BEA-APP
BALTIC ENERGY AREAS
A PLANNING PERSPECTIVE

EU STRATEGY FOR THE BALTIC SEA REGION
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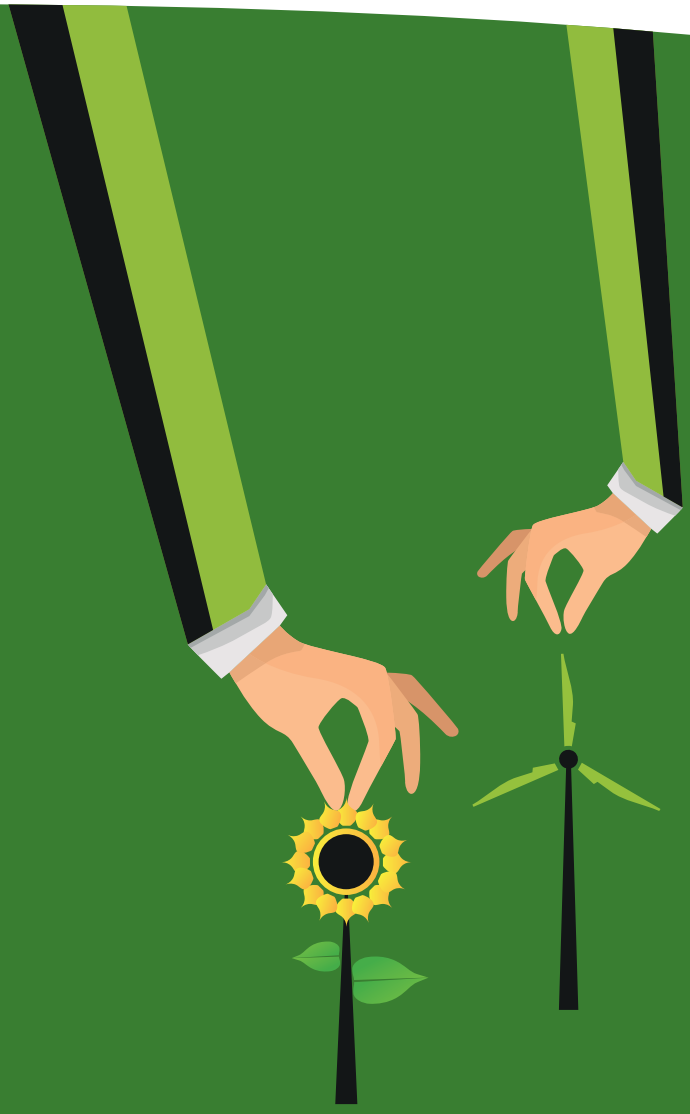
Handbook on innovative modes of stakeholder involvement and communication models:

planning sustainable energy projects



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Content

Abbreviations

BEA-APP	Baltic Energy Areas – A Planning Perspective
CHP	Combined heat and power
CSP	Concentrated solar power
DH	District heating
EU	European Union
LLs	Living Labs
NGOs	Nongovernmental organisations
M-V	Mecklenburg-Vorpommern
NIMBY	Not In My Backyard
PP	Project partner
PV	Photovoltaic
RE	Renewable energy
RES	Renewable energy sources

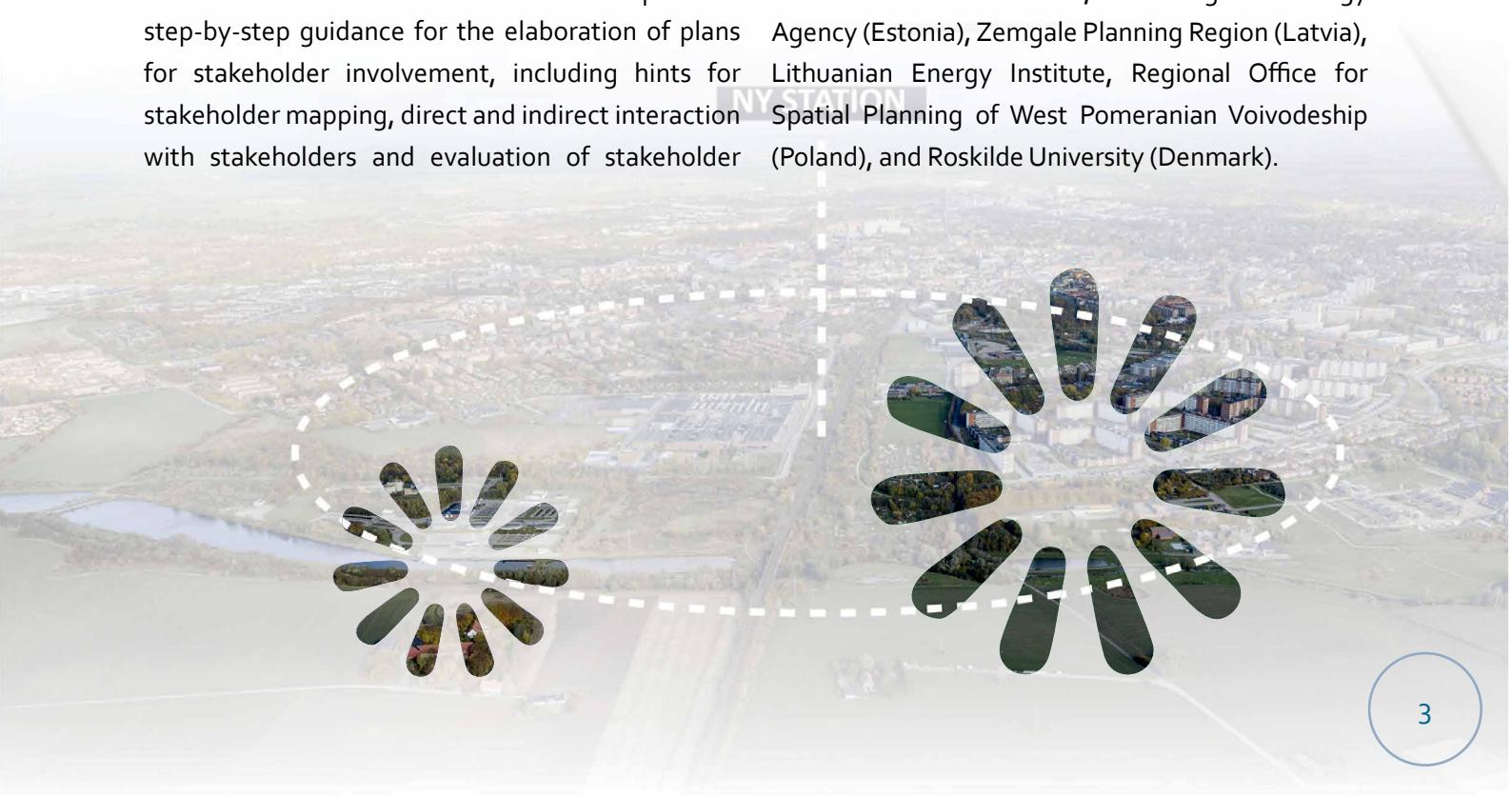
Introduction

Stakeholder involvement is an important prerequisite for fostering the implementation of renewable energy technologies and projects. It has been one of the key aspects of the BEA-APP project, where a lot of attention has been paid to ensure close collaboration with stakeholders throughout the entire project life cycle.

This Handbook reflects on stakeholder involvement, linking it to renewable energy (RE) pilot projects implemented in the BEA-APP project partner regions. Pilot projects have been related to spatial planning and to the use of renewable energy sources. These cases have represented a broad spectrum of renewable energy uses - optimal renewable energy mix in peripheral areas, renewable energy in municipal district heating systems, use of geoenergy in residential areas, production of biogas, use of solar and offshore wind energy. The Handbook provides a background of stakeholder attitudes towards various renewable energy sources (RES) and gives an overview of contextual factors triggering acceptance or non-acceptance of RE projects in Europe.

The reader of this material will receive practical step-by-step guidance for the elaboration of plans for stakeholder involvement, including hints for stakeholder mapping, direct and indirect interaction with stakeholders and evaluation of stakeholder involvement. The Handbook provides information on various innovative stakeholder involvement methods and tools that can be applied depending on the implementation stage of renewable energy and spatial planning activity i.e. targeted planning of RE development in the region/municipality; feasibility study; implementation of the RE project. It presents the main lessons learned from stakeholder involvement during the BEA-APP project activities in the partner regions. Guidance on methods for transferability and replication for widening the uptake of knowledge from stakeholder involvement is grounded on the key principles of systems perspective, adoption capacity and enabling practices towards implementation.

This Handbook is prepared within the framework of the BEA-APP project "Baltic Energy Areas – A Planning Perspective" by BEF-Latvia with contributions from the project partners: Ministry of Energy, Infrastructure and Digitalisation Mecklenburg-Vorpommern (Germany), Skåne Energy Agency (Sweden), Region Blekinge (Sweden), Energy Agency for Southeast Sweden, Regional Council of Central Finland, Tartu Regional Energy Agency (Estonia), Zemgale Planning Region (Latvia), Lithuanian Energy Institute, Regional Office for Spatial Planning of West Pomeranian Voivodeship (Poland), and Roskilde University (Denmark).



