BEA-APP
BALTIC ENERGY AREAS
A PLANNING PERSPECTIVE

EU STRATEGY FOR THE BALTIC SEA REGION
FLAGSHIP

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

RES mix in peripheral regions

The Renovation project of the Rõuge village hall

Rõuge, Estonia, 2016-2018

Tartu Regional Energy Agency

In cooperation with the Rõuge municipality and ROK-Projekt

Content

1. Summary: the objective, context and output of the feasibility study

The pilot project on RES mix in Southern Estonia implemented in the framework of the Baltic Energy Areas - A Planning Perspective (BEA-APP) project according to the priorities and objectives of the Interreg Baltic Sea Programme **aimed:**

• to increase in depth knowledge on planning process, obstacles and opportunities in rural peripheral areas;

• to minimise adverse effects on territory and the environment, other land uses, economic sectors and people;

• to maximise the contribution to renewable energy generation in Southern Estonia;

• to identify the most cost-efficient and feasible forms of renewable energy generation in chosen location.

In its core, the pilot project serves the programme priority increasing production and use of sustainable renewable energy based on enhanced capacity of public and private actors involved in energy planning and supply. It initiated and implemented place-based pilot action assessing local circumstances and conditions, defining the optimal renewable energy mix for selected areas and setting the scene for the replication of such renewable energy projects. It tested new spatially adjusted formal and informal spatial planning instruments optimal balances with competing aims and land uses in the peripheral rural Estonian town, taking into account renewable energy sources, resulting spatial requirements for land use functions of small town, preservation of parkland and cultural landscapes. The RES mix piloting reflects a broad spectrum of renewable sources: the sun and photovoltaic, the ground heat and pumps; firewood and stoves. Piloting in public administration and communicative realities included innovative stakeholder involvement in different modes, an organic approach to problem solving and decision making.

The pilot project focuses on the renovation of the Rõuge village hall, including the optimal selection and installation of renewable energy technologies as well sustainable and smart landscaping of the surroundings. The overall area to be planned is 1,83 hectares, the built-up area is 1116 m^2. The energy and heating systems will integrate ground source heat pumps with photovoltaic panels and traditional wood-burning stoves.

The Rõuge village hall, owned by the municipality, forms a cultural cluster together with the school and parish church. The village hall is used as a community centre for a variety of public and social events, such as parish meetings and workshops, receptions and functions, a small theatre and cinema as well as local entertainment productions, dances, and private parties. The village hall contains one large room and a few smaller rooms. Premises of the village hall will be upgraded using local renewable energy sources. The installation ground heat pumps requires detailed planning of its surroundings as it can be done only in nonbuilt land, as well strict buffering zones apply.

The process of development exemplifies innovation in detailed planning, RET-based engineering, energy efficient renovation and sustainable landscaping solutions in a small town.

The stakeholders of pilot project agreed conclusions on spatial planning of renewable mix in the context of the EU energy and climate framework for 2030, the EU Strategy for the Baltic Sea Region. In its conclusions, the project members note of progress in strengthening cooperation in the area of spatial planning of renewable mix and provides guidance for further planning for the growth of peripheral areas and deployment renewables. The areas covered include:

1) background and context on pilot case, major technical, economic, and environmental features, type of RES, stakeholders,
2) planning objectives,
3) implementation of planned actions,
4) conclusions and lessons learnt on innovative methods applied, process quality appraisal and replicability in the BSR.

2. Methodology and process: implementation of planned actions

The project concept is based on place based renewable energy production and use. The renovation and landscape design of Rouge village hall is chosen to implement place-based project on RES mix in peripheral regions (4.2.1) contributing in workpackage 4 on regional pilot actions.

