BEA APP

Sustainable energy plan of Rõuge municipality, Estonia

Integrating spatial planning, renewable energy transition and energy efficiency

Tartu Regional Energy Agency, PP6

Tartu-Rõuge 2017

Contents

1. INTRODUCTION

The European Union's (EU) package of climate and energy measures stipulated that EU member states must adopt measures to reduce greenhouse gas (GHG) emissions by at least 20%, to increase the share of renewable energy in the final energy consumption and to increase energy efficiency. Reaching the 20/20/20 targets is well on track, the aforementioned facts cannot be viewed as an excuse to decrease actions related to renewable energy and energy savings in EU during next decade. The EU 2030 climate and energy framework, adopted by EU leaders in October 2014 sets three key targets for the year 2030:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels)
- At least 27% share for renewable energy
- At least 27% improvement in energy efficiency

The European Commission Roadmap commits to reducing energy-related CO2 emissions by 80-95% by 2050. Meeting these increasingly ambitious targets expects the member states, including Estonia to make more wide-scale plans and to make larger contributions towards attaining the objectives. Meeting the national and EU-wide aims is absolutely impossible without taking actions in local governments. This is because local governments have a direct contact with the final consumers of energy in their territory.

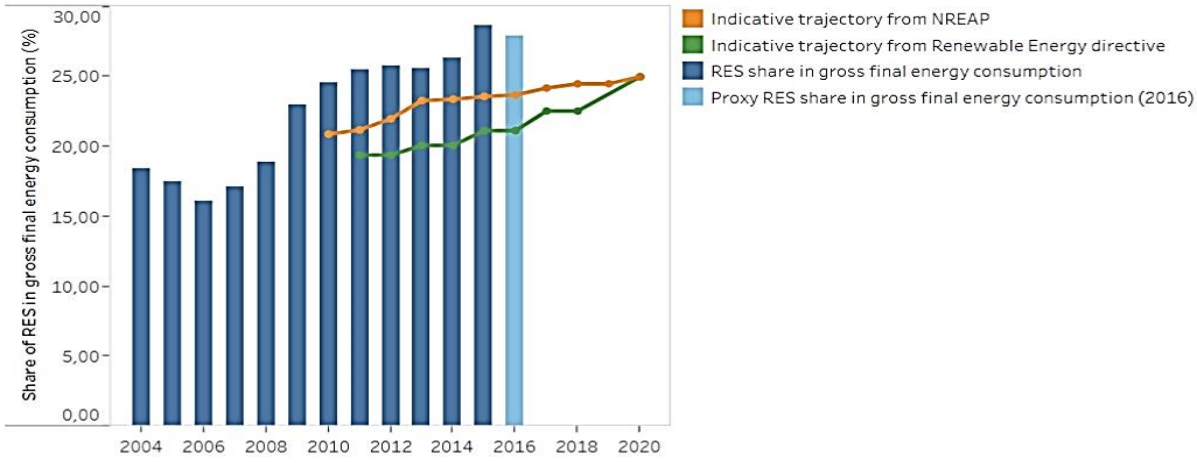
In the light of a need to plan ahead, the Rõuge municipality has taken a long-term course towards sustainable energy, implementing innovative solutions in offering different services (cost)effectively and sustainably. By today Rõuge has made significant progress in multiple fields.

Rõuge municipality joined the Covenant of Mayors 18 December 2013 with a wish to increase energy efficiency and make better use of renewable energy sources in their territory. This action plan for sustainable energy management was upgraded and submitted to the CoM 2017 in the framework of the Baltic Energy Areas – A Planning Perspective (BEA-APP) project. The action plan integrates spatial planning with renewable energy transition and energy efficiency as it was completed in close cooperation with the municpality officials and different stakeholders. The document describes the possible and currently planned actions related to the energy sector and their prospective effect on energy consumption and the CO_2 emissions. The results of the survey CO2 Baseline Emission Inventory in the Rõuge municipality was used as an input while compiling this action plan.

1.1. Estonian developments and trends in the energy policy

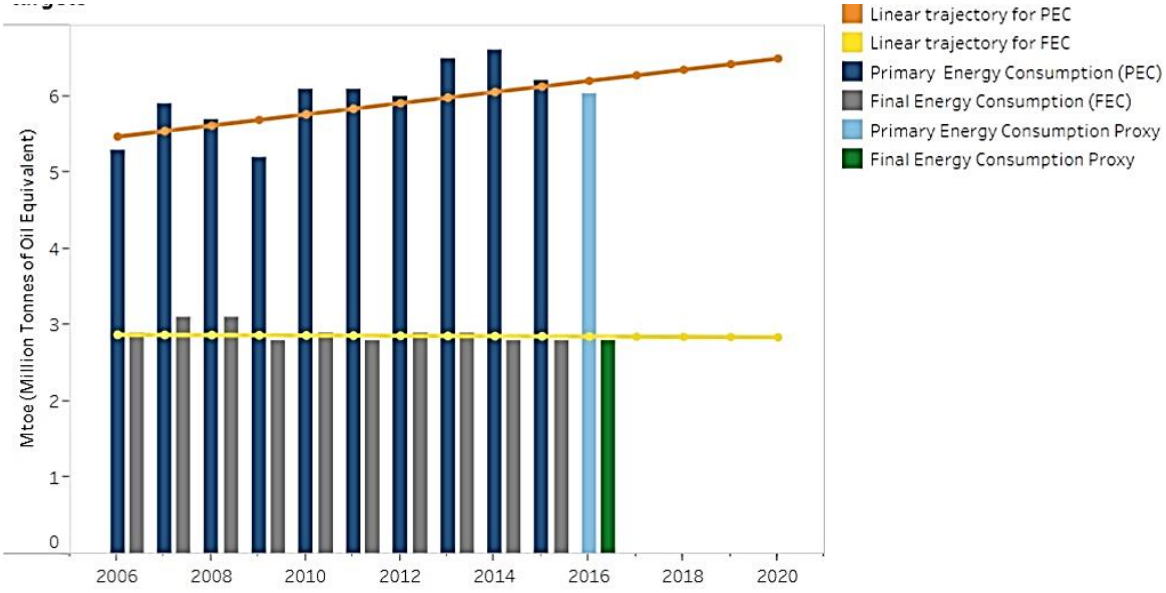
Estonia as EU member state is committed to meet targets concerning GHG emissions, renewable energy and energy efficiency as fllows. Under the Effort Sharing Decision (ESD), Member States must meet 2020 targets on GHG emissions from the sectors that are not covered by the European Union (EU) Emissions Trading System (ETS). These targets range from a 20% reduction to a 20% allowed increase compared with 2005 base-year levels. To ensure progress towards 2020 targets, the ESD also sets binding targets for each year of the 2013–2020 period. Under the Renewable Energy Directive (RED), Estonia is already met 2020 25% target on the proportion of renewable energy sources (RES) in their gross final energy consumption. Under the Energy Efficiency Directive (EED), Estonia set indicative, non-binding targets on primary or