1. Renewable energy: stakeholder acceptance and contextual factors

Renewable energy continues to play an important role in the European Union (EU) to meet its energy needs and reduce greenhouse gas emissions. In 2016, renewable energy represented 17 % of energy consumed in the EU, on the path to the 2020 target of 20 %.[1] Technologies for production of renewable energy are continuously developing, thus allowing increased capacity and efficiency of utilisation of the renewable energy sources (RES). Nevertheless, experience shows that technologies that are technically and economically feasible in a given context, may not be successfully implemented due to social resistance and lack of awareness of the technology.[2] Thus, acceptance by stakeholders at national, regional and local level is crucial to foster the implementation of renewable energy technologies and projects.

In an ideal scenario, the RE technology/project receives support from the expert community, local and national policy-makers. the general public is well informed and has a positive view on technologies, there are no obstacles from local politicians, residents, non-governmental organisations for the concrete site decision and the affected residents support the application.[3]

1.1. Wind energy

Wind energy in Europe – facts and figures

Experts acknowledge technologies for the exploitation of wind energy (onshore and offshore) as the most mature in the field of renewable energy. Technological developments in this field have made onshore wind energy the cheapest form of new power generation in Europe. Roughly calculated, wind energy covers over 11% of Europe's electricity demand.[4] Between 2000 and 2016, compared with other renewable energy sources, wind energy experienced the largest growth in power generating capacity in the European Union. Over this period, the net growth of wind power (particularly onshore) installed capacity in the EU was 142.6 GW (see Figure 1.1.).[5]

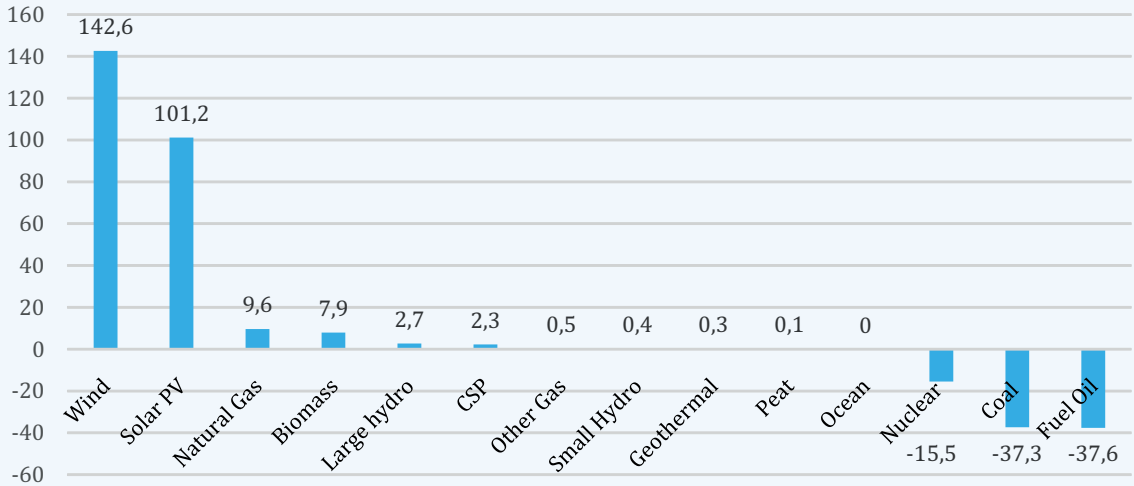


Figure 1.1. Net electricity installations in the EU from 2000 to 2016 (GW)

Perception of wind energy

Results of opinion surveys in the EU[6] show that most EU inhabitants have a positive attitude towards wind energy. The main benefits acknowledged are related to the creation of jobs, economic wealth, and minimisation of climate change effects. However, it is important to distinguish between the general acceptance at national level and the acceptance of specific siting decisions at local level.[7] While on a general level the European population is in favour of wind energy, and there is also a positive reaction from politicians (EU-wide, national, regional level), at local level wind park developers are often confronted with criticism and opposition for causing negative environmental effects, threats to well-being or to key economic activities, assets, future development and for creating an industrialised landscape in rural and natural areas.[8]

In **Denmark,** support in general to wind energy is high at regional and local level among the public, but opinions diverge regarding individual projects and their siting decisions. While some people support having wind turbines in their proximity, others oppose them fundamentally.[9]

According to an opinion survey performed in 2015 – 2017, the majority of **Ukrainian, Estonian,** and **Swiss** respondents were in favour of wind energy development in their countries and would not be disturbed by living within sight of a wind turbine. Projects with the smallest impact on local flora and fauna were most preferred. Wind parks in industrial and commercial zones and on agricultural land were preferred, rather than in ecologically significant regions or near residential areas. Local ownership was reflected to have a significant positive effect on acceptance. Direct participation of the local population in determining the number and location of wind turbines was connected to higher social acceptance.[10]

Although being one of the most cost-effective sources of renewable electricity, wind parks often face intense opposition from stakeholders, the general public in particular. Despite the numerous benefits acknowledged of using wind energy, the strong disadvantages of wind energy are perceived. The main arguments against wind energy include:

- negative visual impact – destruction of landscape e.g. viewshed, aesthetic aspects;
- impacts on the local ecosystem e.g. disturbance and fatalities of birds and bats, destruction of habitats, effect on fish routes (off-shore wind farms);
- annoyance e.g. noise, shadow flicker, low frequency vibration;
- possible health impacts e.g. electromagnetic interference, hearing loss; and,
- economic impacts on welfare e.g. decreasing property value, negative effect on tourism, inefficiency and high expenses for customers, etc.

Expansion of wind parks has caused strong reactions from local communities in many regions. Protests have intensified due to the increased proximity of wind turbines to people's habitats and their frequency on land, which has led to a disturbance of residential areas and negative reactions.[11]

Why do conflicts arise?

Reactions from stakeholders towards wind energy depend on the assessment of direct/indirect costs, potential risks and benefits. Most frequently, conflicts are related to the proximity of wind turbines to settlements - the closer they are, the greater the opposition from neighbouring stakeholders. Previous experience and the awareness (knowledge) level (e.g. on potential health effects) of people also play a role. There have been numerous protests against the construction of onshore wind parks,

particularly in those countries, e.g. the Netherlands, which already has limited surface areas and existing negative effects of wind turbines.[12]

Stakeholders who acknowledge the importance of RES in general are more positive towards the erection of wind parks in their communities. In addition, far from being purely rational, it is apparent that emotions play a significant role in several respects e.g. place attachment if people have symbolic associations with a particular landscape.[13]

Offshore wind parks, particularly if placed at least 16 km away from the shore and not visible from the coastline, appear to be more accepted. They are perceived to interfere less with residential areas or the environment as the onshore ones.[14]

Policy support and other contextual factors

Policy support for wind energy and renewable energy in general can help to increase stakeholder acceptance. Energy security, environmental sustainability and economic development are among the main policy drivers for widening the utilisation of renewable energy in the European Union. Having the binding target to obtain 20% of final energy consumption from renewable sources by 2020, the European Commission in 2016 published a proposal for a revised Renewable Energy Directive[15] to ensure that the target of at least 27% renewables in the final energy consumption in the EU by 2030 is met.[16] Along with the EU targets, the national government's ambitions and policies developed (renewable energy support mechanisms and limitations e.g. set back distances, noise limits) play a significant role in promoting or slowing down the penetration of wind energy and other renewables into the energy market.

Germany has set the target of 40-45% of electricity consumed in the country to derive from renewables by 2025. Both onshore and offshore wind energy shall play a crucial role for this expansion.[17]

Denmark is aiming to reach 50% wind energy contribution in 2020 and to reach renewable self-sufficiency by 2050.[18]

The Netherlands have an ambition to achieve an onshore wind capacity of 6,000 MW by 2020, i.e. to increase the existing capacity by over 3,000 MW. This goal could be reached by installing 1,000 - 1,500 new onshore wind turbines (in 2015, there were approx. 2,525 onshore wind turbines).[19]

Each region in **Belgium** has set its own targets for wind energy development by 2020 e.g., in Flanders, the authorities aim at increasing the share of onshore wind power to 1,063 MW by 2020.[20]

Besides communication and involving stakeholders as early as possible in the planning and development process of wind energy parks, it is important to ensure clear benefits to all stakeholders. There may be financial, economic and infrastructure-related benefits for local communities.[21] In order to secure social acceptance and support for wind energy production on a national level, several countries e.g. Germany, Denmark, the Netherlands have established procedures (participatory schemes)[22, 23] to ensure that the entire local population also benefits from wind energy. Experience has proven that if people participate with their own money e.g. in a wind power plant in their area, they will also support it.[24, 25, 26]

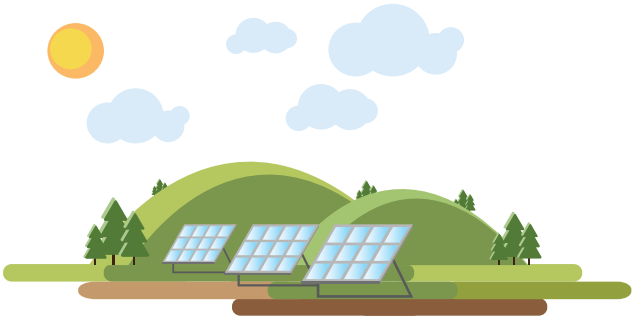
Citizens' energy cooperatives allow citizens to own a wind turbine. These cooperatives are formed mostly at local level but also at regional/interregional level. For example, there are more than 900 energy cooperatives across Germany.[27]