The planning code of densely populated area applies in the Rõuge town. The RES-focused renovation project is conditioned by the principles, standards and requirements of zoning, the task which directly practices the spatial planning methods, addressing the key questions of spatial planning where and how. The zoning sets multiple spatial constraints for the cultural and education facilities in the pilot plot, premises and its surroundings in developing a cohesive and sound built environment, facilitating RES. The pilot project addressed directly spatial, architectural and engineering compromises which succeed in expert discussions, public hearing and political consensus. Mobility has not been focus of this project though the spatial planning for such public premises with open space uses should consider accessibility among other spatial planning tasks. The integrity of the pilot project in relation to the spatial planning, deploying renewables and public relations was underlined throughout the implementation.

The pilot project built on strong interlinkages and cross-dialogue with other workpackages and activities of the project such as increasing stakeholder participation and social acceptance (WP2) and optimising spatial planning instruments for RES (WP2) to provide inputs to the planning criteria, recommendations and energy concepts. The Tartu Regional Energy Agency as responsible acting partner carrying out the pilot activity on RES mix in peripheral rural regions presented the Rõuge village hall case in the 3rd partner meeting in Kaunas, the 4th partner meeting in Jyväsküla and the 5th partner meeting in Szczecin with German, Finnish, Latvian and Danish partners. The mentoring and twinning at meetings as well bilaterally case by case, promoted the know-how transfer of the Southern Estonian RES mix planning case. Mentors guided and assisted the energy agency based on previously made experience with their renewable planning and development projects.

regions.

2.1. Process and timeline

The timeline of pilot project was as follows.

Drafting terms of references, data collection for place-based solutions and relevant information gathering, stakeholder consultations on the village hall renovation – Dec 2016

Tendering process – Jan 2017

Schematic design phase: the architectural design process, visualisation, artist visions for landscaping, creating two to three design options for the consideration - until June 2017

Blueprinting: settling on and presenting a final design, preparing drawings, notes, and technical specifications necessary for bidding, construction, and permit application – until June 2017

Acceptance and approval design drafts – Nov 2017

Stakeholder approach aiming the integrity of formal and informal, innovative, experimental and standard methods and procedures. Acceptance and approval design drafts – Nov 2017

Reporting and lessons learnt – May 2018

The process was implemented according to the agreed timeline.

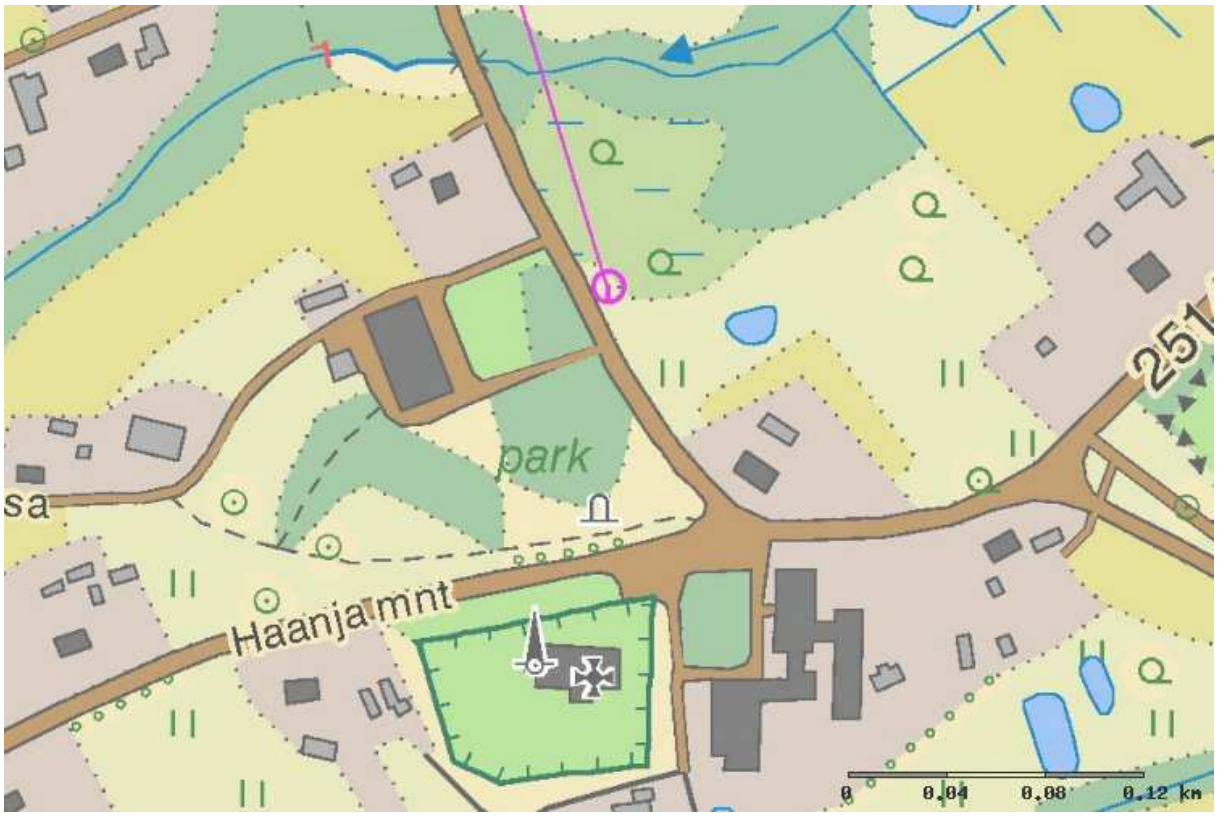
2.2. Demonstration, learning and support on spatial planning to support renewables – the planning approach

