Jēkabpils City
Sustainable Energy Action Plan
For years 2010 - 2020

Pilsētu mēru pakts
Par ilgspējīgu enerģētiku

ZREA
ZEMGALES REĢIONĀLĀ ENERĢĒTIKAS AĢENTŪRA

Energy Management Agency
Intelligent Energy Europe

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Content

1. Introduction

The European Union is leading the global fight against climate change, and has made it as top priority. Local authorities play a key role in the achievement of the EU's energy and climate objectives. The Covenant of Mayors is a European initiative by which towns, cities and regions voluntarily commit to go beyond the objectives set by EU for 2020, reducing the CO_2 emissions in their respective territories by at least 20 %. This formal commitment is to be achieved through the implementation of Sustainable Energy Action Plans (SEAPs).

In 18th March 2009, the chairman of Jekabpils City Council Leonids Salcevics signed the Covenant of Mayors, and the Sustainable Energy Action Plan (SEAP) is a key document that shows how the Jekabpils municipality will reach its commitment by 2020. It uses the results of the Baseline Emission Inventory to identify the best fields of action and opportunities for reaching the target of Action Plan of the City - to achieve proportions 20-20-20 up to year 2020. That means that by 2020 city undertakes to reduce CO2 emission at least per 20%, which is achieved by reaching 20% improvement in energy efficiency and by attraction of renewable energy resources per 20% from the volume of usable energy.

Sustainable Energy Action Plan embraces initial overview of CO2 emissions and prognosis, actions and measures for reduction of energy consumption and development of renewable energy resources in administrative territory of Jekabpils City. In the Action Plan the main directions of development of sustainable energy of the city have been determined, which are to be taken into consideration when planning and implementing measures in provision of energy supply, modernization of energy supply systems as well as energy sources, improvement of quality of services and in the field of energy consumption, increase of energy efficiency, in planning and realization of reduction of energy consumption, as well as in inclusion of renewable energy resources in the energy supply system of the city.

Sustainable Energy Action Plan of Jekabpils city for the years 2010 – 2020 has been elaborated under the management of Zemgale Regional Energy Agency (ZREA) together with the project partner Kaunas Regional Energy Agency (KREA) in close cooperation of institutions of Jekabpils City Council as well as energy supply organizations, service companies and experts.

2. EU main approaches for implementation of sustainable energy policy in the cities

The global collaboration for diminishing the climate change was started by the United Nations Framework Convention on Climate Change (in Latvia adopted by law on 23.02.2005.) and with KIOTO protocol of 2005 (summit of country leaders) with liabilities of the countries by 2012.The next summit of country leaders took place in Copenhagen in 2009 where the new liabilities for diminishing of the climate change until year 2050 were discussed, but the adoption of the new liabilities was postponed to the next years.

The main objective of the liabilities:

"Not to allow the raise of average temperature in the world and up to year 2050 keep it within limits of 2-2,4 °C.

Implementing the new energy policy European Union in 9th March 2007 adopted a package of documents "Energy to the Changing World", where an initiative was set on Covenant of Mayors of Europe, which was prepared and signed in Brussels in 10th February 2009. At the moment more than 1600 cities have joined the Covenant of Mayors. In the text of Covenant of Mayors the main approaches have been defined as well as tasks to municipalities regarding provision of sustainable energy of the cities, including:

-elaboration of Sustainable Energy Action Plan (SEAP) for the time period up to 2020;

-liabilities to reduce CO2 emissions by 2020 per more than 20% from the volume of consumption, enclosing renewable energy resources in the energy supply;

-to organize energy days in the city regularly;

-conclusion that many actions related to energy demand and renewable energy sources and what have to be done to fight the climate change are in the competency field of municipalities or that they cannot be realized without support from the municipality;

-cognition that municipalities, which is the closest structure to the citizens, should be in the front line and should show an example;

-cognition that the responsibility on fight against global warming is shared between municipalities and the governments of the countries and that in the execution of these tasks they should be independent form the liabilities of other persons;

-to involve civil society of the city in the elaboration and implementation of the Action Plan.

European Commission in 3rd March 2010 has started to put into effect a new strategical direction: "Europa2020" the aim of which is to overcome the consequences of the world recession in Europe and to prepare EU economics for the next decade. 5 objectives have been identified which determine what has to be achieved in EU by 2020 and on the basis of which the achievements can be estimated. One of the objectives determines: **the objectives 20/20/20 in the field of climate/energy should be achieved**.

Elaborating the Sustainable Energy Action Plan the following main EU directives in the field of energy supply, energy efficiency, renewable energy resources and environment have been taken into consideration:

1) Directive of the European Parliament and the Council - 2009/91/EC 916.12.2002.) on energy efficiency of the buildings;
2) Directive of the European Parliament and the Council 2004/8/EC(11.02.2004.) on promotion of cogeneration based on demand of useful heat in the internal energy market;
3) Directive of the European Parliament and the Council 2006/32/EC (5.04.2006) on energy end-use efficiency and energy services;
4) Directive of the European Parliament and the Council 2008/50/EC(21.05.2008) on ambient air quality and cleaner air for Europe;
5) Directive of the European Parliament and the Council 2009/28/EC on the promotion of use of energy from renewable energy resources.

Latvian norms and regulations have been developed in line with the EU directives.

3. Jekabpils city

With 26 468 inhabitants in year 2009 Jekabpils was eight biggest city in Latvia. City is located in south-east of Latvia. The area of municipality is 2 553,5 ha, from whom 448,7 ha - waters, 181,2 ha - forests.

The Daugava River runs through the town, and the ancient valley, branches, and islands of the river are considered picturesque. The two historical parts of Jekabpils — Krustpils and the older part of Jekabpils — are connected by the bridge across the Daugava River.

Figure 1. Jekabpils city municipality

4. Overall strategy

4.1 Overall CO_2 reduction target

On the 18th of March, 2009 mayor of Jekabpils municipality, Leonīds Salcevičs, signed Covenant of Mayors. From that day Jekabpils municipality committed to reduce CO_2 emissions, until year 2020, at least by 20 % comparing to baseline (1995) year.
It was calculated that **66 576 tones** of CO_2 emissions were emitted in baseline year in Jekabpils municipality. Trying to reach goal of Covenant of Mayors, at least **13 315 tones** of CO_2 should be emitted less.

4.2 Long – term vision of Jekabpils city municipality

Main challenges in achieving goals of Covenant of Mayors in Jekabpils municipality:

(a) Renovation of residential buildings
(b) Building new biomass CHP plant
(c) Promoting of RES usage for space heating and hot water preparation.
(d) Reduction of usage of transport fuel

4.3 Organizational and financial aspects

In order to reach goals of Covenant of Mayors properly Energy group should be established in Jekabpils municipality. Group should consist of different specialist from municipality administration (transport, development, finance, investment, economy, construction departments) and representatives from local stakeholders (local energy producers, local transport company, etc.). Mayor of Jekabpils also have to pay serious consideration or could be involved to this work group. Group that would consist up to ten members should have a chairman which would be accountable to mayor. Energy group will create municipal Energy Database, implement schedule of actions and measures and organize monitoring of it.

5. Final energy consumption (in year 1995)

Category	FINAL ENERGY CONSUMPTION [MWh]															
	Electricity	Heat/ cold	Fossil fuels								Renewable energies					Total
			Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	Geothermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	3225,5	15201,57											18065,68			36492,75
Tertiary (non municipal) buildings, equipment/facilities	3216	16555,52	2208,97		17655,3				1187,08							40822,87
Residential buildings	21643	34277,06	4237,26						7748,14	531,13			28581,63			97018,22
Municipal public lighting	1522															1522
Industries (excluding industries involved in the EU Emission trading scheme - ETS)	3870,5	9131,29	1161,02		29706				2071,23	141,98			7112,69			53194,71
Subtotal buildings, equipments/facilities and industries	33477	75165,44	7607,25		47361,3				11006,45	673,1			53760			229050,54
TRANSPORT:																
Municipal fleet							65									
Public transport						1446,03	6144,2									
Private and commercial transport						6649,97	28255,8									
Subtotal transport						8096	34465									42561
Total	**33477**	**75165,44**	**7607,25**		**47361,3**	**8096**	**34465**		**11006,45**	**673,1**			**53760**			**271611,54**

5.1 Electricity

Latvenergo AS is the leading producer of electricity and thermal energy in Latvia. Latvenergo supplies electricity to Jekabpils municipality. In year 1995 62 % of electrical energy consumed in Latvia was produced locally (47 % form RES, 15 % from fossil fuel) and 38 % was imported. Electricity network of Jekabpils municipality was and still is integrated in the overall electricity supply system of Latvia. Electrical energy consumers in Jekabpils municipality in year 1995:

- Municipal buildings – 3 225,5 MWh/year
- Tertiary buildings – 3 216 MWh/year
- Residential buildings – 21 643 MWh/year
- Public lighting – 1522 MWh/year
- Industry – 3 870,5 MWh/year

  Total – 33 455 MWh/year

In total **25 106 MWh** of electricity were consumed in year 2008 in Jekabpils municipality. Regarding to year 1995 electricity consumption in Jekabpils municipality in 2008 decreased by **8 372 MWh** (by 25 %). Reduction of electricity consumption can be linked to decrement of population in Jekabpils municipality (decrement of 7 % over last years) and usage of more efficient appliances.