Feed-in tariff in Switzerland has operated since 2008 and granted for 20 years. The amount of funding differs depending on the technology used and the installed plant capacity.[28]

A special levy paid by wind park operators is calculated based on the height, the generation capacity and the electricity yield of the respective wind turbine. In addition, the operator pays **an annual fee** to be distributed to all municipalities within a certain radius.[29]

The co-ownership scheme – a certain percentage of the ownership shares of a wind park must be offered to residents with permanent residency in the municipality.[30]

It must be kept in mind that every wind energy project is unique and requires individual coordination considering the local conditions. People are not just motivated by payoffs. They also evaluate the allocation depending on their distributional effects and the symbolic value they attach to the local landscape. Thus, siting decisions most often cause problems of acceptance. In general, the community-owned wind farms are associated with more positive local attitudes than wind farms owned by commercial companies and, of course, financial compensation values tend to increase the acceptance of wind turbines.[31, 32]



1.2. Solar energy

Solar energy in Europe – facts and figures

Photovoltaic cells for the conversion of solar energy into electricity, solar thermal heating and cooling systems are the most common examples of technologies. In 2016, around 6% of total primary energy production of renewable energy was generated by solar energy in the EU-28.[33] Strong continued growth in the generation of electricity and heat by means of solar energy can be expected in the coming years, as several EU member states are choosing solar to meet their national binding 2020 renewables targets.[34] Germany, Italy, UK, France and Spain are among the largest producers of solar energy in Europe[35] while solar power in the three Baltic States, Sweden and Finland plays an insignificant role. Studies indicate that there is still a large unexploited solar energy potential in Europe.[36, 37]

Solar energy potential - defined as the physically available solar radiation on the earth's surface - has been studied thoroughly. The estimated solar potential is significantly reduced when technical, economic, social and environmental factors and constraints are considered. Large scale solar energy installations can be considered environmentally and socio-economically beneficial if the proper design, planning, siting and management is ensured, including evaluation of land availability, orientation and angle, population, transport network and the electricity grid. Being accepted by the public in general, innovative business models and appropriate incentive schemes are needed to compensate the high initial costs.[38]

Perception of solar energy

Opinion surveys show that residential solar energy is gaining increasing attention in many countries. This attitude is driven by acknowledgement of the environmental benefits (e.g. reduction of CO_2 emissions), cost savings, increasing local employment, energy independence, and reliability.[39] A European social survey "European attitudes towards climate change and energy"[40] carried out in 2016-2017 highlights that solar power has the highest level of support in Europe, particularly in Germany, Italy and France. People perceive solar energy as the best technology to affordably address climate change and to reach the EU's decarbonisation goal. It can be used in decentralised small-scale applications - rooftops, parking lots and building windows, thus allowing inhabitants to become small-scale solar players taking an active part in energy transition from fossil fuels to renewable energy. Several good practice examples of solar powered schools, homes and solar charging points for small appliances and electric vehicles are available from throughout Europe.[41] Along with technological developments, a significant increase in energy prosumers – citizens that both produce and consume their own energy - can be also predicted.

By providing significant environmental benefits, large-scale photovoltaic systems may also cause undesirable effects on land use, landscape and biodiversity. The main constraints are related to protected and sensitive nature areas, built-up areas, wetlands, water bodies and forests. Thus, idealistically they should be located on unused, low productivity agricultural and/or pasture land areas, degraded or contaminated land, sites with a poor, high saline concentration, severe erosion or contamination of heavy metals.[42]

Development of a large-scale solar power plant is a complicated, lengthy process, and the requirements are variable depending on the labour involved, the specific state and county of the development, and the circumstances of the development.[43]

Why do conflicts arise?

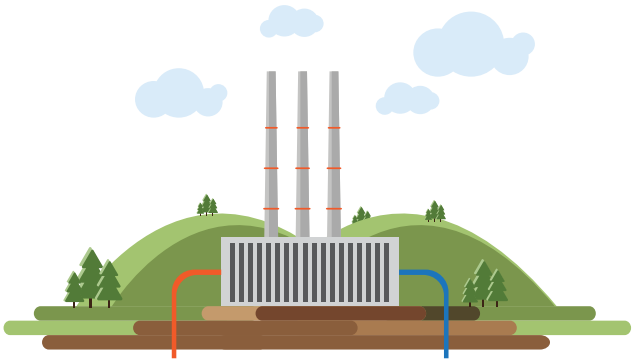
Solar plant installation projects in Europe do not usually create conflicts with stakeholders. Conflicts can arise about the siting of large-scale solar farms on land suitable for agriculture. Thus, involvement of stakeholders from the very early stages of planning the location of a solar plant is a prerequisite, to avoid conflict situations at a later stage of project development.

Policy support and other contextual factors

More ambitious policy visions for increasing the share of renewable energy in the EU (at least 27% in 2030) will mean a new push towards exploitation of solar and other renewable energy sources. The EU cohesion policy is one of the instruments used to promote solar energy and support the targets set by the Renewable Energy Directive (2009/28/EC). Many regions in Italy, Spain, France, the Czech Republic and Croatia have been allocated high volumes of EU funds to promote solar energy. In most cases, direct or indirect financial incentives are required to increase the commercial attractiveness of large-scale solar PV projects.

Several types of support mechanisms are applied e.g. feed-in tariffs, reverse auctions and tenders, marker-based instruments (e.g. quota obligations), tax incentives (e.g. reduced value added tax), soft loans, capital grants.

Application of the **feed-in tariffs scheme** has continued to be the most common instrument in Europe for boosting the utilisation of solar energy in many countries. Some countries have differentiated feed-in tariff schemes for rooftop and ground-mounted solar projects. Availability of policies that guarantee and facilitate connection and access of PV plants to the grid are important for PV projects.[44, 45]



1.3. Geothermal energy

Geothermal energy in Europe – facts and figures

Geothermal resources i.e. geothermal energy present in the earth in the form of heat, stored in rocks, trapped vapour, water or brine can be used directly to generate electricity or to provide thermal energy services (process heat, space heating and cooling). Geothermal energy contributes to around 3% of total primary production of renewable energy in the EU-28 countries.[46] The use of geothermal energy is steadily increasing in Europe, particularly in recent years, and is expected to play a significant role for reaching the EU 2030 targets. In 2017, the total installed geothermal electricity capacity in the European Union was 1 GW_e. Supported by construction of new district heating networks and retrofitting the existing ones, the use of geothermal energy for heating is also increasing. Geothermal heat has been recognised as a cost-effective solution to meet heating needs. Geothermal district heating accounts for 1.7 GWth of capacity in the European Union (198 plants in 2017). Italy, Iceland, Germany, France are among the countries with the highest growth in use of geothermal power. Besides large-scale installations, there are about 2 million units of individual geothermal heating systems (geothermal heat pumps) installed in Europe (more than 20 GW_{th} of heating capacity).[47]

Perception of geothermal energy

Surveys conducted in European countries e.g., Germany, Italy, have shown that views on geothermal energy are less formed in comparison to technologies for the use of solar and wind energy. There is still a lack of knowledge on technologies available and impacts on landscape, seismicity, gas emissions, economic and social impacts.[48, 49]

Exploitation of geothermal energy is usually associated with potentially positive effects on employment, environment, technology innovation, reduction of energy costs and independence from energy imports. However, there have been examples of social resistance, e.g. Greece against geothermal power projects (perception of impacts e.g., on tourism, protests about decisions on siting). At the same time, there are examples where local stakeholders have been continuously involved in the project design and implementation and become proud of having such new technologies applied in their region.[51]

Seismicity and damage through seismicity, but also noise pollution during drilling, construction and operation, visual impact during the construction phase (boreholes, pipelines) are among the major reasons for not accepting geothermal power. After seismic events related to geothermal energy plants e.g., in Germany in 2009, the opposition against geothermal power in the area affected increased greatly.[51]

Integration of renewable energies into the energy system cannot be reached with the opposition of stakeholders. Success in project development can only be achieved if there is support at all levels by affected stakeholders for the implementation of renewable energy projects. Acceptance can be reached through information, consultation, cooperation and participation.[52]

Why do conflicts arise?

Geothermal energy poses various advantages in comparison to other renewable energy sources. It is not dependent on wind or weather and thus reliable in its supply, it has nearly unlimited availability, could be operated 24 hours a day and can contribute to the production of base load power requirements.