Remote community. Rõuge is a very remote community 280 km from Tallinn, the Estonian capital and just 20 km from Russia, EU external border causing several local development issues and market distortions, specifically in this case implementing innovative RES technologies.

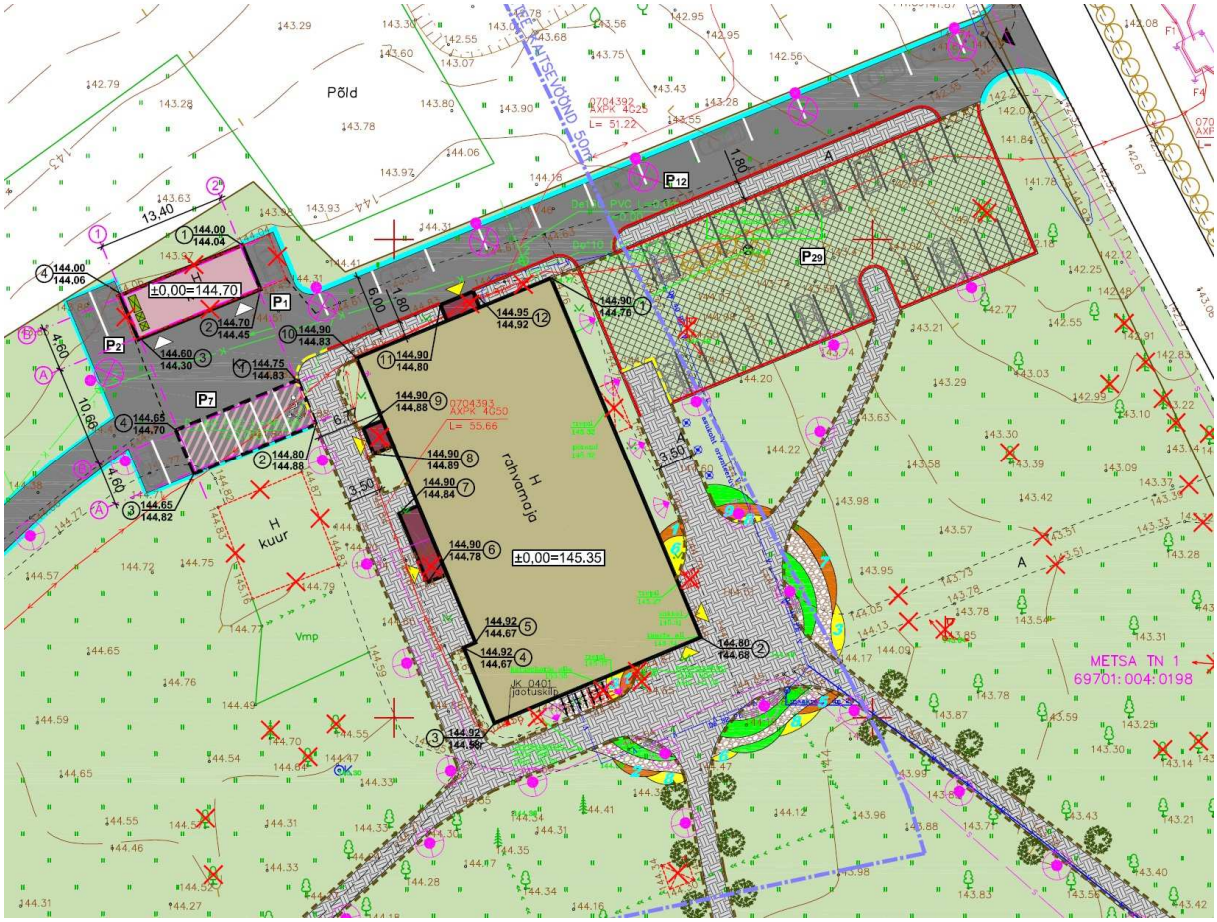
Focal and landmark position. The village hall has a focal position in the cultural cluster of the town neighbouring with the school and the parish church surrounded by the memorial park. The location is highly sensitive and complex providing the excellent test site for introducing renewables in town planning complexities and wide range of interests.