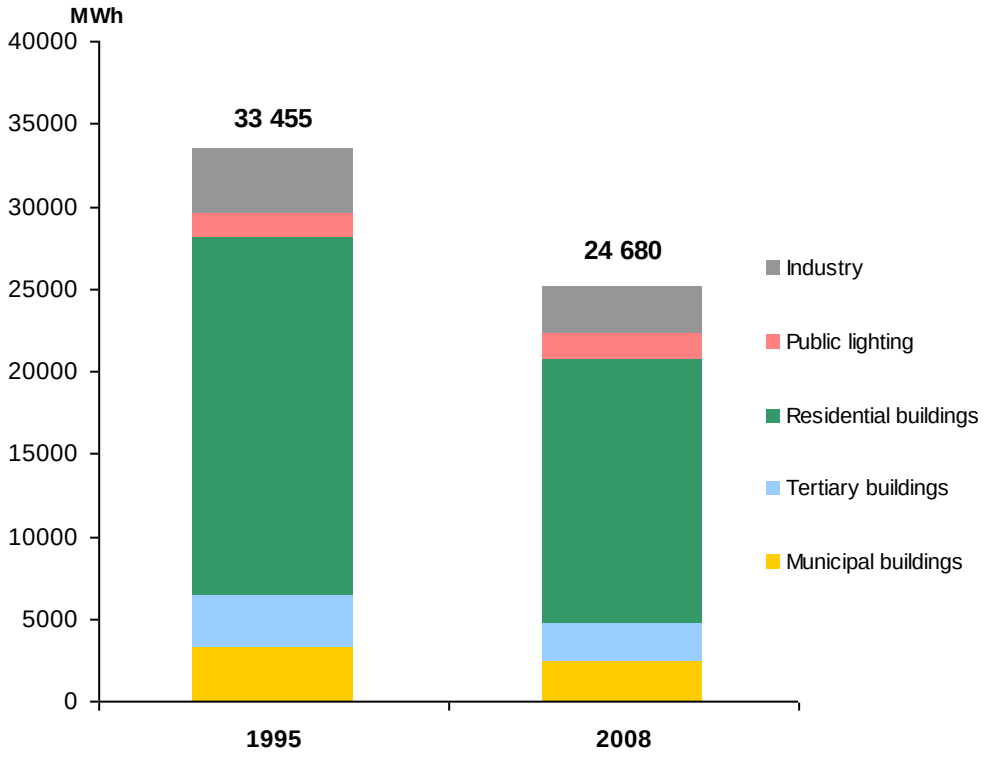


Figure 2. Electricity consumption in Jekabpils municipality in 1995 and in 2008

Jekabpils, source of information: LR bureau of Statistics

In year 1995 were no local energy producers in Jekabpils municipality. In 2001 "*Tvaika street 4"* boiler house started to produce electricity. Capacity of this local CHP is 6 MW_{th} and 0,6 MW_{el}. Produced electricity is sold to Latvenergo. In year 2009 this CHP produced 1 652, 2 MWh of heat energy and **243,5 MWh** of electricity.

It is planned to build Biomass CHP plant in 2010. Capacity of this new CHP would be – 6,715 MW_{th} and 1,4 MW_{el}. It is expected that it would produce **7 200 MWh** of "green" electricity per year.

5.2 Public lighting

Energy service company JPPA „Pilsetsaimnieciba" provides street lighting in Jekabpils city. In year 1995 in Jekabpils municipality 2 000 luminaries were installed, of which 1 000 are mercury and 1 000 incandescent type lamps.

The total length of street lighting network in Jekabpils city in 2009 was 85 km, the city lighting provided by 2 200 luminaries, of which 1 830 were mercury and incandescent type lamps and 370 – sodium lamps.

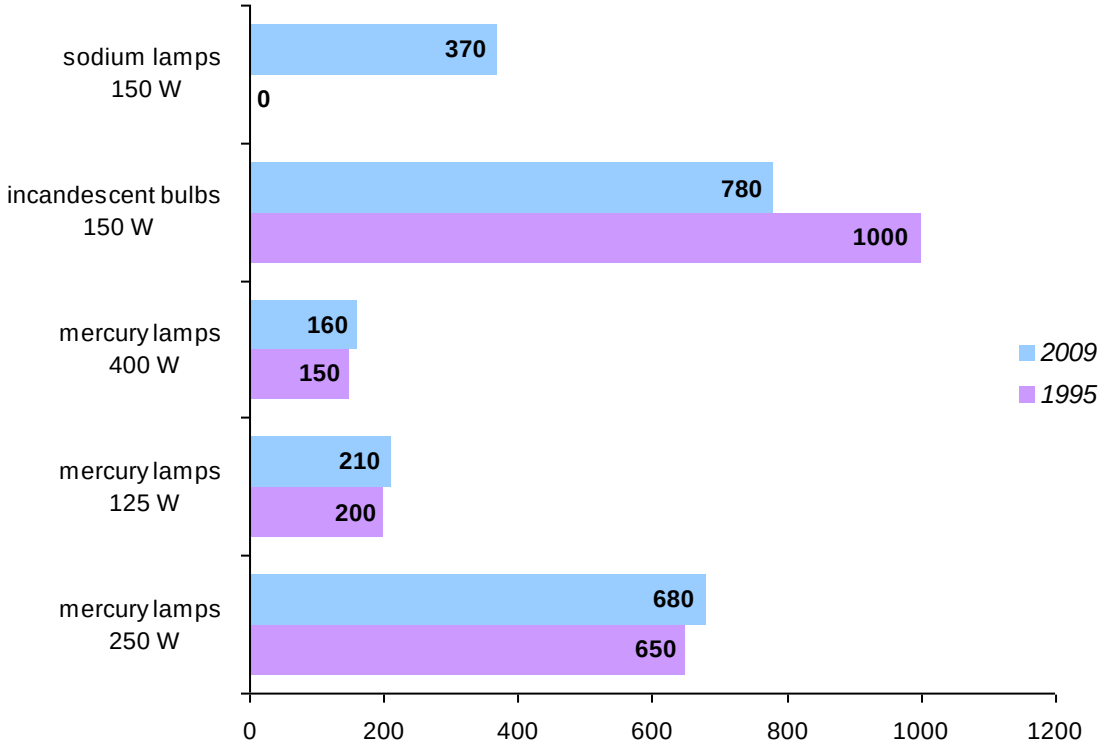


Figure 3. Number of luminaries in public lighting sector

Jekabpils, source of information: Jekabpils City Council

1 522 MWh of electricity was consumed in public lighting sector in year 1995. Since 1995 public lighting situation improved – old concrete poles changed to metal poles; old bulbs replaced to more energy efficient ones. 1 489,5 MWh of electricity was consumed in public lighting sector in year 2009. Electricity consumption reduced by **32,5 MWh** comparing 1995 year to 2009.

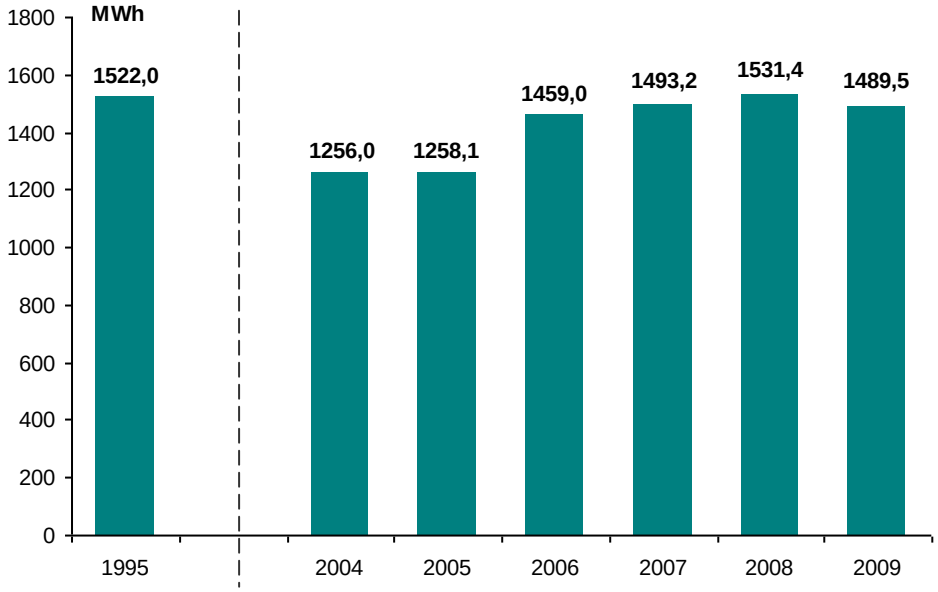


Figure 4. Energy consumption of public lighting in Jekabpils municipality

Jekabpils, source of information: Jekabpils city council

However, there is still big potential of energy saving in public lighting sector. In year 2009 only 17 % of illuminators were with sodium lamps. By changing old mercury lamps (48 %) and incandescent bulbs (35 %) to sodium ones it would be possible to save electrical energy by **650 MWh** a year.

5.3 Heating

The current centralized heat supply system in Jekabpils has been created during the 7th and 8th decade of the past century. Since the beginning of the 10th decade when the heating supply was handed over to local government, the system has not been renovated.

"Jekabpils siltums" Ltd has inherited a heat supply system, which still has to be evaluated as technically incomplete and inadequate for the current economic situation despite relatively large previous investments.

However, during last fifteen years situation in heating sector, due to renovation of heating network and reconstruction of boiler houses, have improved.

Heat consumption (district heating) in Jekabpils municipality in 1995 was:

- Residential buildings – 15 201,57 MWh/year
- Public buildings – 16 555,52 MWh/year

- Municipal buildings – 34 277,06 MWh/year
- Industry – 9 131,29 MWh/year

  Total – 75 165,44 MWh/year

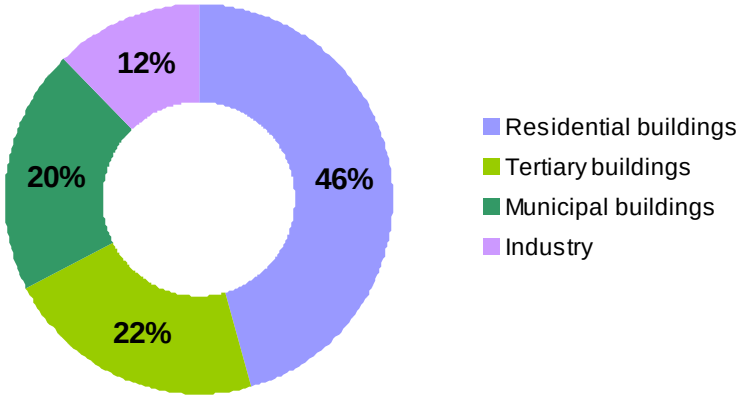


Figure 5. Heat consumption (district heating) in Jekabpils municipality in 1995

Jekabpils, source of information: LR Bureau of Statistics

In year 1995 most usable fuel in district heating sector was heating oil (*62,8 %*) It was used in main three boiler houses. Natural gas (*15,4 %*), coal (*1,7 %*) and peat (*0,6 %*) were also used in heat production. Firewood was the only one renewable energy source used in district heating sector (*19,5 %*).