The technological system (pipe system) may require large amounts of space, and there are difficulties in maintaining the equipment which is mainly based deep under the earth's surface. Additionally, there can be adverse environmental impacts through the release of potentially harmful or hazardous substances as a side product of this kind of energy production.[53] The risk geothermal energy projects are still facing is related to the exploration risk - carrying out costly drilling at the location, but not finding sufficient quantities of thermal water or the required subsoil temperatures for the economic implementation of a project. Moreover, the initial positive attitude towards geothermal power plants can change with time when the project reaches the drilling stage and installation of equipment and plants.[54]

Experts suggest not starting with geothermal development if a developer is not certain that the first project will be an absolute success, as initial negative impressions require a lot of effort, time and investments to be modified. Prior to starting project implementation, all elements of social acceptance within the local environment should be identified and proper solutions developed to overcome negative opinions, and proper strategies developed for promotion of benefits.[55]

Policy support and other contextual factors

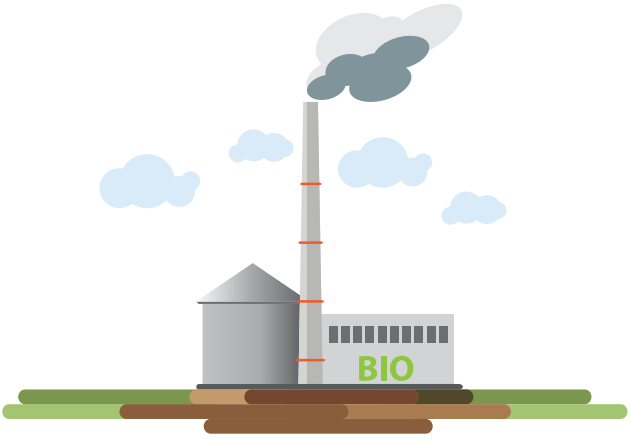
Geothermal installations require high capital costs; thus, several countries have introduced policy support instruments to enhance the uptake of geothermal technologies.

Germany has established a support scheme – **fixed feed-in tariff** for electricity generation using geothermal resources over 20 years.[56]

In France, a **renewable heat fund** has been established for funding operational projects – deep geothermal installations as well as heat pumps.[57]

In the Netherlands, a **renewable energy grant scheme** has been introduced to provide financial compensation to producers for the renewable energy they generate. Grants for fixed geothermal heat pumps in the Netherlands are available via the Sustainable Energy Investment Scheme.[58]

Any geothermal energy project needs to be planned individually, taking into consideration the geological conditions beneath the site. Similarly to other renewable energy sources, solutions for siting of small-scale installations can easily be found, while for the proposed locations for the construction of large-scale geothermal energy plants, preference should be given to remote or already industrialised areas. In this case the potential opposition from stakeholders is reduced.



1.4. Biomass

Biomass for energy in Europe – facts and figures

Biomass is a renewable energy source that can be used to produce electricity, heat and transport fuels. Solid biomass is most commonly used comprising wood materials, (e.g. wooden logs, chips, pellets, by-products of timber industry), solid agricultural waste e.g. straw and dry manure.[59] Around 64% of total primary energy production of renewable energy in the EU-28 in 2016 was generated from biomass[60] - mostly solid biomass - forestry residues and, to a limited extent, agricultural by-products. Traditionally, solid biomass has been widely used for heat and electricity production and the energy production and inland consumption has shown an increasing trend since 2000. Finland, Sweden, Estonia, Latvia and Austria are the leading countries regarding gross energy consumption of solid biomass. It can be predicted that the role of wood energy will remain significant along with improvement of technologies to make better use of the forestry potential.[61, 62]

Perception of biomass as an energy source

Opinion surveys carried out show that public acceptance in general towards bioenergy systems is lower than for some other types of renewable energies e.g. wind, solar. Acceptance of bioenergy in countries with high levels of biomass use e.g., Sweden, Austria is higher in comparison to countries having fewer biomass sources for energy production.[63]

According to EU legislation, production of energy from biomass is considered as carbon neutral, based on the assumption that the carbon released during the combustion of solid biomass will be re-absorbed during tree growth. Use of biomass for energy can also contribute to energy security but may have negative effects on the environment and health e.g. due to air pollution by particulate matter, adverse effects on soil quality e.g. due to an increase in energy plants, and biodiversity e.g. due to deforestation. Thus, following the principles of sustainability and the cascading use of biomass, combustion of biomass should be considered as a last step.[64]

Why do conflicts arise?

The severity of economic, social and environmental conflicts, impacts and constraints depends on the types of biomass used, localisation of plants and the extent of the involvement of various stakeholders in the decision-making process. Siting conflicts and public mistrust linked to unfamiliar technology or its performance, the socio-cultural context of the exact area, uncertain or unclear policy and regulatory frameworks are all influencing factors.[65]

Policy support and other contextual factors

Sustainability must be a prerequisite for energy production from biomass. In 2016, the European Commission updated the sustainability criteria for biofuels used in transport, bioliquids, solid and gaseous biomass fuels used for heat and power to be included in the revised Renewable Energy Directive.[66, 67] Aiming at substituting fossil fuels, several countries are putting more emphasis on the utilisation of biomass.

Finland has proposed phasing out the use of coal for energy by 2030. **Energy taxation** will be used to encourage primarily the use of forest chips and forest industry by-products for combined heat and power (CHP) production and the separate production of heat. **A feed-in tariff** is available, amongst others, for wood chip power and heat production plants.[68]

In Sweden, the use of biomass for energy production was expanded due to support by national energy policy tools and local municipal initiatives. For example, the **carbon tax system** has notably increased the cost of coal in production of district heat, and biomass became the cheapest fuel for this use. Introduction of **investment grants** and subsequent tradable **renewable electricity certificates** have promoted the use of biomass for electricity production.[69]

Depending on what choices are made regarding the types of biomass used, as well as where and how they are produced/grown, utilisation of biomass for energy production (particularly in large scale utilities) can affect economic and social aspects e.g. food security, land use and land ownership, agricultural and forestry development, as well as posing environmental concerns.

1.5. Biogas

Biogas in Europe – facts and figures

Since 2006, the European Union (28) has experienced a significant growth of biogas in primary energy production reaching 16.1 Mtoe in 2016. Production of biogas mainly takes place in methanation plants of various scales using different forms of feedstock e.g., manure, crop waste, but also energy crops (e.g. maize),[71] while the shares of landfills and wastewater treatment plants have reduced. Biogas production technologies have made substantial progress in recent years. As a result, by the end of 2014, there were already more than 1700 active biogas plants in Europe. The major output of biogas is concentrated in Germany, the UK, Italy, followed by the Czech Republic and France.

Along with utilisation of biogas for electricity and heat production, increasing attention is paid towards upgrading biogas to biomethane for utilisation as a biofuel in natural gas vehicles. Sweden and Germany are among the leading countries for the use of biogas fuel. Even though the use of energy crops for biogas production will be reduced, estimations show a significant potential to increase the biogas production to approx. 30-40 Mtoe in 2030. It is expected that biogas will contribute a large share of the EU renewable energy targets.[70, 71]

Perception of biogas as an energy source

Biogas production reduces waste streams in industry and municipalities. It helps to reduce greenhouse gas emissions e.g. associated with manure management and helps to substitute fossil energy sources. Together with environmental benefits, the production and utilisation of biogas helps to enhance energy security and self-supply. Along with wind and solar energy, biogas produced from manure and organic waste is in general perceived as a clean and sustainable option for energy production.[72] Negative environmental impacts are related to e.g. local photochemical ozone formation. Moreover, if energy crops (e.g. maize) are utilised for biogas production, this leads to environmental pollution related to the growing of these plants. Utilisation of non-food energy crops grown with a low agronomic input could help to solve this problem.

Why do conflicts arise?

The acceptance by local stakeholders towards the installation of new facilities for biogas projects differ from country to country. In some countries, e.g. Switzerland, due to the perceived benefits, cost balance, trust towards plant operators is relatively high, but in many other countries, groups of citizens establish committees to oppose such projects. Reasons for opposition range from the "NIMBY" aspect to different visions to achieve local sustainable development. Conflicts usually arise if the "benefits" are lower than the "costs", and not only in direct monetary terms e.g. reduced property prices and a tourism decrease, but also those related to odours, adverse landscape impacts (cultivation of monocultures e.g. maize), use of resources (food versus fuel), increased local traffic, noise etc.[73] The food versus feed discussion is an important issue in the Netherlands, Germany and Belgium.[74] At the same time, it is observed that non-acceptance is uncommon where local cooperative initiatives (i.e. community energy projects) have been established benefiting from the biogas production. Such initiatives are well-known in Denmark, Germany and Italy.[75]

Policy support and other contextual factors

The costs of biogas production (initial costs for installation of a plant) are generally above those of natural gas prices, thus several EU member states, e.g. Germany, Sweden, and Spain have introduced support systems e.g. investment subsidies, driving the considerable growth of biogas production.

Examples of **various incentives** include investment subsidies and loans, feed-in tariffs, green certificates, carbon tax, support for small-scale facilities, incentives for use of manure as feedstock, gate-fees for waste handling. In addition, there is also knowledge-oriented support e.g. biogas as part of manure handling strategies along with priority access to national electricity and gas grids, preferential conditions for gas-fuelled cars. Stability of policies, incentives and tariffs fixed for 15-20 years are considered as very important by investors.[76]

Similarly to other RES, prior to the development of a biogas plant, the most critical issues should be locally investigated, identified and addressed, involving the main stakeholders – consumers, neighbours, local politicians, plant operators, farmers, organic waste producers, biogas equipment designers, investors, and local energy suppliers. Stakeholder involvement from an early stage is desirable in order to gain project acceptance while dealing with the issues related to perceived costs, perceived benefits and trust in project developers.[77]

2. Elaboration of plans for stakeholder involvement

The purpose of stakeholder involvement is to unfold the potential for production and utilisation of renewable energy sources by considering regional/local circumstances and by gaining social acceptance. Stakeholders can be defined as being the persons or groups that are directly or indirectly affected by renewable energy projects, have an interest in these projects or can influence their outcomes – either positively or negatively.[78,79] Seven major stakeholder groups related to renewable energy projects can be distinguished: public authorities (policy and decision-makers), energy producers, investors, professional associations, experts (consultants), environmental NGOs, and citizen/society groups. Depending on the goals of renewable energy projects, stakeholders from national, regional and local level should be involved.