Promoting renewables mix. The pilot defined the optimal solutions for renewables. It facilitates and promotes directly renewables as the systems integrate ground source heat pumps with PV panels and traditional wood-burning stove. In addition, the design and plot layout apply general principles of sustainable renovation such us the passive solar heating. The design and engineering differentiated from other pilots extending the range of pioneering planning cases.

The special attention is paid on rural mobility promoting sustainable multimodal access giving preferences to pedestrians and bikers as well convenient and safe access from bus stop. Also, the project followed rather demanding normative for car parking.



The map of the Rõuge town, the cultural cluster: the village hall (above the park), the church (fenced), and the school (eastwards of the church)



Layout of the village hall plot

2.3. Demonstration, learning and support on communication and conflict resolutions – the stakeholder approach

The planning process comprised testing innovative forms of public participation in line WP3. The pilot contributed substantially in pioneering methods and planning practices for awareness raising, public hearing and communication. The public and expert meetings, public hearing and other communication activities for conflict resolution are implemented during the planning and design process as follows.

Expert meeting of renovation draft plan of the Rõuge village hall 26.01.2018 in the Rõuge municipality office

The expert meeting (7 participants) hold discussions of the working draft of renovation and input for upgrading of the renovation draft plan and design. The Members of the municipality government and council, architect, project managers, communication officer contributed to the meeting. The meeting was chaired by the mayor of Rõuge municipality Tiit Toots. The discussion focused on renewable application and feasibility taking into account planned plot, renovation and budgetary limitations. The outcome was the draft amendments to designing, statements and inputs by the local authority. The list of issues and comments was drafted and presented.

Public hearing of renovation draft plan of the Rõuge village hall 23.02.2018 in the Rõuge village hall

The public hearing (16 participants) in the village hall was held presenting the draft of renovation to the public, consulting with users and interest groups, using awareness raising and participatory planning methods, getting feedback and input for upgrading of the renovation draft plan and design. The stakeholder involved were officials of municipality, culture and local societies, users of village hall, neighbouring land owners and community members, council members, designers, engineers. The hearing meeting was chaired by the mayor of Rõuge municipality Tiit Toots.