final energy consumption for 2020. For primary energy consumption, Member States have set targets ranging from a 24% reduction to a 22% increase compared with 2005 levels. For final energy consumption, these targets range from a 22% reduction to a 43% increase compared with 2005 levels. No indicative trajectory has been formally set to monitor progress towards these targets. This analysis uses a simple approach for monitoring progress, which considers an indicative linear trajectory between 2005 energy consumption levels and 2020 targets.



Sources: EC, 2017b; EEA, 2017j; EU, 2009d; Eurostat, 2017c and 2017d.

Figure 1. Estonian progress towards RES percentage in energy consumption (Eurostat data)



Sources: European Council, 2014; Eurostat, 2017a and 2017b.

Figure 2. Progress towards Estonia's primary and final energy consumption targets (Eurostat data).

2. ENERGY TRENDS IN THE RÕUGE MUNICIPALITY

2.1. Rõuge municipality

Rõuge municipality is located in southerrn Estonia, Võru county. The biggest towns and villages are Rõuge, Nursi, Viitina and Sänna.

Figure 3. Rõuge municipality in Southern Estonia

The area of the Rõuge municipality is 263,7 km^2, with population 2215 inhabitants (2017). The population of the Rõuge municipality is quite stable which is exceptional in such peripheries.

2.2. The Covenant of Mayors

The Rõuge municipality decided to join the Covenant of Mayors on 18 December 2013. The covenant is a mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and using renewable energy sources on their territories. The covenant is upgraded to the Covenant of Mayors on Climate and Energy. Rõuge as signatory aims to meet and exceed the 20% CO2 reduction objective by 2020. The mayor on the behalf of municipality commited to:

1. Prepare a baseline emission inventory and submit the Sustainable Energy Action Plan.

2. Monitor implementation and achieving the goals at least every second year after submission of the Action Plan.

3. Organise Energy Days in co-operation with stakeholders, allowing citizens to get information about the opportunities and advantages offered by energy economy and more intelligent use of energy.

The main indicators used in measuring the productivity of the implemented actions are the changes in energy consumption (MWh/year) as well as change in CO2 emission (tCO2/year).

2.3. The energy planning and spatial planning

Rõuge general plan draft established the principles of spatial development. The spatial development of the municipality proceeds from the sustainable land use, based on the needs and trends of economic, social and cultural environment and natural environment are treated in a balanced way. The general plan support the improvement of living environment and increasing energy efficiency.

The development of Rõuge municipality until 2027 aims:
„Rõuge municipality promotes new energy technologies, modernisation of infrastructure and sustainable environment.
Public institutions involved in energy planning and management

Rõuge municipality council and its commissions;

Rõuge municipality government: all departments;

Affiliated institutions such as Rõuge Communal Services; Rõuge Energy Centre

3. ENERGY CONSUMPTION AND CO_2 EMISSIONS IN THE RÕUGE MUNICIPALITY

The following describes the energy consumption and the resulting CO2 emissions in Rõuge municipality in 2010. Detailed information on the choice of the base year and the identifying and processing methodology of energy consumption is described in CO2 Baseline Emission Inventory at Covenant of Mayors. IPCC (International Panel on Climate Change) and the codes set out in the guidelines of the Covenant of Mayors were used as a basis while collecting and processing the data as well as the idea that it must be possible to recollect and process data on the same basis at a fairly low cost of time and finances during implementation period.

Consumer data from the year 2010 was used when compiling the CO_2 baseline emission inventory. The following figures illustrate energy consumption and the resulting CO2 emissions in sectors connected to the baseline inventory.