Boiler houses in Jekabpils district heating system in year 1995:

Name of boiler house	Capacity	Fuel
Tvaika 4	37,1 MW	Heating oil
Dārza 7	9 MW	Heating oil
Celtnieku 13	6 MW	Heating oil
Ķieģeļu 1	3.6 MW	Gas
Madonas 28	0.2 MW	Firewood
Liepu 22	0.2 MW	Firewood
Brīvības 39	0.2 MW	Firewood
Pasta 39	0.1 MW	Firewood

Following actions in order to improve situation in district heating (boiler houses) and to increase renewable energy usage were made:

1. *"Tvaika street 4"* boiler house modernization process began with the boiler house gasification in September 1999. Two years later in year 2001 *"Tvaika street 4"* boiler house was partly

reconstructed and started to use wood chips, sawdust and natural gas for heat energy production.

2. In year 2000 "*Darzu Streets 7"* boiler house was reconstructed – 2.5 MW wood chips boiler and two gas boilers VC-1, 6 with 1.86 MW capacity each, were installed.
3. In year 2001 "*Celtnieku Streets 13*" boiler house was renovated by installing a boiler that used domestic fuel – wood waste.

In year 1999 timber company Ltd. *"Breku studenti"* started to produce heat energy and supply it to local neighborhood. Two boilers, each of 1 MW capacity, for heat production use sawdust and wood chips. *"Breku studenti"* supply heat energy to seven multi-storey buildings and one mall. In year 2009 "Breku studenti" produced **4 703,97 MWh** of heat energy.

Another timber company in Jekabpils municipality Ltd. "Osukalns" heat energy production started in year 2005. *"Osukalns"* boiler house capacity is 5,67 MW – wood is being used for heat production. *"Osukalns"* sell produced energy to *"Jekabpils heat"* company – **10 309,1 MWh** of heat energy were sold in year 2009.

Boiler houses in district heating system in year 2009:

Name of boiler house	Capacity	Fuel
Tvaika 4	43.38 MW	Gas, woodchip, chips
Celtnieku 13a	3.36 MW	Chips, woodchips
Darza 7	6.22 MW	Chips, woodchips
Kiegelu 1	3.6 MW	Gas
Rigas 237	0.12 MW	Firewood
Rigas 104	0.3 MW	Firewood
Madonas 53a	0.3 MW	Firewood
Breku studenti	2 MW	Sawdust, chips
Osukalns	5,67 MW	Wood

Regarding to reconstruction of boiler houses and erection of new ones (that use wood products for heat production) usage of renewable energy (in district heating sector) increased significantly. From **26 869,25** MWh in year 1995 to **63 160,3** MWh in year 2008. Usage of RES in district heating sector increased more than twice. Usage of fossil fuel (in district heating sector) reduced from **112 247** MWh in year 1995 to **10 870** MWh in year 2008.

It is planned to build new Biomass CHP plant in 2010. Capacity of this new CHP would be – 6,715 MW_{th} and 1,4 MW_{el}. It is expected that it would produce **26 800 MWh** of "green" heat energy a year.

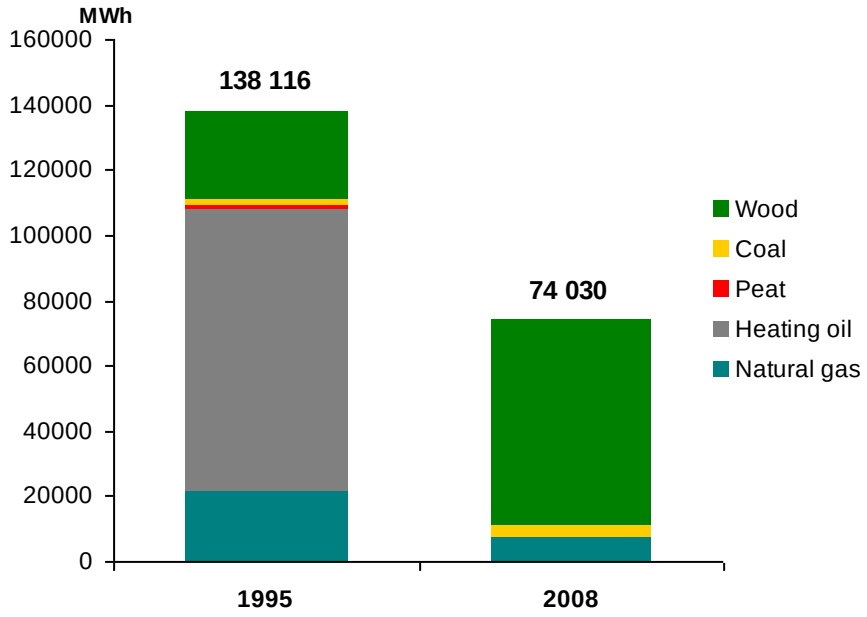


Figure 6. Fuel used for heat production in DH sector.

Jekabpils, source of information: LR Bureau of Statistics

The workload of district heating network is low – only 1.9 MW/km. Approximately 90% of the heating network diameter does not comply with the current workload and exceeds the required for several times.

Heat supply is mostly provided through isolated pipes that are old and obsolete. In year 1995 losses in district heating network reached **47 %**. Due to implemented renovations heat losses were reduced till **26,1 %** (year 2009).

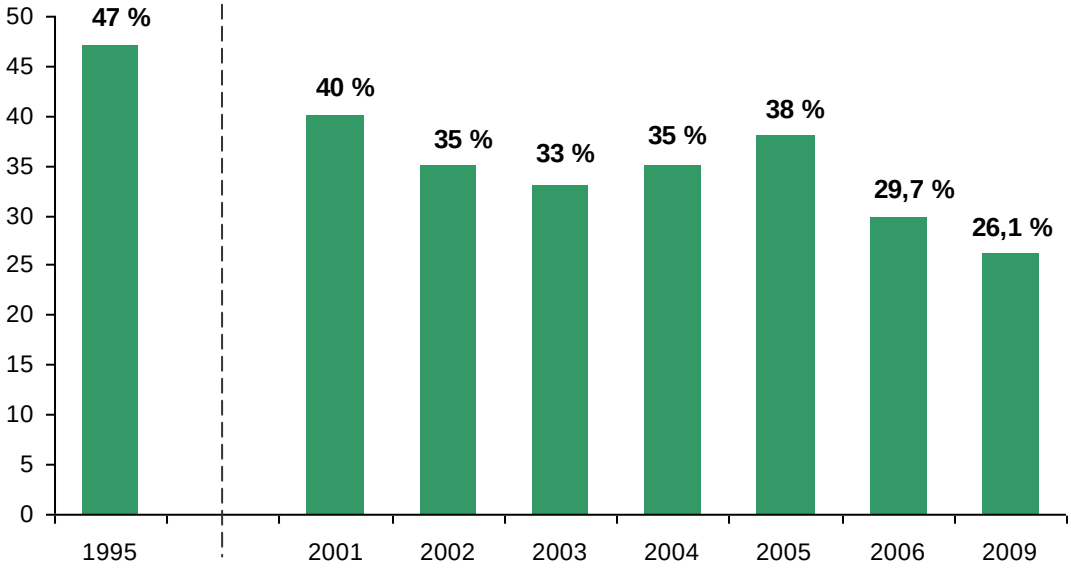


***Figure 7**. Losses in district heating network*

Jekabpils, sources of information: "Jekabpils siltums"

Recently the following actions in order to improve the district heating system and to raise energy efficiency have been made:

1. The reconstruction of heat network in Jekabpils was initiated in 1998. Most worn-out sections of the heating network were replaced. Also part of four-pipe system was rebuilt into two-pipe system. Overall 4.2 km of heating network has been changed until year 2006. Due to this renovation energy losses were reduced by **3 000 MWh**.
2. All pipes of heating network in *Bebru Street* residential neighborhood were replaced – in total length of 7 274 m. Due to this renovation energy losses were reduced by **5 000 MWh**.
3. First phase of reconstruction works in *Nameja Street* residential neighborhood started in year 2007. Optimization of heating network in Nameja Street, Viesīte Street, Draudzības aleja, Jaunā Street was implemented. Total length of the heating network and the diameters of the existing pipes were reduced. Total length of pipes replaced – 4 500 m.

Due to reconstruction of boiler houses and renovation of district heating network, energy production in Jekabpils municipality decreased from **138 116,5 MWh** in year 1995 to **74 030 MWh** in year 2008 i.e. by **46 %**!

However, local heat energy production (in decentralized buildings) increased during last 13 years. In year 1995 decentralized buildings consumed **120 408** MWh of heat energy. In year 2008 decentralized buildings used **138 036** MWh of heat energy. Energy consumption in decentralized buildings increased over **14 %** during last years.

5.4 Transport and mobility

In year 1995 there were 6 547 vehicles registered in Jekabpils municipality. It was calculated that all those vehicles used **42 496 MWh** of energy. Number of vehicles in Jekabpils municipality had a tendency to grow – 12 663 vehicles were registered in municipality in year 2008. Number of vehicles increased almost *twice*, compared year 1995 to 2008. Due to increased number of vehicles, fuel consumption increased too. In year 2008 all vehicles registered in Jekabpils municipality used **76 675 MWh** of energy.

Jekabpils municipality owned 17 vehicles in year 1995. All those vehicles consumed 7 293 litres of gasoline in year 1995. It was calculated that these vehicles used **65 MWh** of energy. From year 1995 till 2009 municipal fleet increased more than *two* times. In year 2009 Jekabpils municipality owned 40 vehicles, that consumed 29 903,9 litres of gasoline and 18 977,8 litres of diesel. It was calculated that **431,1 MWh** of energy were consumed in municipal fleet sector. Energy consumption in period 1995 – 2009 increased more than *six* times.

