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Tartu Regional Energy Agency

Sustainable energy plan of Rõuge municipality, Estonia

Integrating spatial planning, renewable energy transition and energy efficiency

Executive summary

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Contents

1. Introduction

In the light of the European Union's (EU) package of climate and energy and the Estonia's national climate and energy policy, **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 aiming 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 municipality 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.

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. Energy policy-making in the framework of 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 committed 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).

2.1. The energy planning and spatial planning

Rõuge general plan draft established the principles of spatial development, including energy related built environment, transportation, heating and other technical networks. 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 supports 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 are as follows: 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 CO2 emissions

The following describes the energy consumption and the resulting CO2 emissions in Rõuge municipality in 2010. 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 heating energy 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 bio-fuelled 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.

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 provides 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.

84 % of transport fuels is consumed in private cars. 16% of consumption comes from the municipality transportation, incl 3 coaches, 4 cars and other vehicles for communal services.

4. Sustainable energy plan

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.

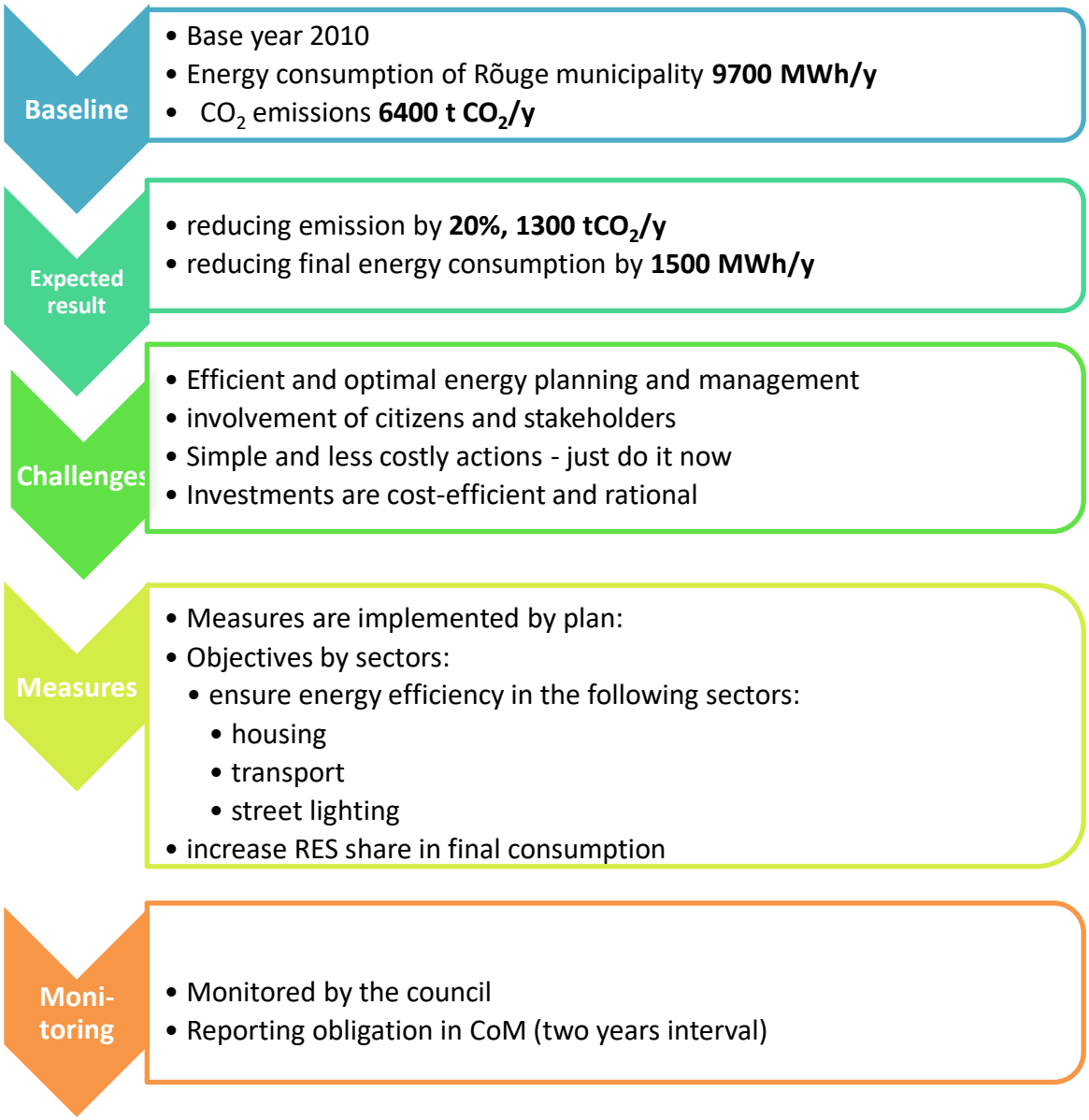

Figure 7. The implementation of the Rõuge municipality sustainable energy plan

Two major pillars of actions:

A. Energy efficiency in final energy consumption:

   Housing
   Transport
   Streetlighting

B. Increasing generation of renewable energy

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.

Housing. 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.

Transport. The local level has an important part in reducing transport energy consumption and CO_2 emissions.
Streetlighting. Modernisation of streetlighting, using solar technologies and automatization, smart lighting systems.

District heating is set by the comprehensive plan of the Rõuge, which prescribes that there are district heating areas in Rõuge. 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. Development plan is drafted for the district heating and renovations are planned.

Renewables. Promoting renewables and switching the the green electricity. RE increased by **200 MWh**, CO_2 emissions reduced by **450 t CO_2 y.** Green streetlighting, additional RE **20 MWh**, CO_2 emissions reduced **22 t CO_2 y.** 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.** 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.

4.1. Participatory planning and management

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

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.

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.

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