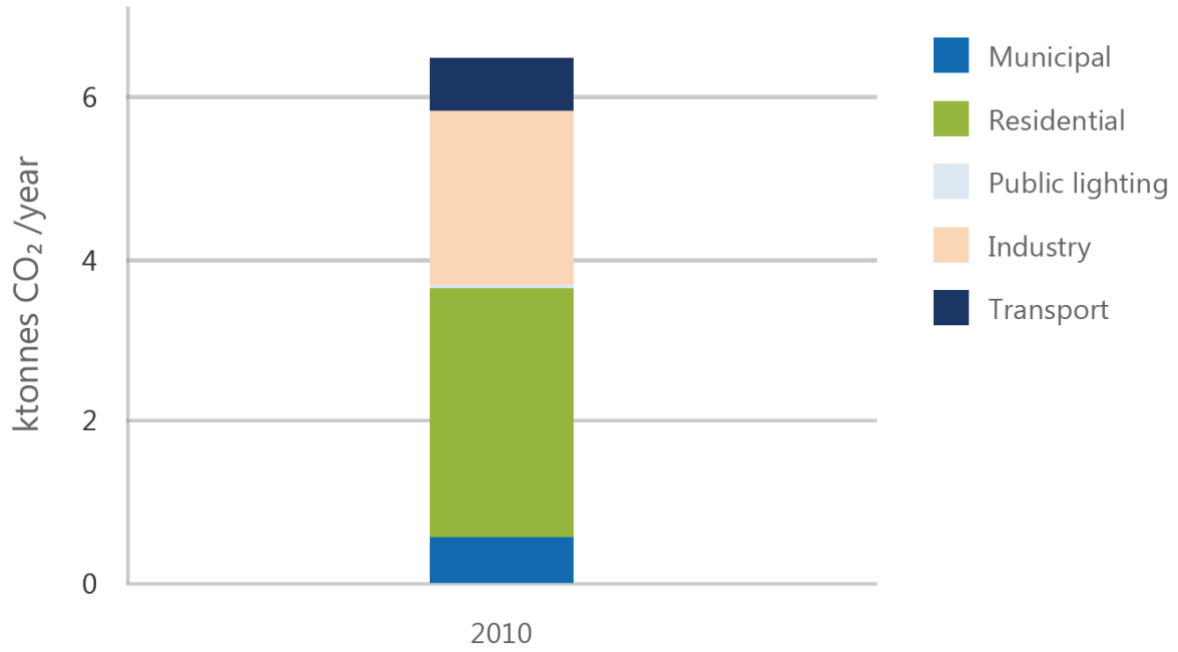


Figure 4. Greenhouse gas emissions per sector.

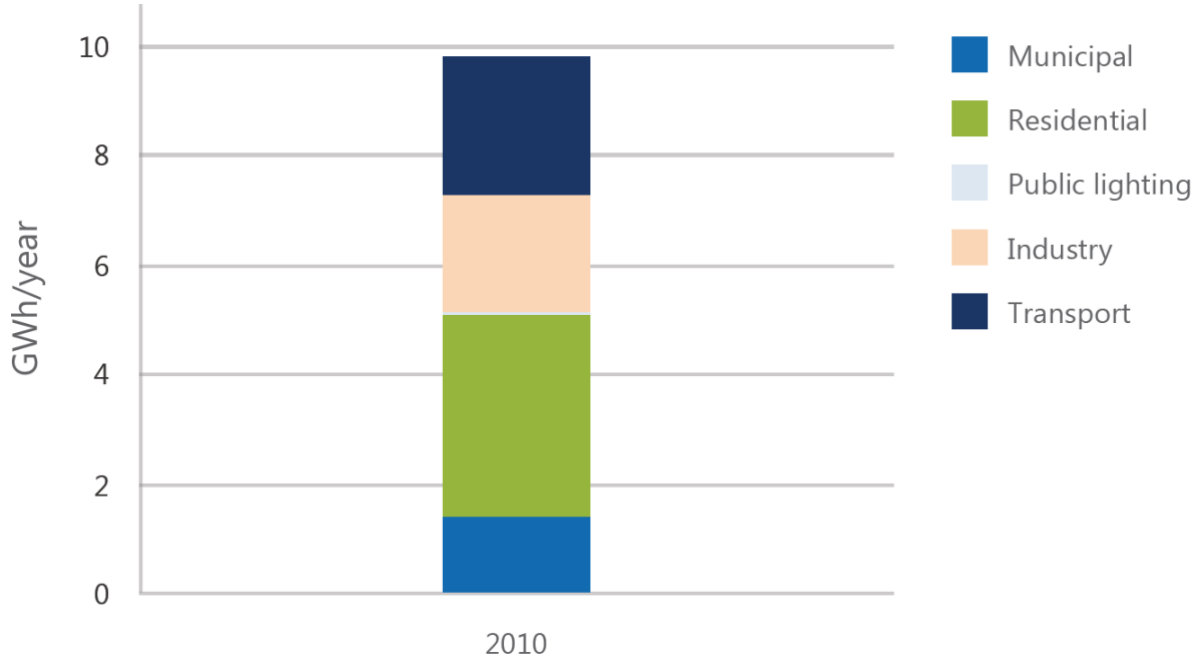


Figure 5. Final energy consumption per sector.

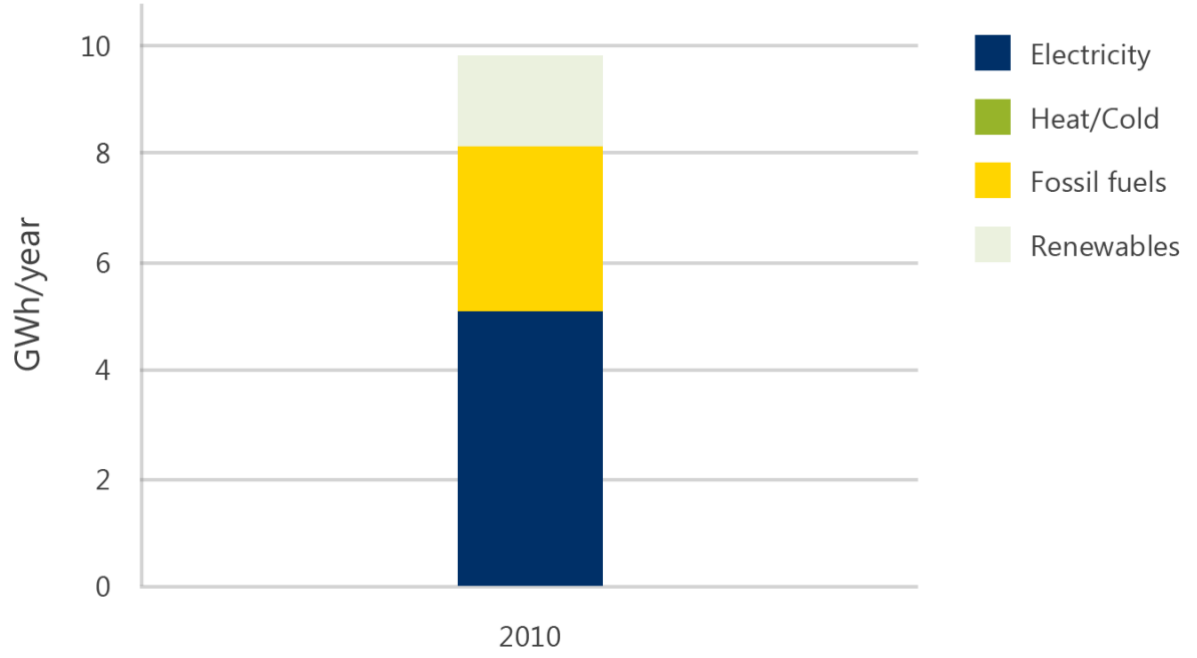


Figure 6. Final energy consumption per energy carrier.