There are three main steps to be undertaken for engaging with stakeholders: 1) the identification of key stakeholders (stakeholder mapping); 2) interaction with stakeholders (direct and/or indirect); 3) evaluation of stakeholder involvement (feedback from stakeholders) (see Figure 2.1.).

Step 1. Stakeholder mapping includes identification (desk research) and initial contacts (e.g., interviews) with stakeholders at national, regional/local level to assess their interest, influence and importance in renewable energy development and for gathering insight on the relative importance of specific environmental, social and governance issues. The insight is valuable for strategic planning, operational management and capital investment decisions. It serves as a strategic tool that can provide support when prioritising, organising and planning, as well as in communication, in different phases of the RE development.

Step 2. Once stakeholders have been identified, their roles and interests acknowledged, appropriative (innovative) methods and tools are selected for the further interaction and engagement of stakeholders. Selection and application of methods or approaches is case-specific and largely depends on issues to be resolved concerning RE projects. In addition, several contextual factors (legislative, socio-economic, technological, environmental, resources, previous experiences etc.) are important constituents for the implementation and largely determine the selection of tools and methods for interaction with stakeholders. In addition to this, there are a few preconditions (e.g., time for interaction, outreach, performance) to be kept in mind about stakeholder involvement.

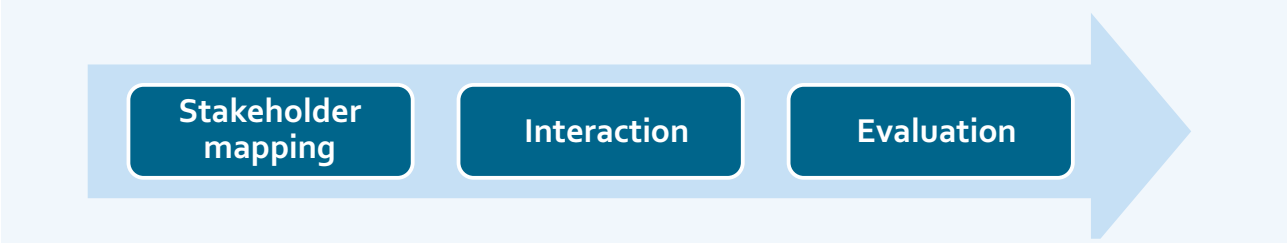


Figure 2.1. Three main steps for planning stakeholder involvement

Key preconditions for successful interaction with stakeholders:

- Early (timely) involvement
- Bilateral level -> Core group -> Larger outreach
- Exchanging information -> Building understanding -> Feedback -> Ensuring participatory engagement

Early participation and involvement of stakeholders is a prerequisite for increasing acceptance and avoiding potential conflicts in future. Involvement of stakeholders, particularly from local communities, in the planning of renewable energy projects prevents conflicts arising that can cause delays, additional costs, legal issues or even jeopardise the project. Overall strategic management of all stakeholders (starting at bilateral level, establishing a core group of active stakeholders up to the larger outreach of a wider stakeholder group) should prevail in the communication activities.

There are 4 sequential stages of stakeholder involvement relevant when developing a renewable energy project: [80]

- **Exchanging information** on the potential development of the RE project, giving opportunities for input and shaping of the project;
- **Building understanding** – allowing people to give informed opinions, myth-busting, overcoming perceptions;
- **Feedback** – ensuring that opinions are exchanged, heard and considered;
- **Ensuring participatory engagement** by offering e.g. shared ownership schemes, co-operatives.

There are five general principles in communication with stakeholders[81] that should be respected at all stages of stakeholder involvement to minimise the risk of conflict situations:

Openness	**Share** all relevant information with stakeholders!
Inclusiveness	**Interact** with all stakeholders!
Responsiveness	**Listen** to the community and stakeholder concerns!
Accountability	**Monitor, evaluate, ensure participation** in debates!
Flexibilty	**Be open** to amendments and local requests!

Communication should solve conflicts but requires effort from all parties involved. Passivity from both sides of the opposing parties will not result in problem-solving. Also, if one side is able to express its views and actions more strongly, the «winner» demonstrates its power, but the «loser» stays dissatisfied. Constructive communication should lead to mutual respect and rely on sound arguments. It is advisable to turn a potential confrontation into a conversation about the future!

Step 3. Evaluation (e.g., in the form of a questionnaire) is an integral part of the stakeholder involvement process. It should include reflections from the stakeholders evaluating the proceedings, goal setting, results and outcomes, satisfaction/ meeting of expectations and at the respective level of innovation. A self-adopted approach for evaluation of stakeholder involvement can be developed in each case individually.

The following chapters reflect on the approach implemented in the BEA-APP project in pilot regions.

2.1. **Step 1:** Case-specific identification of stakeholders

Mapping of the stakeholders involved in the decision-making on renewable energy projects was performed at the early stage of the project, in all regions participating in the BEA-APP project.[82] A **guide and a pre-designed template of stakeholder maps** complemented with instructions for stakeholder mapping and sample templates was prepared. Eight stakeholder groups – "Public authorities", "Energy producers", "Investors", "Experts (consultants)", "Environmental NGOs", "Professional associations", "Citizen/societal groups", and "Others" with a role in the decision-making on renewable energy projects were distinguished.

GUIDE for stakeholder mapping

- Please select the relevant stakeholder group from the pre-defined list of stakeholders. Indicate the institution/department/organisation/company representing the selected stakeholder group. Note their Internet homepage.
- Indicate by marking with (x) the role(s) of the institution/department/organisation/company with respect to RE projects and/or spatial planning.
- Describe briefly their role(s).
- Indicate by marking with (x) on what bases the institution is undertaking its role(s).
- Describe briefly the responsibilities.
- Indicate and describe cooperation of the institution with stakeholder group(s) e.g., public authorities, energy producers, investors, experts (consultants), professional associations, environmental NGOs, citizen/societal groups, others.
- Indicate the details of a contact person from the relevant institution/department/organisation/company who may be contacted further and interviewed on the RE project and spatial planning.

Template (Excel sheet) for stakeholder mapping:

Country	Region	RES topic	Relevant project(s) in the region	Status of the project
			1.	
			2.	
			3.	
			4.	
			5.	

Stakeholder group	Institution/ Department/ Organisation/ Company & website	Role of institution						Description of the role	Responsibilities				Description of responsibilities	Cooperation with other stakeholder groups	Contact person (name, surname, tel, e-mail)
		Initiation	Consultancy	Planning	Financing	Implementing	Other		Voluntary	Compulsory	Advisory	Other			

By performing desk research, partners in the regions identified stakeholders and analysed their interest and influence in RE projects. Information was collected from publicly available sources. The role of each stakeholder (or a stakeholder group) and existing co-operation interlinkages were identified. In addition, **targeted interviews** were performed to check and complete the communication routes and to analyse the interest and influence of stakeholders representing various stakeholder groups on RE projects in the region. Among other issues, the interviews highlighted the need for improvement of the communication expressed by stakeholders. The information and knowledge obtained helped the project partners plan further communication and involvement of stakeholders in the RE pilot projects in their regions.

GUIDE for stakeholder interviewing

The structured interview aims to:

- Check and complete the communication routes related to the roles and involvement of stakeholders in decision-making for the RE project(s);
- Analyse the interest and influence of these stakeholders on RE projects in the region by elaborating on communication aspects and by identifying the needs for improvement.

Interview questions:

1. How would you describe the level of involvement of your organisation/institution in the decision-making process of the respective RE project? *Please indicate the involvement e.g., in the public hearing, working groups, commenting on drafts, actual decision-making, etc.*

2. With which of the other stakeholder groups did you communicate during the decision-making for this RE project? *Please indicate the organisations and the possible reasoning for this, e.g., required by official procedure, your interest, need for expertise, direct invitation from the other stakeholder?*

Stakeholder group	Communication partner (If Yes, please name them /No)	Reasons for communication (or non-communication)
Public authorities		
Energy producers		
Investors		
Experts (consultants)		
Professional associations		
Environmental NGOs		
Citizen/ societal groups		
Other		

3. With which of the stakeholders was the communication good? *Please indicate the strong points, e.g., common vision and aims, interest from the other stakeholder, etc.*

4. With which of the stakeholders was the communication difficult or deficient? *Please indicate the possible reasons, e.g., low interest, contradictory aims to the RE project, etc.*

5. From your experience, what would be needed to improve the communication for a comprehensive decision-making process? *Please indicate the possible approach.*

2.2. Step 2: Case-specific interaction with stakeholders

Interaction with stakeholders in the BEA-APP project has been performed by the project partners mostly by organising various events in the respective project regions. Various round table discussions – regional dialogue meetings, workshops with key stakeholders took place in all pilot regions. Collection of experiences and lessons learned from stakeholder involvement were organised in project pilot regions as a continuous process, where the project partners were asked to reflect on the event by preparing meeting reports.