The agenda of the hearing was set in three stages:

1. Presentation of the draft of renovation design by architect Karmo Tõra.
2. Inputs, comments and feedback by council members, users and public
3. Discussion on feasible solutions for further elaboration and drafting

The community representatives supported heating system based on renewables to replace the historic stove-based systems which was unstable and manual. The positive factors of the renewables were accepted by public, few details were pointed in the exchange of views. The layout of outdoor functions and accessibility was debated to accommodate various interests. Climate-sound allocation and design of parking slot, are there enough places, surfacing materials. Other issues in the discussion between planner-designer, officials, project experts and public comprised: allocation functional areas and main and technical entrances; general and façade design feasibility, cost-efficiency and estimates of development cost, maintenance and operation cost, specific engineering of renewable energy mix, impact of renewable technologies.

The hearing was reported by the county daily Võrumaa Teataja. Invitation and public information was posted at the Rõuge municipality homepage.

The public hearing of the draft project design in the village hall 23.02.2017

Architect Karmo Tõra explained the concept, elaborated planning and engineering solutions and responded to the public feedback and comments on the renovation project of the Rõuge village hall (left solar energy outlook, right interior end-user solutions), 23.02.2017.

3. General features: major technical, economic, and environmental features, type of RES

Design by ROK-Projekt, reg.nr.11426802, EEP001210 19.10.2007. Ph +372 6838036.

Architect: Karmo Tõra, ph +372 5098347, karmo@rokprojekt.ee

Address: Metsa str. 1 Rõuge town, Rõuge municipality, Võru county, Estonia

Owned by the Rõuge municipality, Ööbikuoru 4, Rõuge town 66201, Võru county, Estonia, ph. +372 7859312, vald@rauge.ee

Project manager in the Tartu Regional Energy Agency: Antti Roose, +372 53328233, antti.roose@trea.ee

Issued 06.04.2017. Sections: General. Background. Conditions by institutions. Report. Layout of the plot. Building designs. Views. Detailed designs. Energy label.

18346 m² 100% public building land

Building stock: Rõuge village hall, 968,8m² (1936) and garage 73,9m² (1965)

Infrastructure: Rõuge water supply and wastewater system (2015) and floodlighting (2013)

Altitude: 142-148 m

Surrounded by the park, mostly deciduous trees, the park is overgrown and needs renewals.

Constructions phases:

I Renovation of the village hall

II Construction of ancillary building

III Landscaping and construction of outdoor infrastructure (Parking, entrance area, greenery)