In total, sectors registered to the baseline inventory used **9,76 GWh** fuels and converted energy (electricity, district heating) which resulted in an emission of **6465 t CO_2**. The majority of energy consumption (56%) was needed for electricity, which is also the biggest CO_2 emission (88%), followed by the transport 10% and heating 2,5%. The most of the heat is produced from biomass but most of the electricity used in Estonia is produced from oil shale. Transport energy adds 26% of total consumption. In the base year 2010 the percentage of renewable energy used in Rõuge was making up about 38% of energy consumption.

Heating in housing, public sector and processing sectors compound **10 %** of total energy consumption. Dominantly biofuelled heating adds just **0.1 % of CO2 emissions**. Share of local energy production to overall final energy consumption was just 3.1%.

The public premises consume **0.5 GWh**, street lighting adds just **0.04 GWh**. The consumption of transport fuels totals **10 %** of CO_2 emissions, **84 %** is consumed in private cars.

Table 1. The energy consumption and CO2 emissions of public premises in Rõuge.

Public premises	Heating, MWh	Electricity, MWh	CO_2, tCO_2
Rõuge school	149	266,4	300,16
Viitina public building	210	61,7	71,62
Rõuge town hall	140	16,2	19,82
Nursi village centre	112	16,3	19,60
Rõuge kindergarden	88	12,8	15,39
Rõuge municipality office building	78	20,3	23,67
Sänna cultural house	56	40,3	45,81
Rõuge youth centre	58	29,1	33,29
Garage	0	21,8	24,42
Fire depo	6	7,4	8,36
Ööbikuoru tourist centre	0	8,5	9,52
Bus station	3	3,8	4,29
Youth cafe	0	0,8	0,90
TOTAL	**900**	**505**	**577**

3.1. Energy consumption in housing sector, businesses and municipal uses

850 dwellings are located in the Rõuge municipality, including 18 3+flats apartment buildings. Living area of dwellings totals to 97 000 m^2.

Table 2. Dwellings

Parameter	Single-family dwellings	Apartment dwellings
Number	829	18
Closed net area, 1000 m^2	83	14
Volume, m^3	966	50

Electricity consumption adds ~70 % energy consumption in housing, followed by Renewable heating 19% and fossil fuelled heating 9%.

The electricity consumption is shared half by half between private clients (2645 MWh) and business clients/companies (2457 MWh).

There are 228 streetlighting spots in the Rõuge municipality, the system proovides the saving mode. In total, the street lighting system in Rõuge consumed 35 MWh in base year, followed by Viitina with 3.4 MWh.

Businesses consumed **~1.9 GWh** electric energy. The consumption of electric energy increases year by year and this is related to the higher production volumes.

3.2. Transport fuels

Therre are quite few policy measures to cut the consumption of transport fuels. 84 % of transport fuels is concumed in private cars. 16% of concumption comes from the municipality transportation, incl 3 coaches, 4 cars and ohter vehicles for communal services.

The estimates of transport fuel consumption are based on traffic in the Võru county and Rõuge municipality as follows.

Table 3. Mileage of vehicles and transport fuel's consumption in Rõuge municiaplity

Type of vehicle	Mileage, 1000 km/a		Fuel consumption		Consumed energy, MWh		
	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	TOTAL
Total	2368		-	-	498	1614	2112
EURO 4	148	369	8,4	9,5	125	314	439
EURO 3	166	292	8,4	10,2	141	267	408
EURO 2	132	404	8,4	10,3	112	373	484
EURO 1	92	393	8,4	10,3	78	362	440
EURO 0	50	323	8,4	10,3	42	298	340

Accordingly, the private cars consumed **~2.1 GWh** transport fuels.

4. SUSTAINABLE ENERGY PLAN OF THE RÕUGE MUNICIPALITY

The Rõuge aims to reduce CO_2 emissions by 20%, 1293 t CO_2

*The energy transition concept is based on **close cooperation and joint actions** between public and private sector, citizens, public administration and non-governmental organisations.*

*The energy transition and renewable deployment **should use territorial planning principles**, both adjusting restricting and allowing zoning according to the emerging renewable energy technologies and smart engineering.*

The challenges to reducing CO_2 emissions are as follows:

Challange 1: Rõuge municipality guarantees optimal energy consumption, providing and supporting active energy planning and management, promoting energy efficiency and deployment of renewable sources.

Challenge 2: To achieve energy efficiency and renewable objectives all citizens and stakeholders are to be involved in the energy transition.

Challenge 3: The simplest tasks of energy transition are implemented as priority actions coming years.

Challenge 4: Investment policies are cost effective and rational.

Strategic targets are reached through a symbiosis of conscious consuming and innovative smart solutions.

The implementation is shown in the following figure.