In baseline year busses of Jekabpils bus park consumed **7 590 MWh** of energy. In year 2008 Jekabpils bus park owned 52 buses, which used **12 839 MWh** of energy. Fuel consumption increased by **5 249 MWh** (in period 1995–2009).

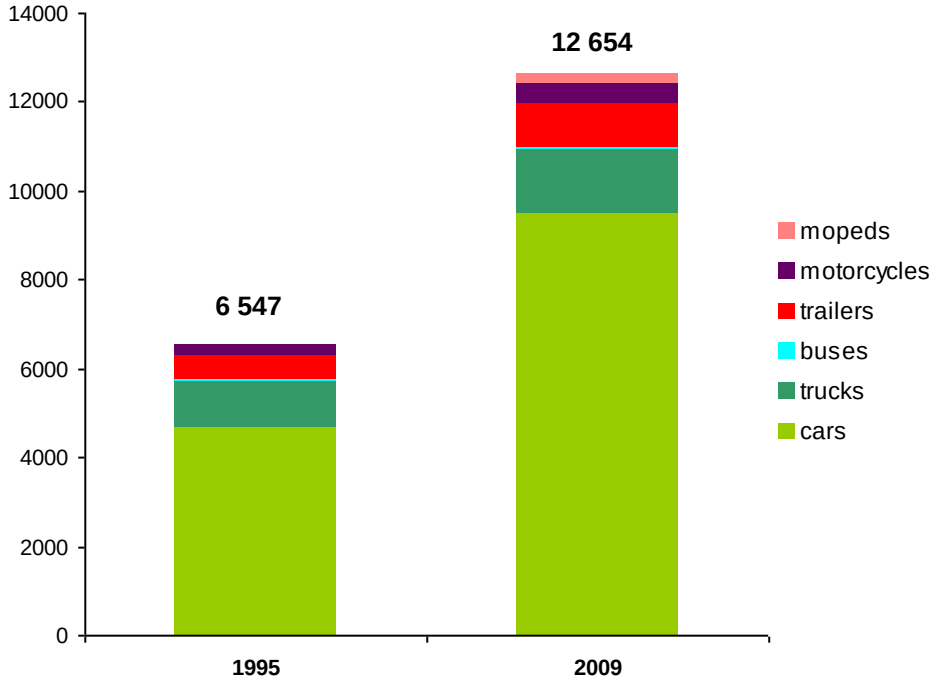


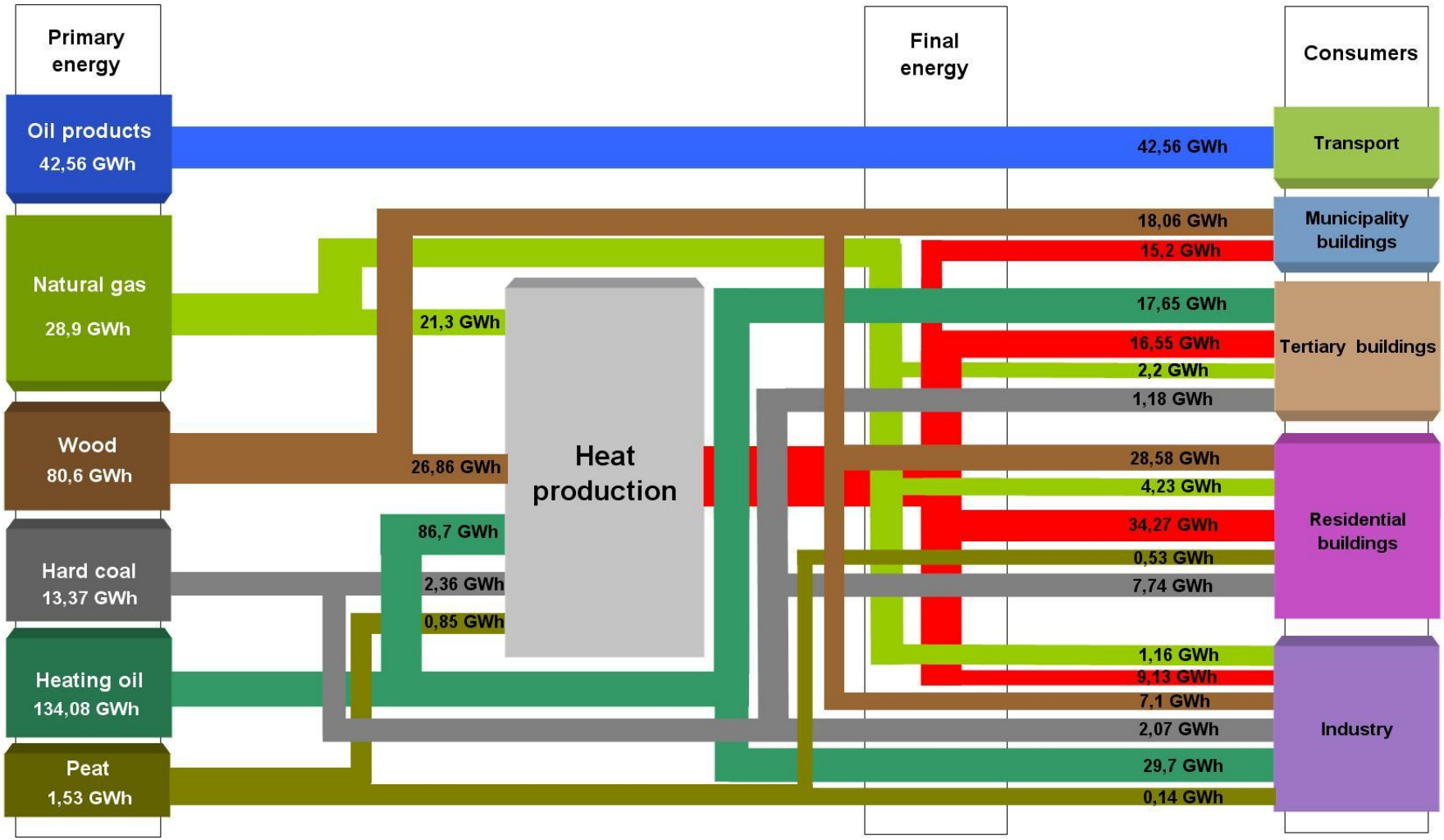
Figure 8. Number of vehicles in Jekabpils municipality

Jekabpils, source of information: LR Bureau of Statistics

Due to consistent increment of vehicles in Jekabpils municipality, it is expected that number of vehicles will increase by 10 % by 2020 compared with year 2009. Fuel consumption and CO_2 emissions would increase in parallel.

It is necessary to pay serious attention to transport sector in Jekabpils municipality and to take actions by promoting efficient driving, eco fuels, public transport etc.

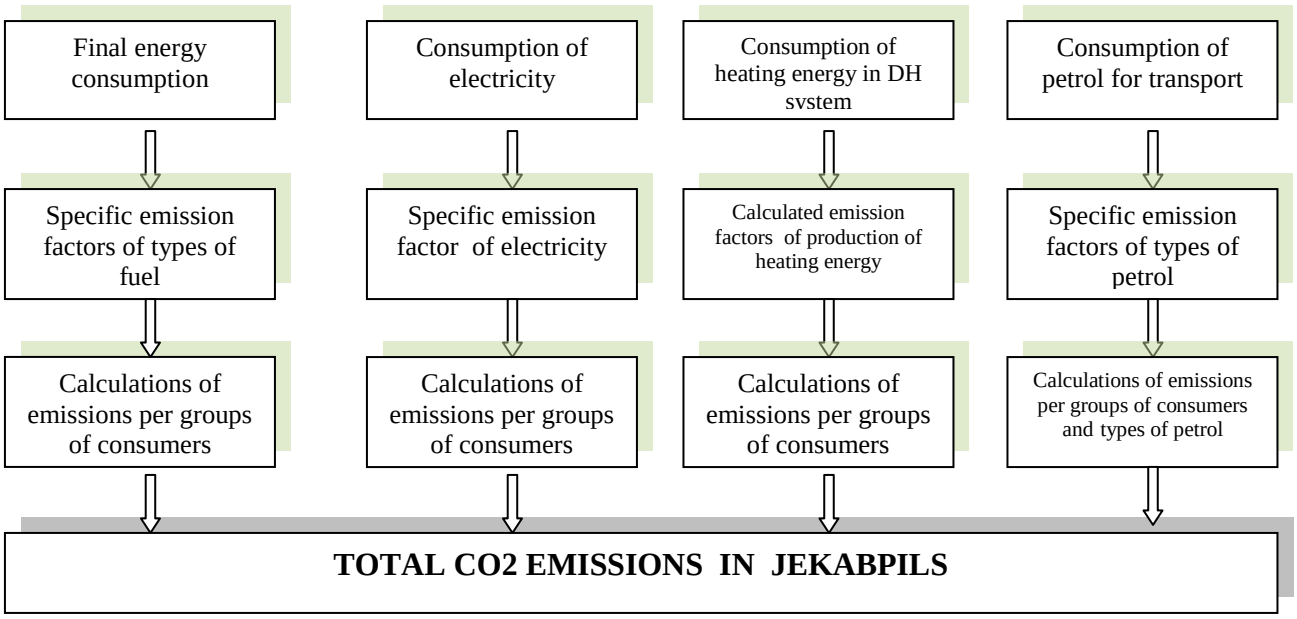
5.5 Energy production and consumption in Jekabpils municipality (in year 1995)



6. Calculation of emissions

6.1 Methodology for calculation of emissions

As a basis for calculation of volume of carbon dioxide (CO2) emissions all kinds of energy consumption in all the territory of Jekabpils city of all the year, irrespective of the place where this energy is produced. CO2 emissions are calculated separately for electricity consumption, consumption of heat energy in district heating system, consumption of fuel for transport and final energy consumption in households, industry, state and municipal enterprises and in service sector. From the group of gasses creating greenhouse effect only CO2 emissions are calculated. In calculation of emissions the "standard" methodology has been used and parameters from the guidelines elaborated by IPCC - Intergovernmental Panel on Climate Change. The algorithm used for calculation of CO2 emissions in Jekabpils City:



In calculation of CO2 emissions the energy consumptions which cannot be influenced by municipality are not taken into consideration, and which are beyond competency of municipality, such as sea and rail transport, all kind of freight transit, aviation services, use of agricultural and construction technique. Also the emissions from the industry technologies, decomposition processes of natural organic substances, sewage treatment tanks and landfills as well as from open burning processes.