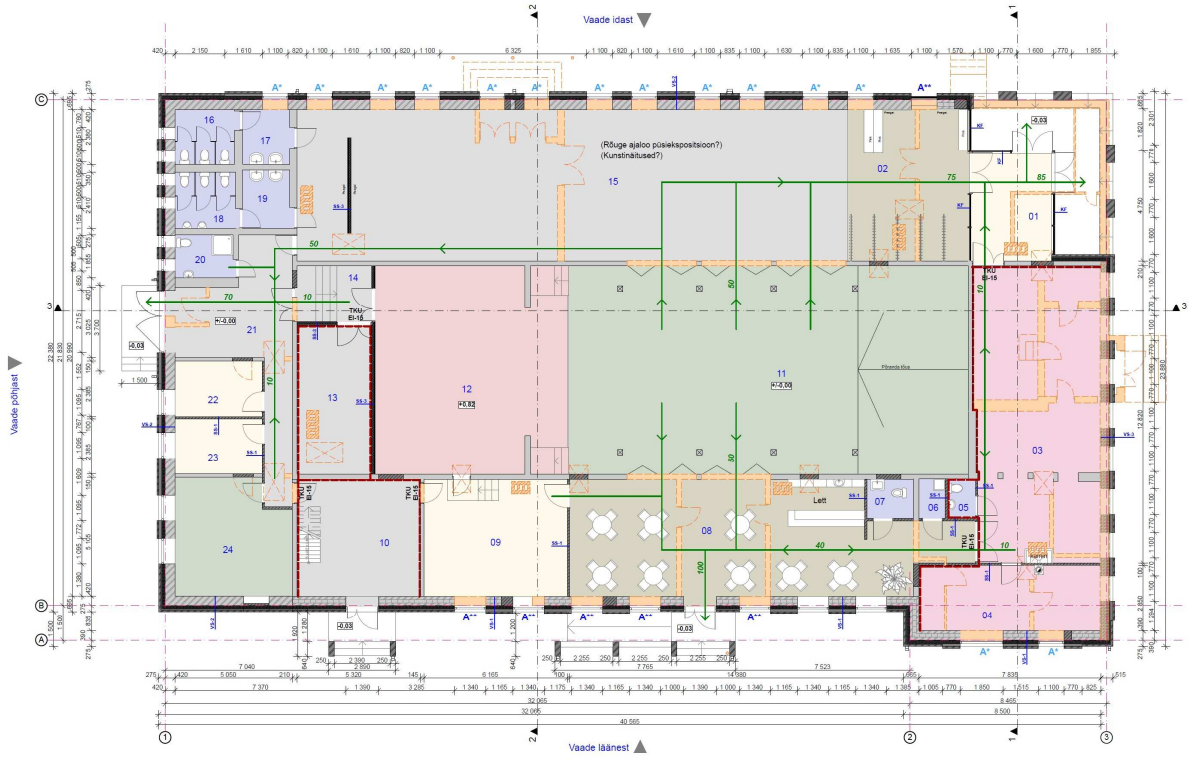
Concepts: RES mix combining solar engineering, ground heat engineering, and traditional stoves. Accessibility by walking, sustainable parking

The village hall in January 2017

The main entrance of the village hall during events of the Estonian Independence Day, 24.02.2017

Aerial view of the village hall plot and park by ROK-Projekt.

Frontal view of the village hall by ROK-Projekt.



Indoor layout of the village hall by ROK-Projekt.

3.1. Energy and heating

All the constructions of the building are insulated to the requirements. Design ensures adequate natural lighting. The building equipped with heart recovery ventilation and underfloor heating.

Total heating energy capacity: Total 35 kW, heating 25 kW, ventilation 9 kW, hot water boiler 300 l.

Characteristics of the heater: heating 35 ° C / 30 ° C, ventilation 50 ° C / 35 ° C. The minimum temperature is 55 ° C what to take as a basis for choosing a domestic hot water heat exchanger.

The following systems are provided in the heat sink:

- floor heating system;

- ventilation heating system;

- domestic hot water system.

The building has a designed underfloor heating system. The heat carrier is water with parameters 35/30 ° C, which is prepared in a mixing unit which is installed in the technical room. The system is two-pipe distribution collector. The system's qualitative adjustment is based on the room air temperature using room thermostats. In each ventilated space, fresh air is supplied directly from the injection system, or transient air. The ventilation airflow is selected according to the regulations.

PV system. The nominal capacity of the solar panel is 275 W. 66 pcs solar panels with a capacity of 18.15 kW (156 m^2) to be installed on the roof of garage. Estimated annual production: 15682 kWh.

The traditional stove in the library room: 5 kW, heating area 100 m^2, efficiency 90%.

The energy efficiency: 143 KWh / m^2a. The public building is certified as the B class.