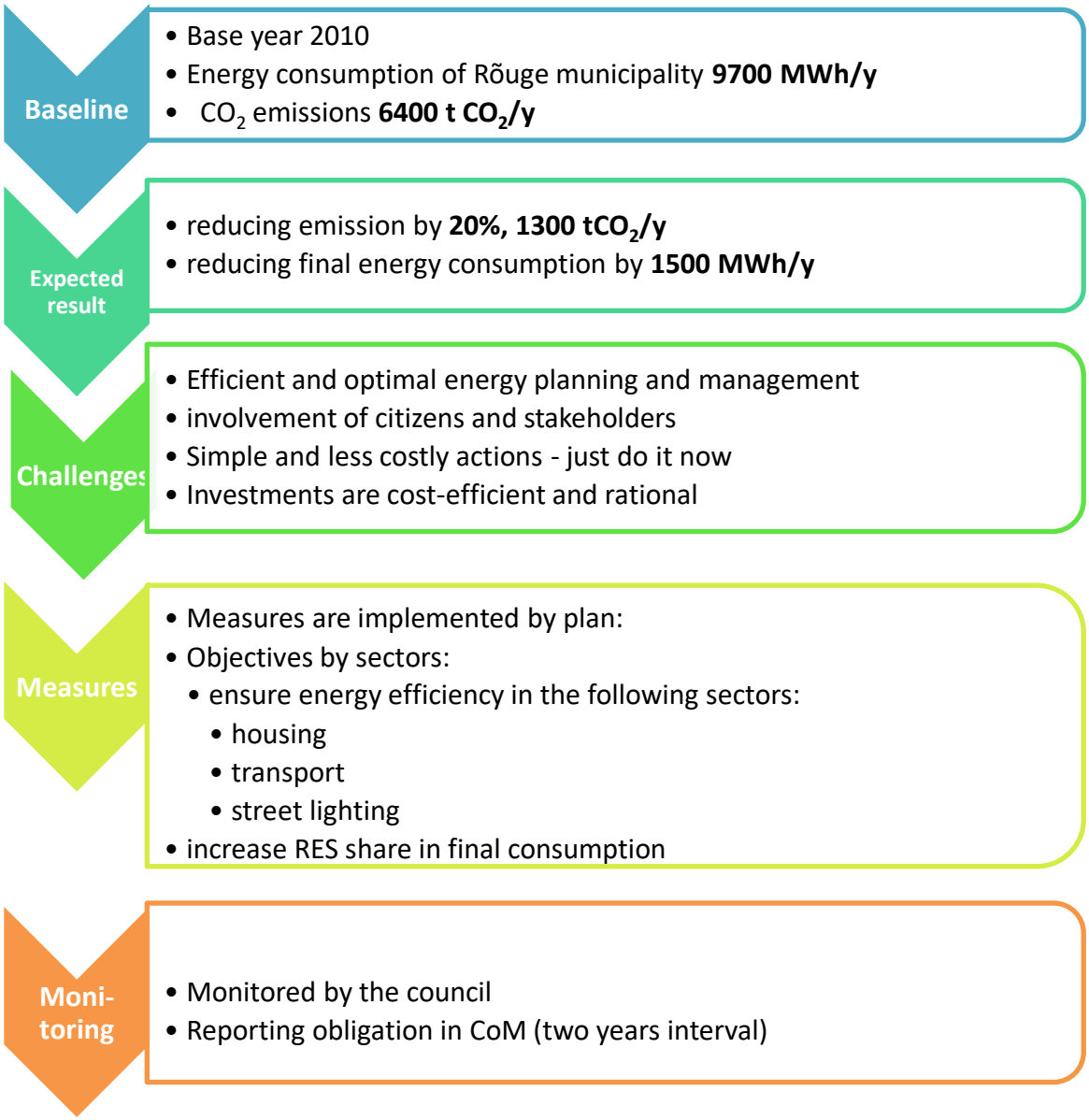


Figure 7. The implementation of the Rõuge municipality sustainable energy plan

Two major pillars of actions:

A. Energy efficiency in final energy consumption:

   Housing
   Transport
   Streetlighting

B. Increasing generation of renewable energy

Challenges 1 and 2 are related to basis of further actions. Challenges 3 and 4 address actions as required. The leading department in implementing this action plan is the **Department of economy and planning** who coordinates the implementation of the development plans and

accounting and is responsible for the detailed planning and upkeeping the technical infrastructure and for making it more effective.

4.1. Energy efficiency measures

Housing

The potential of energy saving in the housing stock is 43 GWh/y of heating energy and 2,7 GWh/y of electric energy. The engineering potential lays on heating mainly.

As of 2021, all new buildings must be near-zero energy houses, while new public sector buildings must correspond to the respective requirements already as of 2019. The following table (Table 4.2) provides and overview of the construction costs and expected energy consumption of near-zero energy buildings (nZEB) and low-energy buildings.

Tabel 4. Unit costs of near-zero energy and low energy buildings

Building category		Cost €/neto m²	Energy consumption, kWh/(m²·y)
Offices	Minimum: 2013	1176	99,73
	nZEB: 2032	1251	58,25
	Saving	-75	41,48
Apartment dwellings	Minimum: 2013	960	107,11
	nZEB: 2032	1022	62,73
	Saving	-62	44,38
Single-family dwellings	Minimum: 2013	1320	109,5
	nZEB: 2032	1446	42,27
	Saving	-126	67,23
Other buildings hooned	Minimum: 2013	1176	99,73
	nZEB: 2032	1250	58,25
	Saving	-74	41,48

Renovation is cost-efficient in the context of the following 20 years for office buildings, school houses, commercial and industrial buildings, as these buildings have good market-economical prerequisites for the improvement of energy efficiency. In the case of office buildings and school houses it is cost-efficient to renovate the new building as a whole so that it would correspond to the energy class C.

The energy efficiency of housing stock, using incentives provided the municipality is as follows:
The potential measures that a local government unit may apply to improve the energy efficiency of buildings are [37]:
1. Renovating the existing buildings to save energy and improve internal climate, incl.

- Supporting (facilitating) the renovation of apartment buildings
- Supporting (facilitating) the renovation of small residential buildings
- Supporting (facilitating) local renewable energy solutions
- Supporting (facilitating) the demolition of apartment buildings that are no longer used

2. Supporting the construction of new energy efficient buildings, incl.
- Implementing the requirements for nZEB in an accelerated manner
- Supporting the construction of nZEB
- Supporting the establishment of energy cooperatives
- Reinforcing construction supervision

3. Improving land use and planning, incl.
- Assessing energy consumption and CO2 impact during the planning process in the framework of environmental impact assessment
- Promoting compact urban planning in the existing centres and setting requirements that allow more efficient transportation and infrastructure solutions in urban planning
- Implementing infrastructure fees so that the land, which has been allocated a function in the comprehensive plan would be more valued, and so that construction activities could be guided by the city

4. Showing example in energy saving as a representative of the public sector, incl.
- Renovating public sector buildings to make them energy efficient
- Supporting green labels and green public procurements
- Executing pilot projects of constructing nZEB for the public sector
- Making the residential buildings leased out by the public sector energy efficient.
- Completely renovating apartment building areas to improve the living environment around the buildings
- Supporting the preservation of constructional and cultural heritage in residential areas of cultural and environmental value.