In calculation of CO2 emissions the factors based on average physical properties of fuels used in Latvia are applied as well as methodological instructions of IPCC.

For calculation of CO2 emissions from the electricity consumption the emission factor is used, which characterizes the average structure of production of electricity in Latvia (instructions from SEAP-guidebook) as electricity consumed in Jekabpils is provided from different sources of electricity production.

For calculation of CO2 emissions from the consumption of heating energy in the district heating system the emission factor is used, which is calculated basing on structure of production of heating energy and structure of

fuel in that particular year. Algorithm for calculation of CO2 emission factor of production of heat energy in the district heating system:

$$E_F = \frac{CO2_{VES}}{V_{SA}}$$

Where :

E_F = CO2 emission factor in district heating system [t/MWh]

$CO2_{VES}$ = total amount of CO2 in the heating supply produced by the local producers [T]

V_{SA} = total amount in district heating, that has been consumed [MWh]

Algorithm for calculation of CO2 emission factor for production of heat energy in Cogeneration stations of district heating

$$E_{KO} = \frac{\frac{(V_S)}{K_S}}{\frac{(V_S)}{K_S} \quad \frac{(V_E)}{K_E}} * CO2_k$$

Where :

E_{KO} = CO2 emission factor in cogeneration stations for heat energy [t/MWh]

$CO2_K$ = CO2 emission factor depending on the type of the fuel used in cogeneration station [T]

V_S = total amount of produced heat in the cogeneration stations [MWh]

K_S = typical efficiency coefficient in production of heat energy when not using cogeneration (assumed 90%) [MWh]

K_E = typical efficiency coefficient in production of electricity when not using cogeneration (assumed 40%) [MWh]

V_E = total produced volume of electricity at the cogeneration station [MWh]

Firstly the CO2 emission factor of heat production in cogeneration stations is calculated, after which it is possible to calculate the total CO2 emission factor for heat production in the district heating system.

6.2. Data for calculation of the emissions

Information about the total heat consumption in the district heating system in Jekabpils and per different consumer groups was received from the main heat supply operator. As basis for electricity consumption were taken data from

joint stock company ”Latvenergo”. To estimate the structure of energy end consumption in Jekabpils the information received from the municipality was used (type of buildings and structure of property).

For the calculation of consumption of the primary energy resources the data provided by LR Central Bureau of Statistics were used. In those data an information has been compiled about total amount of gas, timber, coal, mazut, petrol, and diesel used in Jekabpils city. LR Central Bureau of Statistics provided data on the consumption of the primary energy resources in boiler houses as well as in cogeneration stations.
By use of primary energy resources the consumed energy for heat supply and transport was calculated, using conversion factors from mass to energy in units (IPCC 2006).Thus the total consumed volume of energy was calculated. Distribution in separate user groups was done basing on the information provided by the municipality on the total structure of property in Jekabpils city, volume, type of use and ownership. From this equitation the procentual equitation was drawn which was used in the further calculations.

For estimation of energy end consumption in the household sector the data were used on structure of energy consumption, number of consumers and characteristics of households from the LR Central Bureau of Statistics “Consumption of energy resources in households” (in years 1996, 2001 and 2005). In these data there is separately shown information on energy consumption structure in Jekabpils households. Selection for the survey is made as stratified incidental selection of one or two-level households.

7. CO_2 emission baseline inventory (in year 1995)

Category	CO2 emissions [t]/ CO_2 equivalent emissions [t]															
	Electricity	Heat/ cold	Fossil fuels								Renewable energies					Total
			Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Biofuel	Plant oil	Other biomass	Solar	Geothermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	351.58	6236.6											903.28			7491.48
Tertiary (non municipal) buildings, equipement/facilities	350.54	6792.09	446.21		4925.83				404.79							12919.47
Residential buildings	2359.09	14062.5	855.93						2642.11	122.16			1429.08			21470.93
Municipal public lighting	165.90															165.90
Industries (excluding industries involved in the EU Emission trading scheme - ETS)	421.88	3746.22	234.53		8287.97				706.29	32.65			355.63			13785.18
Subtotal buildings, equipments/facilities and industries	3648.99	30837.49	1536.6		13213.8				3753.20	154.81			2688			55832.96
TRANSPORT:																
Municipal fleet							16.19									16.19
Public transport						386.09	1529.91									1916.00
Private and commercial transport						1775.54	7035.69									8811.24
Subtotal transport						2161.63	8581.79									10743.42
	3648.99	**30837.4**	**1536.6**		**13213.80**	**2161.63**	**8581.79**		**3753.20**	**154.81**			**2688**			**66576.38**
Total	**3648.99**	**30837.4**	**1536.6**		**13213.80**	**2161.63**	**8581.79**		**3753.20**	**154.81**			**2688**			**66576.38**

By becoming member of Covenant of Mayors Jekabpils municipality committed to reduce CO_2 emissions in it territory at least by 20 % until year 2020. To reach this goal at first it is necessary to know baseline situation of CO_2 emissions in municipality. Emissions in different energy sectors were calculated and shortly described below:

7.1 Electricity

Latvenergo AS – the leading producer of electricity and thermal energy in Latvia, supplies electricity to Jekabpils municipality. **33 477 MWh** of electrical energy were consumed in Jekabpils municipality in baseline year. Therefore **3 649 tones** of CO_2 emissions were emitted. **25 105 MWh** of electricity were consumed in Jekabpils municipality in year 2008. As a result **2 736 tones** of CO_2 were emitted.

Due to decrement of electricity consumption, **913 tones** of CO_2 were emitted less in year 2008 than in baseline year.

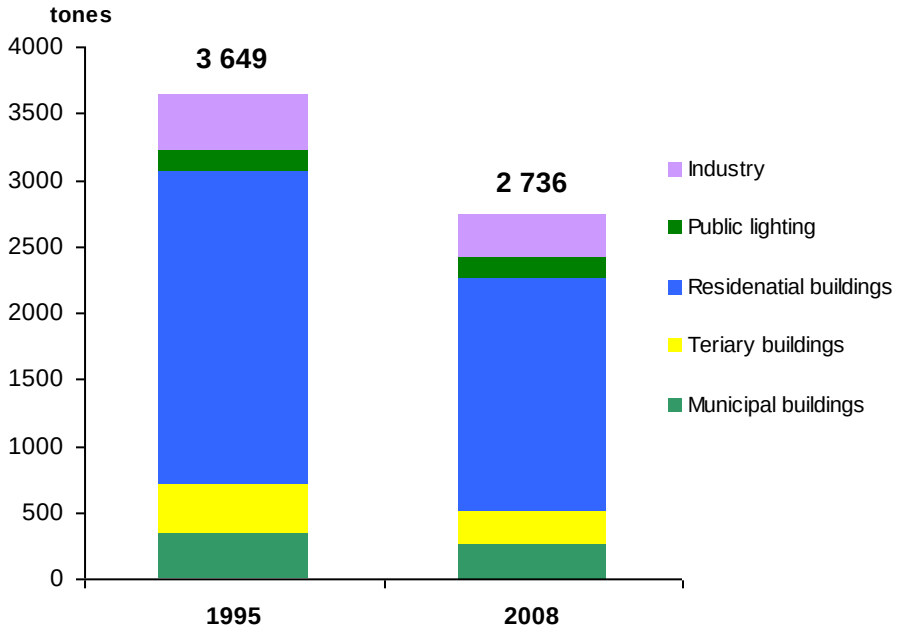


Figure 9. CO_2 emissions in electricity sector in Jekabpils municipality.

Jekabpils, source of information: ZREA

Potential of CO_2 reduction

- *There is a potential of electricity saving in public lighting sector. By changing old mercury lamps to sodium ones it would be possible to reduce CO_2 emissions by **70 tones**.*
- *It is planned to build new biomass CHP in Jekabpils municipality in 2011. Planned capacity for the new plant is 1,4 MW_{el} and 6,715 MW_{th}. Planned amount of electricity produced in this*

*new CHP plant is 7 200 MWh per year. By producing "green" electricity It would be possible to reduce CO_2 emissions by **784 tones**.*

7.2 Heating

Most heat energy in Jekabpils municipality in baseline year was consumed in residential buildings sector. Therefore, most emissions were emitted in this sector. **19 111 tones** of CO_2 were emitted in residential buildings sector. In industry sector – **13 363 tones** of CO_2 emissions were emitted in year 1995. **12 568 tones** of CO_2 emissions were emitted in tertiary buildings sector in baseline year. The least emissions were emitted in municipal buildings sector – **7 139 tones**. Overall **52 183 tones** were emitted in heating sector in baseline year.

During last years situation changed significantly. Due to replacement of fossil fuel to biofuel, emissions in heating sector reduced by *three* times. **12 118 tones** of CO_2 were emitted in residential buildings sector in year 2008. As it was in baseline year industry sector was in the second place by emitted emissions in year 2008 – **2 187 tones**. Municipal buildings in year 2008 emitted **1 823 tones** of CO_2 emissions. The least emissions were emitted in tertiary buildings sector – **1 817 tones** were emitted. Overall **17 946 tones** were emitted in heating sector in year 2008.