4. Conclusions and lessons learnt on innovative methods applied, process quality appraisal and replicability in the BSR

The Rõuge pilot project on renewable mix provides a cross renewable inventive, ambitious and unique case that addresses common RES planning and stakeholder involvement issues of towns and villages and highlights successful examples of how rural planning can accommodate multiple renewable technologies in reshape peripheral areas in the framework of energy transition to renewables. The case study also demonstrates the importance of the key planning principles promoted by BEA-APP project in general and in the specific outputs on setting renewable energy planning criteria and reaching stakeholders. The renovation of village hall delivers coordinated implementation of renewable mix deployment to positively influence the economic, social, cultural and environmental dimensions of rural areas. The experiences were required to be territorially balanced and thematically linked to the renewable technologies and deployment. Such case would enable planners, energy engineers and consultants, decision makers to make more informed decisions on their own renewable and energy transition challenges in the Baltic Sea Region. The Rõuge pilot case can serve as inspiring practice along with other pilot cases of the BEA-APP project and policy recommendations on planning and renewables when reviewing local territorial planning frameworks and plans in regard public premises and cultural areas. The feasibility study report on place-based RES solutions of peripheral southern Estonia can be used in similar RE planning cases in Mecklenburg-Vorpommern (DE) and West Pomerania (PL). It is also expected that the Rõuge pilot case substantively inform and contribute to the smooth planning processes despite different planning jurisdictions in BSR countries.

The project exemplifies the complexity of planning renewable installations in small town where the strict planning code applies. This pilot project is replicable in rural areas having opportunities to combine renewable mix such as ground heat pumps, solar panels and traditional biomass-fuelled stoves. Such energy technologies could be combined in many rural areas of the Baltic Sea Region, namely, in the Baltic states, in forested and sparsely populated parts of Finland, Sweden, Poland and Mecklenburg-Vorpommern.

The project provided the know how in renovation cases which requires balancing functionality of energy supply and heating and cost-efficiency of the renovation project conditioned by multiple criteria set in the detailed plan. The RES-focused renovation project is conditioned by the principles, standards and requirements of zoning, addressing the key questions of spatial planning where and how. The zoning sets multiple spatial constraints for the cultural and education facilities in the pilot plot, premises and its surroundings in developing a cohesive and sound built environment, facilitating RES. The pilot project re-examined all abovementioned circumstances and addressed directly spatial, architectural and engineering compromises which

succeeded in multiple expert discussions and public hearing. Also, it required seeking political consensus among council members as an ultimate process quality criteria for the approval and implementation of the project.

Officials of municipality, users of village hall, neighbouring land owners, tourism and other entrepreneurs, community members, cultural and local societies, council members, designers, engineers participated actively in the planning and design drafting process. Wide dissemination of invitation was arranged by social media and personal approaching. The open moderated workshop was the key setting, warmed up and introduced by the Rõuge mayor Tiit Toots. Comprehensive and attractive visualisation is given by architect Karmo Tõra. Handouts of drafts are given as take-away. Participants in the planning and design process were satisfied with the process quality in regard content, speed, communication and involvement. The process was open, transparent and fully inclusive reaching the objectives and delivering outputs. At the public hearing and in accepting the project drafts, the mayor Tiit Toots welcomed the progress achieved in the area of renewable energy, such as the elaborating and designing the renovation project and efforts to integrate renewable technologies in rural planning considering strict planning code and zoning restrictions. The pilot project extended the window of opportunities in spatial planning of renewable mixes specifically in Southern Estonia, also the know-how and lessons learnt could be transferred across rural areas in the Baltic Sea Region.

The territorial planning process succeeded to engage in an inclusive consultative process across multiple stakeholder communities in a given formal planning process. According to planning and construction code, stated requirements and as a results of stakeholder compromises and trade-offs (councillors, officials, neighbours, environmentalists, engineers, village society etc) the planning solution for renewables was made feasible using the western side of planned plot. Consequently, one should consider all options and unbuilt land in surroundings to deploy renewable mix. To make energy policy interventions effective there needs to be a long term plan and trajectory, which embraces the potentials and challenges of an area. The BEA-APP project delivered also the sustainable energy plan of Rõuge which enables territorial and horizontal policy integration which has proved vital in shaping the spatial development of any territory in guiding future growth and innovation.

Link

See the design report of the renovation project (in Estonian) here:

http://trea.ee/wp-content/uploads/2018/09/BEA_RES-mix-rouge-village-hall-renovation-310818-1.pdf

The historic photo of the Rõuge village hall, behind of the Independence monument, 1938.