The detailed description of the measures is available in the document Development Plan of the Energy Sector of Estonia 2030.

Action 1.1 Reaching minimum C-class. Saving heating energy by **20%, 160 MWh, saving electric energy by 100 MWh, CO_2 reduction 100 t CO_2**

Action 1.2 Renovation apartment dwellings and reducing heating energy consumption by 50%, 450 MWh and electric energy consumption by 10%, 130 MWh, **CO_2 reduction 340 t CO_2**

Transport

Estonian transportation is characterised by the fast intensification of car use and increasing road transport, as well as by an uneconomic vehicle fleet and the marginal use of renewable fuels. In the past 10 years the use of passenger cars in Estonia has increased by approximately 50%. At the same time, the number of public transportation users has decreased. A remarkable part (~44%) of transportation fuel use is connected to traffic for commuting. Thus, it can be concluded that the local level has an important part in reducing transport energy consumption and CO_2 emissions.

The potential measures that a local government unit may apply to reduce transport energy demand and consumption are:

1. Reducing the demand for motorised individual transport, incl.

- Developing cycle and pedestrian traffic in cities
- Guiding land use to reduce urban sprawl and the dependency on cars
- Reorganising streets to promote public transportation, pedestrian and cycle traffic

- Developing the mobility management of cities and companies
- Promoting remote working
- Developing carpooling and short-term car rental
- Organising a public bicycle system

2. Efficient vehicle fleet, incl.

- Benefits for energy efficient cars.
- Using an energy-saving driving style.

The potential impact of the measures on bicycle use is described in the following table.

Table 5. The impact of measures on bicycle use

Measure	**Impact on reducing car use**	**The (estimated) proportion that the potential for shifting to bicycles makes up of the former**	**Shift from driving cars to riding bicycles (estimation)**
Campaigns promoting pedestrian and cycle traffic	1%	½	0.5%
New pedestrian and cycle traffic infrastructure	2%	1	2%
Transportation plans for institutions	2%	1/5	0.5%
Reorganising street layouts, calming traffic	10%	¼	2.5%
Parking fees in work places, changing parking regulations	12%	1/5	2.5%
Compact planning of institutions	25%	1/5	5%

Actions in transport sector
Action 1.3 Develop integrated multimodal transport concept, 15% CO_2 reduction, **70 t CO_2**

Spatial planning addresses environmental impact (air pollution) and economic considerations, road maintenance and parking regulations.

Action 1.4 New car tenders in the municipality – electric, hybrid, A and B class vehicles only. plus e-charging station, **20 t CO_2**

Streetlighting

Actions in streetlighting
Action 1.5 Modernisation of streetlighting, using solar technologies and automatization, smart lighting systems, reducing energy consumption by **50% 20 MWh and CO_2 reduced by 43 t CO_2 y.**

District heating

The comprehensive plan of the Rõuge prescribes that there are district heating regions in the city, within which all consumer installations that have joint the district heating network are provided with heat by way of district heating proceeding from the principles described in the District Heating Act. Thereby, it is prohibited for consumers who have joined the district heating network to use various types of heating (i.e., in parallel with district heating), since only this way can it be guaranteed that the consumption volumes and efficiency shall correspond to the district heating network's technical requirements, and, thus, the consumers shall be guaranteed a moderately priced service and high-quality heat supply. As an exception, consumers may use/purchase heat from non-fuel and renewable energy sources in addition to the heat from the district heating network. OÜ Rõuge Kommunaalteenus is responsible for producing, distributing and selling heat in Rõuge. The field of district heating is mainly regulated with the District Heating Act, while price regulation is in the competence of the Competition Authority of the Republic of Estonia, with the price ceiling 57.76 eur/MWh (below the Estonian average).

Actions in district heating

Action 1.6 Development plan drafting for the district heating.

Action 1.7 Renovation of the Rõuge heating plant.

Action 1.8 Renovation of district heating network. Losses reduced by 50%, **270 MWh**, **CO_2** emissions reduced by **54 t CO_2 a**

Action 1.9 Expanding the district heating to the industrial park with addition consumption 500 MWh. By replacing fossil fuels **CO_2 emissions reduced 138 t CO_2 y.**

Action 1.10 Transtion of the Viitina apartments to the renewable heating, replaced by **190 MWh, CO_2 emissions reduced by 50 tCO_2**

Action in business sector

Action 1.11 Business reduce energy consumption by 10%, 180 MWh, impact of **CO_2 emission reduction 202 t CO_2**

4.2. Renewable energy measures

Action 2.1 Promoting renewables and switching the the green electricity. RE increased by **200 MWh**, CO_2 emissions reduced by **450 t CO_2 a**

Action 2.2 Green streetlighting, additional RE **20 MWh**, CO_2 emissions reduced **22 t CO_2 y**

Action 2.3 Housing sector deploys PV systems reducing fossil electricity by 10%. RE increased by **130 MWh,** CO_2 emissions reduced by **180 t CO_2 y**

Action 2.4 Private sector and businesses deploy addition 20% of renewables. RE increased by **100 MWh**, CO_2 emissions reduced by **100 tCO_2 y.**

In total, solar parks with nominal capacity 400-450 kW are to be developed.

Action 2.5 Promoting renewable transport fuels.

4.3. Participatory planning and management

Action 3.1 Set energy planning using standard procedures and regular monitoring for renewable energy concept using territorial factors.

Action 3.2 The municipality is the promotor, the initiator and partner of the private sector, both private households and the business sector, the use of renewable energy and energy conservation.