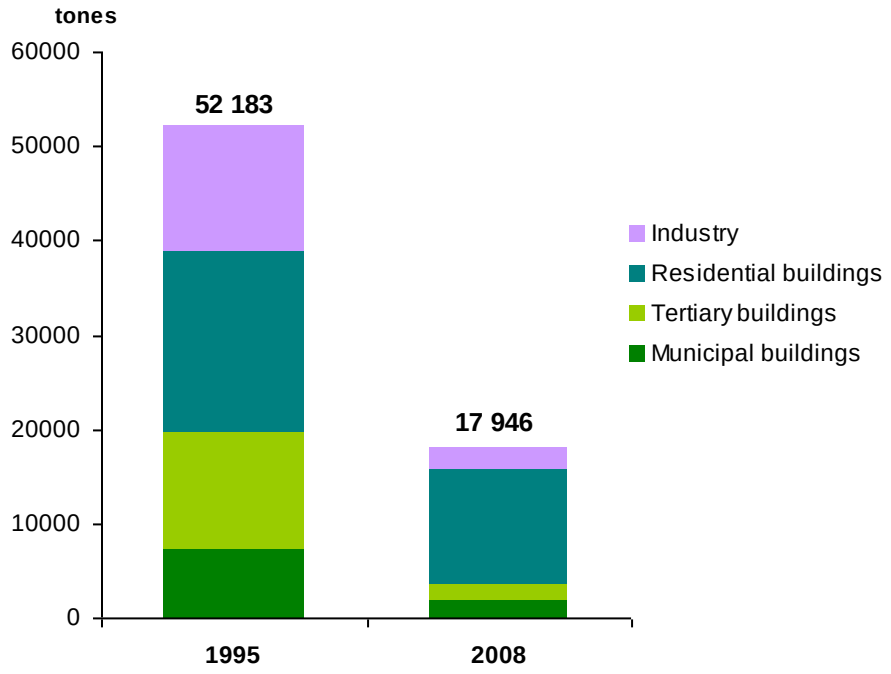


Figure 10. CO_2 emissions in heating sector in Jekabpils municipality.

Jekabpils, source of information: ZREA

30 837 tones of CO_2 emissions were emitted in district heating sector in baseline year. It came from heat energy production using natural gas, heating oil, coal, peat and wood.

After reconstruction of boiler houses *(district heating sector)* over last years usage of RES increased, meanwhile CO_2 emissions decreased significant. After reconstruction of boiler houses and replacement of fuel only **5 857 tones** of CO_2 emissions were emitted in district heating sector in year 2008. Over last thirteen years CO_2 emissions in district heating sector reduced by **81 %**!
During district heating network renovation losses were reduced from 47 % (*in year 1995*) to 26,1 % (*in year 2009*). **14 493 tones** of CO_2 were emitted in year 1995 from losses in heating network. After improvements made (*replacement of fuel and renovation of heating network*) only **1 528 tones** were emitted in year 2008. CO_2 emissions from district heating network losses reduced by **90 %**!

Potential of CO_2 reduction

- *By renovating district heating network, replacing old pipes to new, till year 2020 it would be possible to reduce heating losses from 26,1 % to 10 % and reduce CO_2 emissions by **585 tones.***
- *By renovating half of residential buildings, that are connected to district heating (~70 buildings) until year 2020, it would be possible to reduce energy consumption by 40-45 % and reduce CO_2 emissions by **880 tones.***
- *It is planned to build new biomass CHP in Jekabpils municipality in 2011. Planned capacity for the new plant is 1,4 MW electricity and 6,715 MW heat. Planned amount of heat energy produced is 26 800 MWh per year. In this case it would be possible to reduce CO_2 emission up to **2 840 tones**.*

7.3 Transport

It was calculated that **10 743 tones** of CO_2 emissions were emitted by different vehicles in Jekabpils municipality in baseline year. Major part of CO_2 emissions came from private vehicles – **8 811 tones**. Public transport in year 1995 emitted **1 916 tones,** municipal fleet only **16,19 tones** of CO_2 emissions. Number of vehicles in Jekabpils municipality from year 1995 until year 2008 increased almost twice, while CO_2 emissions increased almost twice. It was calculated that **20 144 tones** of CO_2 emissions were emitted by different vehicles – **16 767** tones came from private vehicles and **3 377** tones came from public transport.
Overall CO_2 emissions (in period 1995 – 2008) in transport sector increased by **9 401 tones**.

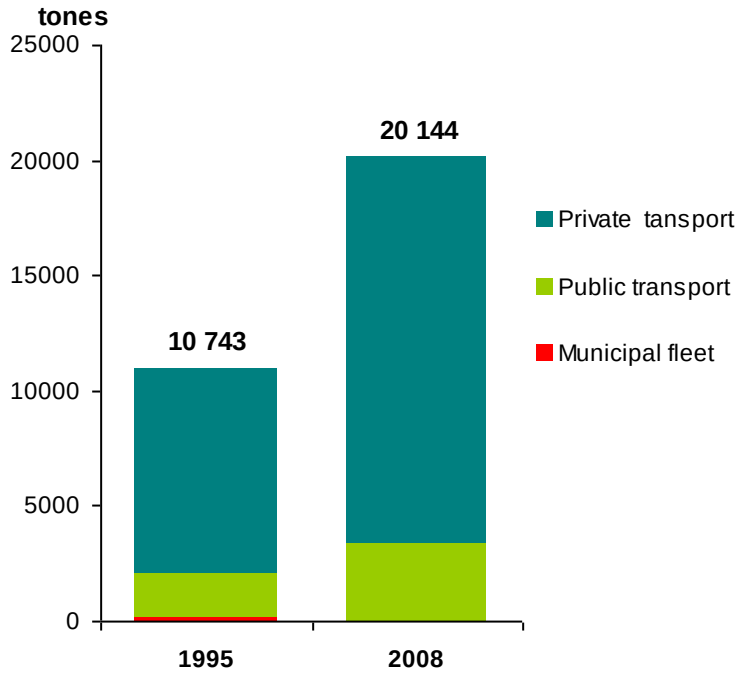


Figure 11. CO_2 emissions in transport sector in Jekabpils municipality

Jekabpils, source of information: ZREA

Potential of CO_2 reduction

- *By promoting efficient driving, travel by foot and bicycle (also laying new bicycle and foot ways), promoting "car pooling", public transport and etc. it would be possible to reduce energy consumption and CO_2 emissions at least by 5 %. These measures would reduce CO_2 emissions by **1 000 tones**.*

7.4. CO_2 emissions summary

It was calculated that in total **66 576 tones** of CO_2 emissions were emitted in Jekabpils municipality in baseline year (1995). It was **2,32 tones** of CO_2 per capita in baseline year. Major part of CO_2 emissions in Jekabpils municipality territory were emitted from heating sector – **52 184 tones**. **10 743 tones** of CO_2 emission in municipality came from transport. The least part of CO_2 emissions came from electricity used in Jekabpils municipality – only **3 649 tones**.

In total **40 827 tones** of CO_2 emissions were emitted in Jekabpils municipality in year 2008. **1,5 tones** of CO_2 per capita were calculated in year 2008.

For today situation have been changed and major part of CO_2 emissions in Jekabpils municipality territory is emitted in transport sector (not in heating sector as it was in year 1995). **20 144 tones** were emitted in transport sector in year 2008. **17 946 tones** of CO_2 emission in municipality came

from heating sector. The least part of CO_2 emissions (as it was also in baseline year), came from electricity sector in Jekabpils municipality – **2 736 tones**.

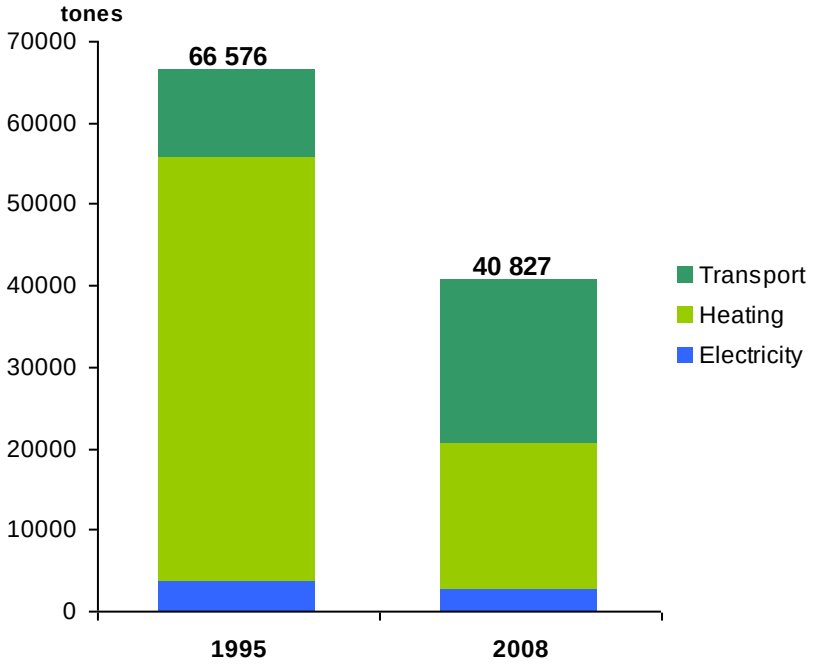


Figure 12. CO_2 emissions in different sectors

Jekabpils, source of information: ZREA

The main goal for all cities of "Covenant of Mayors" till year 2020 is to reach 20 % reduction of CO_2 emissions comparing with baseline year.

As it was mentioned before **66 576 tones** of CO_2 were emitted in baseline year. In order to achieve goal of "Covenant of Mayors" municipality should reduce emissions by **13 315 tones** until year 2020. However, until year 2008 CO_2 emission in Jekabpils municipality were reduced by **25 749 tones** (more than 36 %). It is important to keep (or to rise) this level until 2020.

Nevertheless, Jekabpils municipality still has a potential of CO_2 reduction. Using all measures mentioned above it would be possible to reduce CO_2 emissions additionally by **6 159 tones.** However, it is necessary to continue sustainable development in Jekabpils municipality.

8. Ways of CO_2 reduction in Jekabpils city municipality

1. By changing old mercury lamps to sodium ones in public lighting sector it would be possible to reduce CO_2 emissions by **70 tones**.

2. By renovating district heating network, replacing old pipes to new, till year 2020 it would be possible to reduce heating losses from 26,1 % to 10 % and reduce CO_2 emissions by **585 tones**.

3. By renovating 50 % of residential buildings, that are connected to district heating until year 2020, it would be possible to reduce heat energy consumption by 40-45 % and reduce CO_2 emissions by **880 tones**.

