
AB Kauno Energija pays taxes for atmospheric and water pollution. If allowable emission rate limits or annual limits are exceeded, the company must pay the fines under the applicable laws of the Republic of Lithuania. There have been no pollution-related incidents in Kaunas and the company was not imposed any penalties in 2012 – 2018.

AB Kauno Energija is also involved in the greenhouse gas emissions trading system. This system includes emission allowances (EA) allocated to Petrašiūnai power-plant, Šilkas, Pergalė, Garliava, Jurbarkas boiler-houses and Noreikiškės boiler-house with a cogeneration power-plant.

Heat price for customers

One of the greatest benefits to customers of replacement of natural gas with biomass is a significant decrease in heat price.

As biofuel is two to three times cheaper than natural gas and EU subsidies are used for equipment, heating prices have fallen significantly in recent years and district heating is increasingly appealing to heat consumers. The average price for heat decreased by 41,22% from 8,49 ct/kWh in 2012 to 4,99 ct/kWh in 2018 without VAT.



Such a quick shift of a big city from the usage of natural gas to renewable biofuel was a true revolution in heat production sector.

Usage of natural gas in Kaunas decreased radically from 95% to 10%. Usage of renewables increased from 3% to 90% in 5 years.

CO₂ emissions from AB Kauno Energija heat production facilities decreased by 27,7% from 29055 t in 2012 to 21008 t in 2018.

Competition between heat producers holding heat prices at competitive level has been implemented and as the result, the average heat price for consumers decreased.