Action 3.3 Rõuge rural government in co-operation with Rõuge Energy Center and other partners organize events for awareness raising, changing attitudes and habits, and implementation of energy management in the private sector.

Action 3.4 Subscriptions to energy performance certificates and regular collection of energy data on all energy consumed in buildings owned by the municipality.

Energy management is the conscious and planned use of energy that guarantees using energy and resources in an optimal manner for improving the quality of the living environment in a region, institution or building.

Modern energy consumption and production can be made more efficient by implementing smart and intelligent technologies—both technical solutions and ICT applications. Smart technology will not work without smart consumers. The symbiosis of the three aforementioned elements creates the possibility of monitoring energy use and production, as well guiding these based on necessity.

Energy management may be applied both on the level of individuals and organisations. Energy use may be managed within a building, construction or means of transport.

A clear overview of energy consumption and the greatest consumers object by object form the basis for energy management. After getting the overview, an action plan on saving measures and alternative means for energy production is prepared and implemented. A high-quality result is guaranteed by monitoring and improving activities.

4.4. Implementation

The structural units of the Rõuge municipality Government are responsible for performing the activities prescribed in the Action Plan. In order to achieve the objectives, the institutions cooperate with energy suppliers, other companies connected with the field and apartment associations. A local government unit may be a successful role model in performing activities related to renovation and energy saving. A local government unit deals with various activities related to the field of energy in its everyday work but residents often do not have a clear overview of this. Issuing simple and to the point information about the renovation of kindergartens and school houses, constructing pedestrian and cycle tracks will improve the image of local government units and encourage the residents to undertake activities leading to

saving energy. It is practical to organise surveys (e.g., via the web page) to involve the residents to a greater extent—this way, the Municipality Government can collect information about the residents' knowledge on energy saving and their attitudes towards the subject.

In the course of implementing a development plan, the Rõuge municipality prepares yearly overviews of the consumption volumes of their administrative buildings (indicators: heat and electricity consumption (MWh), special energy consumption (kWh per m^2·in a year)). For the purposes of better comparability it is practical to reduce the figure indicating the use of heat for heating within a common year. Valid information about all activities in the field of energy is available on the municipality home page (e.g., changes in the total length of pedestrian and cycle tracks, investments into street lighting, etc.). The respective activities bring benefits both to Rõuge administration and the residents.

4.5. Financing

Most of the support aimed at financing activities related to sustainable energy management comes from EU's Structural and Investment Funds, with national financial resources added to the support. Using the resources is a part of the implementation plan of the cohesion funds.
In preparing the implementation plans it was proceeded from the principle that the European structural and investment funds provide a one-time boost for achieving significant changes in Estonia. Using the funds must bring about a developmental leap, increasing the efficiency, impact or quality of achieving objectives in a field, sector or sector of the economy, and creating positive influences. Smart economic growth, people's well-being and the improvement of working and living quality are at the heart of the implementation plan. Estonia uses EU support for the development of education, employment, economy, environment and energy, transport and information technology.

The activities undertaken are:

- Supporting the renovation of apartment buildings. Implementation unit: Kredex foundation
- Increasing the commissioning of alternative fuel in transport. Implementation unit: Environmental Investment Centre foundation
- More efficient production and transmission of heat. Implementation unit: Environmental Investment Centre foundation
- Renovation of street lighting systems. Implementation unit: Environmental Investment Centre foundation

- **Sustainable development**

The activities undertaken are:
Public urban spaces and sustainable urban mobility. Implementation unit: Enterprise Estonia
Creating kindergarten places. Implementation unit: Enterprise Estonia
Implementing high-quality smart technological solutions is supported with the measure ICT infrastructure and improving local government units' administrative capabilities if supported with the measure Public services capability.
LEADER programme supports rural policies http://www.voruleader.ee/.

Information on energy service companies is available in the document Analysis on the Possibilities of Launching a Market of Energy Service Companies.

- **Loans on favourable terms and securing loans (loan portfolios)**

Loans on favourable terms (interest rates lower than those on the market and a longer repayment period) and securing loans (first and foremost, a buffer against the repayment of losses) are mechanisms with which the public sector facilitates making investments. A good example is the loan offered for the renovation of apartment buildings by the Kredex foundation.

Securing a loan portfolio reduces an ESCO's risks in case of a payment delay, and, thus, the general cost of financing (it secures that the payments are made later).

- **Sustainable energy fund**

A sustainable energy fund is a local or national means of financing that is used for financing several sustainable energy projects. The fund's resources may be used to grant loans to projects that do not have access to other financial resources, or loans may be granted with interest rates that are lower than those on the market. A fund may be established by a local government unit by involving private sector resources in the undertaking.

- **Energy cooperatives and crowd funding**

An energy cooperative is a location-based form of cooperation that may be also united by other common interests; its main purpose is to produce and distribute electricity and heat with its own devices to its own members.

An energy community is a form of cooperation the participants of which are united by location or joint interests, and its purpose is to achieve a common objective through one activity or several activities connected to supplying (consumption, production, transmission, sales) or saving energy; e.g., a more securely transmitted, cheaper energy supply and/or intensifying local economic activities and/or better quality of life and/or transferral to renewable energy and or energy efficiency and/or return on an investment, etc. (Glimstedt law firm)

The energy cooperative movement is not widespread in Estonia as of yet but it is becoming more popular. The Development Fund is preparing support measures and a framework for the energy cooperatives.

4.6. Monitoring

The results of the measures implemented for achieving objectives can be measured. The existence of measures and the system (structure) intended for monitoring them is important since objectives are often connected to long-term processes and activities, the results of which can be unpredictable. The existence of purposeful indicators enables to monitor achieving objectives and the impact of implemented measures. Thereby, it is possible to identify the weaknesses of chosen trends and potential deviations from what was predicted.

The performance and monitoring of activities is coordinated by the Engineering Service of the Rõuge municipality Government's Economy and planning department. The efficiency of implementing measures is measured by preparing monitory CO_2 emission inventories. Monitory inventories must be prepared at least biannually owing to the responsibilities taken with joining the Covenant of Mayors.