4. It is planned to build new biomass CHP in Jekabpils municipality in 2011. In this case it would be possible to reduce CO_2 emissions up to **3 624 tones** *(electricity and heat).*

5. By promoting efficient driving, travel by foot and bicycle (also laying new bicycle and foot ways), promoting “car pooling”, public transport etc. it would be possible to reduce energy consumption and CO_2 emissions at least by 5 %. These measures would reduce CO_2 emissions by **1 000 tones**.

9. Possibilities of attraction of financing for energy saving in Jekabpils city

Renovation of multi residential houses is mainly done in three ways:
1) rennovation is carried out by energy service enterprises - ESCO companies (further in the text ESCO);
2) state or municipal energy enterprises established especially for rennovation of public or residential buildings (further in the text – PEKO);
3) society of apartment owners.

In other contries of European Union there are also public –prvate partnerships operating in the field of increasing of energy efficiency for public and residential houses which have not been developed in Latvia.
In countries of Eurpean Union the most common way of rennovation of residential houses is involvement of **enegy service companies – ESCO** in the provision of this service. Energy service company is an enterprise and enterpreneurship providing services in the field of energy, including implementation of energy saving projects, establishment of energy infrastructure, production and supply of energy services by undertaking also risk mangement and attraction of financing in this sector.
ESCO carries out a deeper analysis of a property with a target to find the best solution in terms of energy efficiency, organizes the renovation and management of the property and regaining of investments within 5 to 20 years. It manages the regain of investment together with the savings gained due to implementation of energy efficient measures. To ensure succesful and mutually favourable collaboration ESCO concludes a terminate contract with the receiver of the service, for instance, the society of apartment owners. During this contract ESCO undertakes all the liabilities related to preparation, financing, implementation of energy efficiency measures by guarranting the the anticipated energy effciency result, and by providing the management of the object during the lifetime of the contract. After the end of the contract all the gains obtained as a result of renovation become the property of the service receiver – the owners of the apartments.

When concluding an ESCO contract, two strategies can be applied:

1) The Contract stipulates that the service provider receives fixed percents from the saved means all the duration of the contract. It motivates the service provider to ensure the maximum energy savings straight after the implementation of the project and to maintain the saving of energy up to the end of the contract, even incresing the saved energy with additional measures.
2) The Contract stipulates that residents are paying a fixed monthly payment per square meter according to the amount of square meters.

The succesful operation of ESCOs during several decades have gained recognition both in the world and European Union countries as by attracting the private collaboration partners municipalities have managed to improve the energy eficiency in the buildings owned by them even in the case when there is insufficiency of their own means. For instance in Nykoping municipality, Sweden, with the help of ESCO 123 buildings have been renovated since 2006 (schools, houses for elderly, hospitals, production objects etc.) reducing energy consumption per 21%, reducing CO2 emissions by 4,3t as well as reducing house maintenances costs. Berlin municipality in Germany during the implementation of the energy saving strategy with help of ESCO renovated 85 properties of the city, reaching saving of 2,8 milion EUR and reducing CO2 emissions per 16,2t.

Municipal energy service company PEKO is an enterprise owned by municipality, which operates according to priciples of energy service company for its operations using finance means of municpipality and attracted financing. Usually the objective of municipality is not obtaining of profit but energy efficient refurbishment of public houses and residential fund owned by the municipality, if due to any reasons this cannot be done by residents or ESCO. PEKO can ensure renovation of also those multi residential houses, which due to high risk not to pay off is not done by ESCO or residents.

This institutional model for provision of renovation is mainly used by municipalities in Germany. For instance Freiburg municipality by use of PEKO during ten years (1990.-1999.) obtained reduction of CO2 per 17%. Also it has been decided that PEKO is used for the buildings the energy consumption of which is up to 50 000 EUR a year, for other houses choosing ESCO model, ensuring reduction of annual energy consumption payment per 40 000 EUR. Within framework of project PICO Light a pilot project was carried out in three buildings in Düsseldorf, Velbert and Wuppertal, calculating that a full renovation of buildings would cost 170 500 EUR, which would decrease the payments for energy consumption per 36 000 EUR/year and calculating that investment would pay off in less than 5 years.

PEKO scheme is more and more used in the new EU member states. For instance in Poland Jordanów city PEKO model has become a main solution for modernization of the whole energy system, forseeing that the saved means form the energy consumption payments saved as a result of renovation of the building will be directed for improvement of the energy system. By renovating a town hall and a kindergarten 3900 EUR were saved from energy consumption payments per year.

In latvia there are no traditions for establishment of state or municipal energy service companies, there is no PEKOs established in Latvia. Still in Latvia biggest cities there are housing companies managing residential houses, to which the relevant municipality could delegate PEKO functions.

Societies of apartment owners - the establishment of such societies is regulated by law adopted by Saeima in 28.09.1995. "On Ownership of an Apartment" („Par dzīvokļa īpašumu") and Civil Law adopted in 1997. The operation of the society is regulated by Law adopted in 30th October 2003 "Law on Societies and Foundations". The main objective of establishment of such society is to ensure the management of common parts of the residential houses or on behalf of apartment owners to delegate its management to other person.

In case of energy efficient renovation of multiresidential house the society of apartment owners is to be considered financially the most favourable model for the apartment owners. In this case energy efficient refurbishment of the house is managed by the owner itself which is personally interested in the results.

Establishment of societies of apartment owners in Latvia, also in Jekabpils, is happening very slow, as apartment owners lack the knowledge, understanding about management of the houses and energy efficient refurbishment of houses. Due to economic recession in Latvia from year 2008 apartment owners are afraid of risks related to credit taking and responsibility for ensurance of quality of energy efficient refurbishment of houses.

For apartment owners also practical side of establishing societies of apartment owners seems complicated. Organization of a meeting of all the apartment owners and obtaining support of more than 50% for establishing of a society of apartment owners, election of a chairman of the board, preparation of statutes. After making of the decision of establishing of a society of apartment owners a stamp of the society is to be obtained, the signature of the chairman of the board is to be approved as well as the society is to be registered in LR Register of Enterprises, submitting the minutes of the meeting of the apartment owners, decision of the meeting on establishment of the society, list of members of the board, statutes of the society, application for registration. If all the documentation is filled correctly then registration of the society takes about one month, but usually this process is longer as the submitted documentation, especially if prepared by residents without lawyers education, is with mistakes.

After establishment of the society and its registration the apartment owners in the common meeting should make a decision whether to improve heat insultation of their house or not. If 50% (+ one voice) vote for it, then the project application is to be prepared and all the other documentation related to that.

In other contries of European Union residents receive support from the state or municipalites for establishment of the societies and energy efficient refurbishment of houses – there are educative seminars organized, which help to identify the most favourable financing model for the energy efficient refurbishment of the house, as well as energy certificates of the houses being issued.

As alternative to the establishment of the society can be delegating these responsibilities to a physical person or legal entity on the basis of authorisation agreement. This physical person or legal entity then deals with the issues which are in the competence of such societies as determined by law “On Apartment Property”, as well as organizes all the necessary steps to prepare the refurbishment process (energy audit, technical inspection of the house, preparation of the technical design for refurbishment) and ensures its implementation (credit, hiring of construction company and technical superwisors).

Such system is characteristic to Swedish city Göteborg, where apartment owners authorise property managing companies to provide energy eficiency measures. Similar experience is also in Brussels where house managing company organizes energy efficient refurbishment of houses. For instance in 2007 a house renovation was carried out, which cost 490 000 EUR (the foreseen energy consumption – 50 kWh/m² a year), planning to regain the investments in 4 years.

As shown by the above examples, in many places in Europe apartment owners authorise other person or house managing company to do the renovation of the house. This can be attributed to the residents’ lack of knowledge in energy field and the possible gains, as well as their busyness, which would hinder full supervision of the works, assessment of results, preparation of technical design documentation, and preparation of reports.
Jekabpils city municipality together with the biggest house management companies would have to analyse all the ways of organizing the energy efficient refurbishment of the hosues and would have to choose the most favourable way.

Due to fact that energy efficient refurbishment of multi residential houses in Latvia, also in Jekabpils is almost not being realized, we cannot talk about the traditions of attraction of financing. Further the ways of financing the energy efficient refurbishment of houses available in Latvia are described, as well as the ways used by other European Countries have been mentioned.

In Latvia from 2000 - 2008 the possibilties to receive **support from state or municpalities** for energy efficient refurbishment of residential hosues has been limited. As turning point can be considered year 2008 when in accordance with LR Regulations of Cabinet of Ministers No.59 of 05.03.2008. “Regulations on volume of state budged co-financing and its allocation procedure for energy eficiency measures for residential hosues” („Noteikumi par valsts budžeta līdzfinansējuma apmēru un tā piešķiršanas kārtību energoefektivitātes pasākumiem dzīvojamās mājās”) a state support programme was made, managed by LR Minsitry of Economics.
Programme works intensively since April 2009 and the supported measures are as follows:

1) For energy audit of multi residential houses – 80% of energy audit costs but not more than 400 LVL;
2) For precising/corrections of energy efficiency assessment in accordance with the laws and regulations if energy audit has been done by 2008 – 100 LVL;
3) For elaboration of the technical design of multi residential house or preparation of simplified renovation documentation, if a standard solution is not possible – 80% from the costs of elaboration of technical design or costs of preparation of simplified renovation documentation, but not more than 2500 LVL;
4) For preparation of the Statement of Technical Inspection of the multi residential house– 80% from the costs of Statement of Technical Inspection, but not more than 400 LVL;
5) For renovation of multi residential house – 50% from the costs of total eligible costs of renovation project.

Within the framework of the energy audit eligible expenses are: remuneration of auditors, transport expenses, drafting costs of the report and the thermo-graphic analysis. Within the framework of the multi residential building renovation eligible expenses are: drafting costs of the building design, costs of the energy audit, if it is not performed with the state or municipal financial support, costs of construction supervision, costs related to measures with the aim to minimise energy consumption.