A pre-designed template for the stakeholder meeting reports was used. Project partners reflected on: (i) title, purpose, date and place of the event; (ii) number of participants and stakeholder groups participating; (iii) main topics discussed; (iv) possible conflicting issues; (v) tools and methods used for the discussion; (vi) main outcomes, agreements and non-resolved issues; (vii) feedback from participants and organisers on planning and implementation of the regional RE project (e.g., acceptance, resistance, worries, concerns); and (viii) the next steps with regard to further stakeholder involvement (e.g., next meetings, consultations). Stakeholder meeting reports were prepared by the respective project partners and subsequently sent to BEF-Latvia. Reflection on stakeholder meetings was summarised to obtain an overview of communication with stakeholders in the project regions.

Experience from stakeholder involvement in the pilot project implementation was compiled by the project partners. A poster presentation was prepared in a pre-designed template to reflect on cooperation links with stakeholders, tools and methods used for stakeholder involvement and the main outcomes.

Sample template for report from meetings with stakeholders

Tittle of the event	
Purpose of the event	
Date	
Place (region & town)	
Number of participants	
Stakeholder groups participating	
Main topics discussed	
Were there any conflicting issues? *Please specify…*	
What tools and methods were used for the discussion? *Please specify…*	
What have been the main outcomes /agreements/ non- resolved issues? *Please specify…*	
Feedback from participants/organisers on planning/implementation of the case-specific RE project (e.g., acceptance, resistance, worries, concerns)	
What are the next steps with regard to further stakeholder involvement (e.g., meetings, consultations)?	

Compilation of a set of short summaries reflecting the key issues related to the discussion at each event is sufficient to reflect on partnerships when addressing stakeholders. However, the template for the report should include reflection on any conflicting issues raised, the main outcomes, agreements and non-resolved issues, as well as an overview on feedback from participants or organisers on planning or implementation of the case-specific RE project, e.g., on acceptance, resistance, worries and concerns. It is also important to indicate the next steps with regard to further stakeholder involvement, e.g., meetings, consultations.

2.3. **Step 3:** Evaluation of the stakeholder involvement process

The stakeholder involvement process was organised during the implementation of pilot projects in the BEA-APP project partner regions. The structured evaluation was aimed towards obtaining the view from both – the project partners and the key stakeholders involved in the pilot project of each region. The evaluation template was designed with pre-defined questions. This template was aimed towards reflecting the respondent`s evaluation on the stakeholder involvement process, goal setting, results and outcomes from the process, as well as the reflection on satisfaction – meeting expectations and on the level of innovation of stakeholder involvement. In addition, respondents were asked to share their impressions or stories about the stakeholder involvement in the pilot project in their region. The completed evaluation forms were compiled and analysed to highlight the communication experience of the stakeholder involvement process in RE projects (see sample template for evaluation questionnaire).

Sample template for evaluation questionnaire

Your evaluation on the stakeholder involvement process

1. How effective do you consider the methods and tools used to motivate and involve stakeholders in the pilot case of your region?

1 - Low effectiveness	2	3	4	5 - High effectiveness

2. How effective do you consider the involvement frequency of stakeholders to address the pilot case in your region?

1 - Low effectiveness	2	3	4	5 - High effectiveness

3. To what extent do you consider that the stakeholder involvement approach motivates innovative thinking and initiatives in your region?

1 - Low motivation	2	3	4	5 - High motivation

Your evaluation on goal setting

1. How effective do you consider your individual contribution to be towards the goal setting for the pilot case in your region?

1 - Low effectiveness	2	3	4	5 - High effectiveness

2.To what extent do you consider that the stakeholder participation has helped to shape the goal of the pilot case to meet the local needs?

1 - Negligible	2	3	4	5 - High

Your evaluation on results and outcomes from the process

1. How effective do you consider your individual contribution to be towards achieving the results in the pilot case of your region?

1 - Negligible	2	3	4	5 - Highly effective

2. To what extent you consider that the stakeholder participation has helped to achieve the results in the pilot case of your region?

1 - Low extent	2	3	4	5 - High extent

Your evaluation on satisfaction – meeting expectations

1. How satisfactorily have your individual ideas and contributions been considered for the pilot case in your region (i.e. the extent that your needs and requirements are traceable in the co-planning process and developed plan)?

1 - Not satisfactory	2	3	4	5 - Very satisfactory

2. How satisfactory do you consider the capacity of stakeholder participation to be towards influencing the innovative planning and the decision-making of the pilot case in your region?

1 - Not satisfactory	2	3	4	5 - Very satisfactory

3. How satisfactory do you consider the extent of openness to be in stakeholder collaboration during the planning and decision-making in the pilot case of your region?

1 - Not satisfactory	2	3	4	5 - Very satisfactory

Your evaluation on the level of innovation in stakeholder involvement

1. To what extent do you consider that the stakeholder involvement approach applied in the pilot case of your region was innovative by using a user-centric approach and co-creation?

1 - Low extent	2	3	4	5 - High extent

2. To what extent do you consider that the stakeholder involvement approach applied in the pilot case of your region was innovative by taking additional steps beyond the formal stakeholder involvement procedures?

1 - Low extent	2	3	4	5 - High extent

Your impressions/stories about the stakeholder involvement in the pilot case of your region

A convenient evaluation procedure for respondents is by giving individual scores, e.g., from 1 to 5 assigned to each question of the survey questionnaire. Lower scores usually correspond to less effectiveness, motivation, low extent or satisfaction, while higher scores are attributed to high effectiveness, motivation, efficiency, high extent or satisfaction. The average score calculated for each evaluation question from the number of individual answers from respondents can be used as an indication of the effectiveness, satisfaction and extent of implementation of different aspects during the stakeholder involvement process. For example, >4.5 - very good, 4.0-4.5 – good, 3.5-4.0 - medium, and <3.5 - moderate. The comparison is useful to highlight the perspective and acceptance of RE project development by various stakeholder groups.

2.4. Checklist for stakeholder involvement

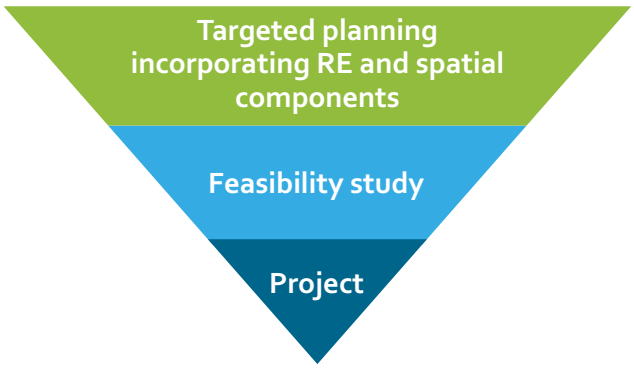
Based on the experience of the BEA-APP project and implementation of pilot projects, a checklist has been developed. It reflects the main items to be considered for planning stakeholder involvement in RE development (see Table 2.2).

Table 2.2. Checklist for stakeholder involvement.

Question	Yes	No
◄ Have you identified the main stakeholder groups relevant to your RE development plan/project?	❐	❐
◄ Do you know their role, responsibility and interest towards your RE development plan/project?	❐	❐
◄ Have you assessed case-specific context factors (legislative, socio-economic, etc.) for stakeholder involvement?	❐	❐
◄ Have you considered multi-stakeholder (public, private, civic) involvement and application of a multi-disciplinary approach?	❐	❐
◄ Have you selected a combination of tools and methods for stakeholder involvement?	❐	❐
◄ Have you elaborated a schedule for direct and/or indirect interaction with your stakeholders to ensure early involvement and regular interaction?	❐	❐
◄ Have you planned the procedure for receiving feedback from your stakeholders on their satisfaction with regard to their involvement and outcomes of the interaction process?	❐	❐

3. Innovative methods and tools for stakeholder involvement

Approaches to stakeholder involvement may differ depending on the implementation stage of renewable energy and spatial planning activity (i.e. targeted planning of RE development in the region/municipality – action plan; feasibility study; implementation of RE project). To increase acceptance, stakeholder involvement should take place throughout the whole planning and implementation process of renewable energy projects.

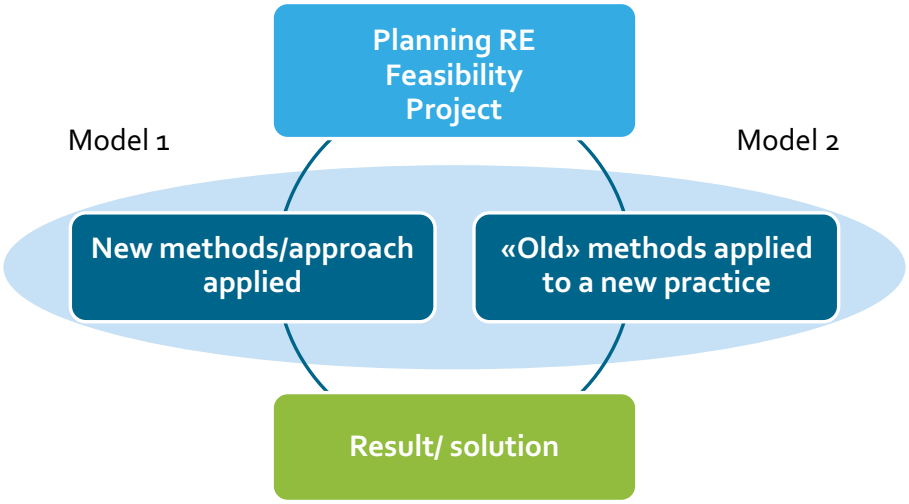


The BEA-APP project sees the innovation by stakeholder involvement in two ways: (i) by employing new methods and approaches, and (ii) by applying convenient "old" methods to a new practice on the way to achieving the desired result. The common feature for innovation is dynamic interplay with stakeholders.