ANNEX 1 The energy consumption of the Rõuge municipality

Sector	Final energy consumption [MWh]															
			Fossil fuel								Renewable energy					Total
	Electricity	Heat/Cold	Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuel	Plant oil	Biofuel	Other biomass	Solar thermal	Geo thermal	
Buildings, equipment facilities and industries																
Municipal buildings, equipment/facilities	506	0	0	0	0	0	0	0	0	0	0	0	687	0	213	1406
Tertiary (non municipal) buildings, equipment/facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Residential buildings	2645	0	0	0	324	0	0	0	0	0	0	0	722	0	0	3691
Public lighting	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38
Industry Non-ETS	1870	0	0	0	218	0	0	0	0	0	0	0	41	0	0	2129
Subtotal	5059	0	0	0	542	0	0	0	0	0	0	0	1450	0	213	7264
Transport																
Municipal fleet	0	0	0	0	0	311	76	0	0	0	0	0	0	0	0	387
Public transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private and commercial transport	0	0	0	0	0	498	1614	0	0	0	0	0	0	0	0	2112
Subtotal	0	0	0	0	0	809	1690	0	0	0	0	0	0	0	0	2499
Total	5059	0	0	0	542	809	1690	0	0	0	0	0	1450	0	213	9763

ANNEX 2 The CO_2 emissions of the Rõuge municipality

Your Emission Inventory:

Sector	Tonnes CO_2															
			Fossil fuel								Renewable energy					Total
	Electricity	Heat/Cold	Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuel	Plant oil	Biofuel	Other biomass	Solar thermal	Geo thermal	
Buildings, equipment facilities and industries																
Municipal buildings, equipment/facilities	566.72	0	0	0	0	0	0	0	0	0	0	0	8.24	0	0	574.96
Tertiary (non municipal) buildings, equipment/facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Residential buildings	2962.40	0	0	0	86.51	0	0	0	0	0	0	0	8.66	0	0	3057.57
Public lighting	42.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42.56
Industry Non-ETS	2094.40	0	0	0	58.21	0	0	0	0	0	0	0	0.49	0	0	2153.1
Subtotal	5666.08	0	0	0	144.72	0	0	0	0	0	0	0	17.39	0	0	5828.19
Transport																
Municipal fleet	0	0	0	0	0	83.04	18.92	0	0	0	0	0	0	0	0	101.96
Public transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private and commercial transport	0	0	0	0	0	132.97	401.89	0	0	0	0	0	0	0	0	534.86
Subtotal	0	0	0	0	0	216.01	420.81	0	0	0	0	0	0	0	0	636.82
Total	5666.08	0	0	0	144.72	216.01	420.81	0	0	0	0	0	17.39	0	0	6465.01

ANNEX 3 The action plan of the sustainable energy - Rõuge municipality

Key Actions of the SEAP

Add action | Delete action | Edit action | Select/edit action as Benchmark of Excellence

Please start by providing your totals by sector and add your key actions afterwards.

Key Actions	Area of intervention	Policy Instrument	Origin of the action	Responsible body	Implementation timeframe		Estimated implementation cost (€)	Estimates in target year			
					Start time	End time		Energy savings [MWh/a]	Renewable energy production [MWh/a]	CO_2 reduction [t CO_2 /a]	
MUNICIPAL BUILDINGS, EQUIPMENT/FACILITIES							20000	200	100	122	
Improving energy effeciency	Building envelope	Building standards	Local authority	Local authority	2014	2020	18000	160	100	100	
Training	Behavioural changes	Awareness raising / training	Local authority	Local authority	2014	2020	2000	40	0	22	
TERTIARY BUILDINGS, EQUIPMENT/FACILITIES							0	0	0	0	
RESIDENTIAL BUILDINGS							60000	450	130	340	
Renovation and energy management	Integrated action (all above)	Grants and subsidies	Other (national, regional, ...)	Households and KredEx Fund	2014	2020	60000	450	130	340	
PUBLIC LIGHTING							90000	20	20	43	
Lighting reconstruction	Energy efficiency	Public procurement	Local authority	Government	2014	2020	85000	20	20	43	
Lighting landmarks and homes	Other	Energy management	Not possible to say	Local authority and households	2014	2020	5000	0	0	0	
INDUSTRY							60000	180	100	300	
Energy efficiency	Energy efficiency in buildings	Energy management	Other (national, regional, ...)	Firms	2014	2020	60000	180	100	300	
TRANSPORT							15000	50	20	90	
Construction charging station of electric car	Electric vehicles (incl. infrastructure)	Grants and subsidies	Other (national, regional, ...)	KredEx Fund	2014	2016	10000	0	20	20	
Mobility planning and promoting electric cars	Cleaner/efficient vehicles	Awareness raising/training	Local authority	Government	2014	2020	5000	50		70	
LOCAL ELECTRICITY PRODUCTION							30000	0	50	50	
PV and Solar park	Photovoltaics	Grants and subsidies	Local authority	Local authority	2014	2015	30000		50	50	
LOCAL HEAT/COLD PRODUCTION							152000	460	500	285	
District heating plan	District heating/cooling network (new, expansion, refurbishment)	Energy suppliers obligations	Local authority	Local authority	2014	2016	2000				
Solar energy heating	District heating/cooling network (new, expansion, refurbishment)	Grants and subsidies	Local authority	Local authority	2014	2016	20000	0	80	43	
Conversion of Viitina DH	District heating/cooling plant	Grants and subsidies	Local authority	Local government	2014	2018	50000	190		50	
Upgrading DH and network in Rõuge	District heating/cooling plant	Grants and subsidies	Local authority	Local government	2014	2020	80000	270	420	192	
OTHERS							43000	140	30	70	
Upgrading energy park and energy trail	Other	Awareness raising / training	Local authority	Government	2014	2020	23000	100	30	30	
Energy school and class, energy days	Other	Awareness raising / training	Local authority	School	2014	2020	20000	40		40	
TOTAL							470000	1500	950	1300	