In order to receive the state co-financing for the energy saving measures, a decision has to be adopted in the meeting of the owners of the apartments in the building and granting an authority to a definite legal entity to submit the relevant application and to perform other activities related to it. The authorised entity shall submit the application to the Ministry of Economy together with the copy of the Minutes from the meeting of the owners of the apartments in the building containing the decision on the type of support, the copy of the Minutes and the Contract, the transfer and acceptance act on transfer of the management rights to the society of owners of the apartments of the building or to the person authorised by mutual agreement of the apartments' owners, if the residential building is privatised under the law "On privatisation of the state and municipal residential buildings", the copy of the contract on the management of the residential building, , if the residential building is privatised under the law "On privatisation of the cooperative apartments" or the law "On privatisation of the fishing companies and fishing collective farms".
The part of the state co-financement for a renovation project (in LVL) is determined based on the estimates of the project eligible expenditure, cost supporting documents and the documentation of the procurement. From this programme the renovation costs in amount of 20 % were covered for the renovated buildings in a limited range – only for those the renovation of which was performed on their own initiative already in 2008, without waiting for a state support or a support by the EU Structural funds.

Since 2004,when Latvia joined the European Union, the EU financial **support for promotion of the national growth and competitiveness** has become available. During the period from 2007 to 2013 as one amongst the first priorities that were determined for attracting funding in the national level was also introduction of energy efficiency measures in the production companies, public and residential buildings. 2010. In 2010 one of the main financial instrument in this respect has become Activity 3.4.4.1 “Measures to improve heat sustainability of multi-residential buildings” under the programme “Infrastructure and measures”. This activity was started in February of 2009 (Regulation of the Cabinet of the Republic of Latvia N0. 138, 11.02.2009). 138). The funds available under this activity in amount of LVL 44 337 000 are targeted to cover 50% the eligible expenses of the renovation project of the building if the result of this renovation brings at least 20% saving of the total heat consumption.

Within the framework of this activity it is possible to recover costs spent for the energy audit (which must be performed before submission of the project proposal), preparation of the technical evaluation and technical design of the building as well as the renovation works aiming to improve the energy efficiency of the building. If these activities are financed from the EU funding other financial support instruments, such as state support programme or a EU programme, may not be attracted unless the activities funded from them are separated.

Since the beginning of 2010 the funding available under this activity has been considered as the most serious of the existing support instruments in the sector of energy effective renovation of buildings since by this funding it is possible to reduce the amount of funds borrowed from the commercial banks in the form of mortgage credits.

The major instrument for financing the energy efficiency measures of buildings is the **credits granted by the commercial banks**. Credits for renovation of multi-residential buildings are provided by the Latvian commercial banks since 2003 (JSC “*Latvijas hipotēku un zemes banka*”), especially actively since 2007. In opposite to the widely spread long-term financement, i.e. the mortgage credit, to receive this loan in the largest commercial banks of Latvia the collateral for the reception of the credit can be the cash flow of the building’s property management entity. The mandatory requirement by the commercial banks for granting the credits to renovation of multi-residential buildings is the consent by 75% of the building’s apartment owners on the reception of the credit.

Since 2009 the loans given by the commercial banks for renovation of multi-residential buildings may be combined with the EU support (ERDF) in such a way gaining a sufficient reduction of the effective interest rate.

In 2010 in Latvia the credits for renovation are granted by *Swedbanka*, *Nordea*, *SEB* and *DnB Nord Banka*.

Summing up the practice of crediting the multi-residential building renovation in Latvia the conclusions are the following:

In order to receive the mortgage credit for renovation these three conditions are essential:

1. The decision by the meeting of the owners of the apartments in the building on reception of the credit determining the kind of the credit repayment – annuity or differentiated, confirming the renovation works to be performed and rise in the property management fee as the collateral for the credit. Although every bank has determined its own threshold for the consent by the owners of the apartments on the renovation, i.e. 60-75% of the apartment owners, it is still advisable to reach at least 90% consent.
2. The exact information on the unpaid debt amount by owners of the apartments for property management, water and heat supply services. It is essential that all the bills were paid within the limits of 95-100% .
3. The bank account of the society of the owners of the apartments and the frequency of payments in the bank granting the credit.

Depending on the quality of the project proposal submitted in the bank as well as the showings of the criteria mentioned above, the interest rate fluctuates from 3.00 + EURIBOR till 4,65 + EURIBOR. In exceptional cases when the project proposal is of a very good quality, the client is of high credibility level and there is no concern regarding a timely repayment of the credit, it is possible to receive 2.5 + EURIBOR.

The standard credit agreement requires a deposit in the crediting bank in amount of one to three months' payments and the credit period is restricted – 15 years.

Several international banks which provide credits for the development projects have determined energy saving and energy efficiency as their priorities. Tha drawback is the fact that international banks provide credits for projects of a major financial scale, besides they require a national energy efficiency development programmē, such as "Guidelines in energy of the Republic of Latvia 2007-2016", "Energy efficiency action plan of the Republic of Latvia 2008-2010".

Till 2011 **European Bank for Reconstruction and Development** (EBRD) is providing support under the initiative of Sustainable Energy by financing activities to promote energy efficiency of municipal infrastructure, including residential buildings, water and heat supply systems and the industrial infrastructure. The funding is ensured by granting loans on low interest rates for credits targeted to projects related to promotion of energy efficiency.

For example, until the year of 2008 with the support by EBRD 240 energy efficiency projects were implemented in Slovakia and totally 11 000 apartments were renovated there, but in Bulgaria more than 24 thousand family cottages were renovated gaining savings amounting to ~180 000MWh in a year.

Until now Latvia has not made use of the support by EBRD funds under this initiative.

European Investment Bank (EIB) in addition to the provision of finances under the JESSICA initiative is issuing low interest credits to EU member states and developing countries for credits related to the issues of environment quality, incl. energy efficiency as well as introduction of EU policy guidelines. In 2009 EIB provided support in the energy sector amounting to 3,4 billion EUR, incl. the loan 100 MEUR for modernisation of the co-generation plant TEC-2 of the JSCo *Latvenergo*.

In relation with the improvement of energy efficiency of buildings a loan has been granted, for instance, to Belgium and Luxembourg in amount of 150 MEUR. These funds are managed by the *DEXIA* bank using them as a 50% part of the co-financement for energy efficiency projects.

The **Nordic Investment Bank** (NIB) ensures loans for energy efficiency measures under the priority of environment improvement targeted to protect environment and reduce pollution. NIB supports activities targeted to reduction of CO2 emissions, usage of renewable energy resources and introduction of environmentally friendly technologies. The energy efficient renovation of buildings falls under type C of Priority 3 projects, having a facilitated funding procedure (the environmental effect evaluation is not necessary). The bank mainly finances projects above 50 MEUR covering 50% from the project costs. Likewise in the case with the EMBRD and the EIB the NIB is also oriented towards crediting of activities via the local banks.

As this bank is formed by 8 states, Latvia included, ad it is largely interested to support activities within in its member states, with this bank the City of Jekabpils has better grounds for negotiating the terms of crediting in comparison with other banks.

In 2009 a long-term agreement was concluded between the NIB and the Lithuanian government on provision of credit in amount of 100 MEUR for implementation of building renovation for 20 years. During this period 39 municipal buildings will be renovated (230 thousand m^2). In 2010 the NIB concluded an agreement also with the Finnish Mortgage institution on the loan targeted to provide support owners of apartments to improve energy efficiency.

KfW Bankengruppe (KfW) is the development bank of the German government providing an immense support in the sector of environment protection and issues concerning the climate, including renovation of houses with an aim to improve their energy efficiency by granting credits to their cooperation partners. In Latvia its partner of cooperation is JSC "*Hipotēku banka*".

In cooperation with the European Commission and EBRD *KfW* is one pf the financers of European Energy Efficiency programme which is targeted to cut the CO2 emissions. In 2009 *KfW*

invested 8.9 billion EUR for improvement of energy efficiency in residential buildings and reduction of CO2 in Germany.

In cooperation with other banks *KfW* has established a number of iniciatives to support less developed countries. For instance, EIB together with *KfW* has established South East European Energy Efficiency Fund under which support is granted to the countries in this region to promote energy efficiency and usage of renewable energy resources. The bank has also set up a special programme for renewable energy and energy efficiency under which loans are granted to the developing countries.

The **Revolving funds** developed as a tendency in the European Union new member states after their accession in 2004.
A revolving fund is a long-term financial instrument created for implementation of cost-effective investment projects providing funding on low interest rates. The fixed capital of such funds is made of the donations by the respective state and self-governments, funding by the financial donor institutions and in separate cases – funding from the EU support funds.

Under the revolving funds the financial support is granted only for the projects which ensure the repayment of funds within a definite period of time and using the repaid funds for financing of next projects. This is a globally wide spread financial scheme for promoting of different activities (e.g., development of SME, modernisation of water or waste management systems), but one of the most visible directions is the promotion of energy efficiency in the state or municipal as well as private properties.
In case of renovation of a multi-residential building the beneficiary of the credit by the fund can be a society of the building's apartment owners who use the credit to cover their part of the co-financement of the renovation project or a municipal energy service companies – for the implementation of the renovation project. The credits are granted for a definite period of time and on a fixed interest rate. The credit repayment starts after the end of the renovation when the saved energy begins to manifest itself by economic return.
As positive example of the revolving fund practice one can mention the cases in Estonia and Lithuania. The funds in these countries are actively functioning since 2009 attracting not only state funds but also financement by the Structural funds and international banks in the form of credits on low interest rates. Credits in Lithuania are granted for 15 years with an interest rate – 3%. In Estonia the management of the revolving fund is entrusted to *KredEx* , credits are with a fixed interest rate 4.8% for 10 years by granting credits via local banks for the period of 20 years. The overall target in the sector of renovation is to improve the energy efficiency by at least 20%. During the first six months of the fund's activity 60 contracts were concluded for 7 MEUR in total. The average period of financial return – 13 years (maximal period – 20).

Such a fund since 2004 is functioning in Hungary (Energy Saving Credit Fund), in 2004 the Energy Efficiency Fund was established in Bulgaria.

In Latvia this kind of fund in not created neither in the state nor the municipal level. It is clear and sure that such a fund could be established by the City of Jekabpils.

10. Sources of the used literature and researches

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