Application of **new methods and approaches** requires a user-centric approach (stressing the importance of users i.e. stakeholders in activities). It calls for widening stakeholder roles from passive informants into co-creators. A combination of communication methods and tools should be considered e.g., Living Labs, crowdsourcing, open innovation, visioning.

Application of **"old" communication methods** requires gradual intensification of stakeholder involvement from the early phase of RE development planning to prepare stakeholders for collaboration at later stages. In practice, this means taking additional steps beyond the formal stakeholder involvement procedures (e.g. defined by legislation).

Innovative stakeholder involvement approaches should be grounded on three key principles: (i) systems perspective, (ii) adoption capacity and (iii) enabling practices to implementation. Experience from the BEA-APP project pilot projects allows participants to draw on guidance of methods applicable.



3.1. Systems perspective

Systems perspective is tailored to create a framework for addressing stakeholders, i.e., turning away from the *ad hoc* activities to a systemic implementation approach. The innovative form of stakeholder involvement is built on a user-centric approach with application of co-creation and co-planning concepts, multi-stakeholder and multi-disciplinary approaches. Interactions between stakeholders identified in each specific case from public, private and civic sectors are the key pre-requisites. We have distinguished the stakeholder involvement in RE project development at the planning phase by development of the action plan or initiative, executing feasibility / preparatory studies and the implementation phase of the action plan or the design projects. The stakeholder involvement approaches and steps are quite specific to the different RE project development stages.

Innovative form of stakeholder involvement constitutes application of co-creation and co-planning concepts, multi-stakeholder and multi-disciplinary approaches ensuring interaction between public, private & civic sectors.

A successful framework for addressing stakeholders requires a feedback loop option where stakeholders involved in the co-creation and co-planning process are invited to evaluate the full involvement. This provides evaluation of the process, goal setting, results and outcomes, satisfaction or meeting of expectations, and the level of innovation. The structured evaluation is aimed towards obtaining the view both from the project partners and the key stakeholders involved in the pilot case of each region. An evaluation template that includes questions to reflect on the most important aspects is advisable to collect compatible responses from various stakeholders. There are plenty of options, e.g., questionnaires in paper or online form, telephone interviews, face-to-face interviews, to secure a number of responses to assess.

Table 3.1. Checklist for systems perspective in stakeholder involvement

Question	Yes	No
◄ Have you planned the systemic involvement of stakeholder groups relevant to your RE development plan/project?	❐	❐
◄ Have you identified the main stakeholders from multi-disciplinary fields relevant to your RE development plan/project?	❐	❐
◄ Have you approached stakeholders from various sectors (public, private, civic) to be involved in your RE development plan/project?	❐	❐
◄ Have you identified the RE project phase (targeted planning of an action plan/initiative; feasibility/ preparatory studies; implementation of a project)?	❐	❐
◄ Have you planned the stakeholder involvement approach and combination of tools and methods to the case-specific RE project phase?	❐	❐
◄ Have you planned the structured evaluation of stakeholder involvement in the co-creation and co-planning of the RE project?	❐	❐
◄ Have you developed the means (e.g., online questionnaire, face-to-face meetings) for obtaining feedback from your stakeholders and the procedure for evaluation of various aspects of their involvement?	❐	❐

3.2. Adoption capacity

Adoption capacity is understood as allocation of enough resources and capacity to approach and involve stakeholders through mutual or formalised partnerships. These partnerships, however, should be supported by individual ideas and contributions from stakeholders. Methods for addressing stakeholders can differ by the implementation phase of the renewable energy and spatial planning projects.

A pre-requisite to increased adoption capacity is the involvement of an appropriate network of experts, both on planning and renewable energy topics. The process of involvement of stakeholders should be sufficiently coordinated and monitored (e.g., by the assigned co-ordinator, core group of stakeholders). The backbone of **indirect involvement** of stakeholders is providing and receiving information through distribution of informative leaflets/queries and using the options offered by various IT tools. The backbone of stakeholder collaboration through **direct interaction** is a series of meetings of different scales and a combination of communication tools and methods applied. Based on experience from the BEA-APP project on implementation of pilot projects and stakeholder involvement in pilot regions we can summarise the approaches applied (Table 3.2.).

Table 3.2. Types of direct interaction with stakeholders

Type of direct interaction	Aim of the direct interaction	Applicability
Small-scale events (up to 10 participants)	◀ Used to address the key group of stakeholders	◀ The core group of stakeholders keeps an overview on the implementation process ◀ Expert(s) provides consultation on specific topics ◀ Discussions on addressing possible conflicts between stakeholder groups
Medium-scale events (a few dozen participants)	◀ To exchange information and knowledge ◀ To address a wider range of participants	◀ Ensures interactive communication by various methods and tools: presentations and discussions at plenary and group sessions; mind-maps and World Café arrangements; consultation by a survey; application of visualisation tools and "take-away" materials
Large-scale events	◀ To address wide and diverse target groups, e.g., inhabitants	◀ Providing objective information by on-site visits to similar facilities and hands-on experience of operational practices

Stakeholder meetings are a good opportunity to collect the views of various stakeholders during the involvement process. Therefore, it is highly advisable to keep well defined and documented reports from the stakeholder meetings (and other events) in addition to the expert's technical reports on technological RE project development and implementation aspects.

Table 3.3. Types of indirect interaction with stakeholders

Type of indirect interaction	Aim of the indirect interaction	Applicability
Informative leaflets/queries	◀ Provide information and receive feedback from smaller groups of stakeholders	◀ Raising awareness on the planned development and activities
Online platforms	◀ Provide information and receive feedback from a broad audience	◀ Obtaining an overview on the general interest of stakeholders in the topic

Table 3.4. Checklist for adoption capacity in stakeholder involvement

Question	Yes	No
◀ Have you allocated sufficient resources for direct and/or indirect interaction with stakeholders relevant to your RE development plan/project?	❐	❐
◀ Have you identified a network of experts on planning and RE topics to cover at the stakeholder involvement events, e.g., meetings, consultations?	❐	❐
◀ Have you considered coordination and monitoring of the stakeholder involvement, i.e., by assigning a coordinator, setting up a core group?	❐	❐
◀ Have you planned a series of events of different scales for adequate stakeholder involvement in the RE project phase (planning of an action plan/initiative; feasibility/preparatory studies; implementation of project)?	❐	❐
◀ Have you developed a template for documented reports from the stakeholder meetings and other stakeholder events?	❐	❐
◀ Have you considered reflections on any conflicting issues raised, the main outcomes, agreements and non-resolved issues in the report?	❐	❐
◀ Have you considered reflections on feedback from participants or organisers on planning or implementation of the case-specific RE project, e.g., on acceptance, resistance, worries and concerns?	❐	❐

3.3. Enabling practices

Enabling practices are tailored to best address the stakeholder needs and expectations, including the capacity building of target groups on spatial planning and renewable energy aspects. This involves objective information packages for various stakeholder groups, particularly civic organisations and inhabitants. However, stakeholders have to value and accept the information provided, which may depend on their opinion about the source of expertise[83].

Table 3.5. Types of info packages for interaction with stakeholders

Type of info package	Aim of the info package	Applicability
Set of handouts	To support the background information	◀ Materials from presentations
Visualisation	To highlight and illustrate the proposed solutions (e.g., technical design)	◀ 3D models ◀ Interactive maps ◀ Posters reflecting implementation steps and outcomes
Hands-on experience	To learn from similar experiences at similarly designed objects	◀ Site visits to similar RE objects e.g. plants, installations

Some training elements are present during the on-site visits and hands-on approach. Tailored sets of handouts and attractive visualisation methods are suitable to enhance stakeholder involvement.

Table 3.6. Checklist for enabling practices

Question	Yes	No
◀ Have you considered elaboration of targeted info packages tailored to different stakeholder groups relevant to your RE development plan/project?	❐	❐
◀ Have you approached experts for preparation of info packages and presentations relevant to your RE plan/project in order to cover specific technological and financial aspects?	❐	❐
◀ Have you briefed experts on specific target groups as receivers of information in order to convey the best message?	❐	❐
◀ Have you planned to use IT tools to highlight and illustrate the proposed solutions to stakeholders?	❐	❐
◀ If you are planning learning from similarly designed objects, have you selected and approached such facilities for site visits?	❐	❐

3.4. Stakeholder involvement in targeted planning of renewable energy development at regional and local level

The key of the targeted planning stage of renewable energy development at regional/local level is to elaborate a conceptual policy document (e.g., a renewable energy development plan/action plan) for implementation of targeted actions to reach the policy goals within a certain time period e.g., 5 years. Spatial planning and renewable energy development should be based on assessment of the needs, availability of resources (energy, land, financial, human), socio-economic, technological and environmental conditions. Depending on the goals, targeted planning of renewable energy development can take place involving stakeholders from national, regional and local level.

Spatial coverage	Stakeholder coverage	Desired outcome	Setting
Regional Local	National Regional Local	Plan	Conceptual

Several sequential steps can be distinguished during the targeted planning of renewable energy development at regional/local level (see Figure 3.1.). Implementation of each step can benefit from stakeholder involvement.

As described previously, the innovative approach of stakeholder involvement during the planning stage applies co-creation and co-planning concepts for interaction between various stakeholders representing the public, private, and civic sectors. All these sectors are interdependent and necessary for implementation of renewable energy policies, plans and measures.[84]

Possible key issues to address during the targeted planning of RE development:

- To perform the **materiality assessment** identifying and engaging the stakeholders at national, regional/local level to assess their interest, influence and importance in renewable energy development and for gathering the insights on the relative importance of specific environmental, social and governance issues;
- To establish a **multi-stakeholder, multidisciplinary co-operation** (e.g., Living Lab) and the coordination (core) team responsible for steering the joint work;
- To develop a **central vision, goals and targets** for renewable energy development at regional/ local level;
- To elaborate **scenarios and pathways** for meeting the goals;

Figure 3.1. Sequential steps in targeted planning of renewable energy development

- To develop a **plan** identifying measures (e.g., institutional infrastructure, resources, renewable energy projects) to be implemented;
- To identify the learning needs and organise **experiental learning** for stakeholders involved in elaboration of a renewable energy development plan to increase their capacities and know-how;
- To ensure **public participation** for comments on the draft renewable energy plan;
- To ensure **progress monitoring and adjustment** of the renewable energy plan.

Various innovative methods and tools can be applied for stakeholder involvement at various steps (phases) of the targeted planning of RE development.

planning as well as in communication, in different phases of the development and implementation of an energy plan. Materiality assessment starts with identification of stakeholders (stakeholder mapping) – being an important step for further stakeholder involvement in renewable energy development planning. Different stakeholders may have different power (role) and interests.

Further steps of materiality assessment comprise: establishing initial contacts with selected stakeholders, identification of social, economic and environmental indicators to measure, involving stakeholders in performing the rating of the importance and impact of each indicator (collection of insights e.g., by a survey), performing joint review of results, analysing the insights and comments, putting insights into action e.g., in the renewable energy plan. [85, 86]

Scanning	Central vision	Scenarios & pathways	Plan development	Acceptance	Follow-up
Materiality assessment:	**Setting main goals and targets:**	**Elaborating scenarios & pathways:**	**Selecting measures & projects:**	**Obtaining feedback:**	**Progress monitoring & adjustments:**
- Living Labs & core team - Online collaborative platforms	- Guided visioning - Crowd-sourcing	- Mind mapping - Role playing	- Experiental learning	- Public hearings - Online collaborative platforms - Story telling	- Living Labs - Online collaborative platforms

Scanning

The scanning phase of targeted renewable energy development planning and stakeholder involvement should start with **materiality assessment**. Materiality assessment is an exercise in stakeholder engagement designed to gather insights on the environmental, social and governance issues that matter most to the stakeholders involved. The insights are valuable for strategic planning, operational management and capital investment decisions. It serves as a strategic tool that can provide support when prioritising, organising and

How?

Early involvement of various stakeholders considering different interests and needs is a prerequisite for the successful outcome of renewable energy development planning. Thus, multi-stakeholder and multidisciplinary co-operation approaches must be applied from the very beginning of RE development planning up to monitoring the progress of implementation and elaboration of adjustments after a certain time period.

Living Labs

Establishing a **Living Lab** is one of the possible ways to implement this approach in practice. Living Labs (LLs) are user-centred, open innovation systems applying a systematic user co-creation approach, integrating research and innovation processes in real-life settings. LLs operate as intermediaries among various stakeholders for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. [87, 88] A coordination team should be established to steer the work process of the Living Lab. [89] Common elements of Living Labs are active user involvement, real-life setting, multi-stakeholder participation, multi-method approach, and co-creation.

Another possible option to enable interaction with various stakeholders is through a website or virtual space. Creation of **online collaborative platforms**[90] allows users to communicate, share information and work together, at the same time providing transparency, participation and collaboration. Such platforms can also allow for constant feedback to stakeholders about how their input is being used.

Developing a central vision

After the problem and situation analyses have been completed, needs and priority issues identified, elaboration of a central vision, the main goals and targets is an important step forward for the RE development planning. Stakeholders should formulate a shared vision of the future with respect to production and utilisation of renewable energy sources for the envisaged time period.

How?

Guided visioning

Guided visioning is a participatory tool that is used to assist a group of stakeholders in developing a shared vision of the future. Implementation of this tool requires bringing stakeholders together to develop written and visualised statements of a community's long-term goals and strategic objectives in the field of renewable energy. Visioning allows stakeholders to assess where they are now and where they can realistically expect to be in the future. By asking guiding questions, visioning allows all the involved stakeholders to express their wishes regarding future development. The visioning should be implemented before the decisions are made. Application of this tool requires time to bring all the stakeholders together and the duration of the process depends on the complexity of issues. In addition, implementation of the visioning needs persons who can lead the process and are experienced in applying this tool.[91]

Crowdsourcing

Crowdsourcing is another participatory tool used to involve large group of citizens to create a future vision of a region or a city. Rather than relying on a small group of stakeholders, crowdsourcing is a practice to engage a 'crowd' – thousands of people to express opinions, share ideas for a common goal and to collectively contribute with ideas, expertise, etc. It is powered by the Internet, social media and smartphone apps. It can be applied at various levels and fields to empower citizens and give a greater voice to people. Advantages of this tool include cost savings, speed and the ability to involve people from various locations and with different skills and expertise [92]

Development of scenarios and pathways

Having set the goals and targets, the further step in planning renewable energy comprises development of scenarios and creation of pathways for how the defined goals will be reached. This stage will benefit from the utilisation of stakeholders' expertise and creativity.

How?

Mind mapping

Mind mapping is a brainstorming tool used to build connections around the central element with the help of images for the problem-solving or decision-making. [95] This exercise allows bringing ideas to life by creating a visual map of various thoughts, to identify correlations, and see the "big picture". There are many mind mapping web apps, but the easiest way is to use a pen and paper. Visualization of interlinkages allows the creation of new ideas without forgetting the ideas previously expressed. [94, 95]

Mind maps have great applicability at the early stages of planning RE development, when creativity for establishing the pathways for reaching a certain goal is particularly necessary. There may be several ways to achieve the goals of the central vision. By not thinking creatively in the early stages, RE development planners may close themselves off from other attractive options. During a mind mapping session, a group can brainstorm about ideas for meeting the defined objectives. Mind maps can also help to elaborate the work breakdown structure of the pathways in more detail. Once the mind maps are developed, there should be a few people who analyse, consolidate, and generally organise the ideas they contain. The second round of group discussions should allow clarification and completion of the mind map to convert it into an outline. [96]

Plan development

The development of a RE plan requires, among others, identification of measures, risk assessment, selection of the institutional infrastructure responsible for further implementation, allocation of resources (financial, man-power, etc.), responsibilities and last, but not least, identification of potential RE projects to be implemented at regional or local level. For this purpose, there may be a need to increase the stakeholder knowledge and capacities related to renewable energy or spatial planning. Identification of the learning needs of stakeholders e.g., by performing a survey at an early stage is important; subsequently the most appropriate methods for capacity building can be selected.

How?

Experiental learning

Experiental learning (learning-by-doing) is the learning process through participation rather than by listening to a lecture or by reading a book or article. [97] Experiental learning helps to develop the hands-on skills of the stakeholders. It requires the involvement of professionals from relevant sectors to steer the learning process, organisation of site-visits to RE energy projects, demonstration of technologies, etc. [98]

Acceptance

Once the draft RE development plan has been elaborated, it needs to be communicated to a broader audience of stakeholders – the general public. Various methods and tools can be used to ensure public participation – organisation of public hearings (info days), publishing the document on the Internet homepage of the respective competent authority, etc. Feedback from the general public can also be obtained through online collaborative platforms, as described earlier. The way in which

the message is communicated plays an important role in gaining understanding from the audience and acceptance of the envisaged RE plan.

How?

Storytelling

Storytelling is a two-way interaction between the information provider - someone telling a story, and recipient(s) - one or more listeners. It can be a powerful tool for communicating messages and engaging audiences. This method (embedding knowledge in a narrative storyline) can be applied to explain complex research results and can increase engagement of the society in the implementation of evidence-based decisions. Storytelling should be easily accessible and should not require the audience to have expert knowledge to understand and associate the information conveyed with the knowledge communicated previously through media TV, radio, etc. [99, 100]

Follow-up

Renewable energy development plans have a certain time frame for implementation. Nevertheless, it is important that regular progress monitoring takes place allowing reflection on the results achieved, assessment of gaps and incorporation of adjustments in pathways and vision. Procedures for progress monitoring may be envisaged in advance and included in the content of the RE development/action plan.

How?

There are several possibilities of involving stakeholders in the progress monitoring. The progress can be monitored by the Living Labs established initially at the first stage of targeted planning of RE development, in this way utilising the opportunity of the networking and co-creation experience developed earlier. Online collaborative platforms can be a tool for obtaining the viewpoint of broader stakeholder audiences on satisfaction of the achievements and proposals for further improvements.

Table 3.7. Checklist for stakeholder involvement in targeted planning of renewable energy development at regional/local level

Question	Yes	No
◄ Have you considered and selected a set of (innovative) methods and tools for stakeholder involvement for RE development planning in your region/municipality?	❐	❐
◄ Have you discussed and agreed on a common vision and preferences regarding RE development in your region/municipality with all relevant stakeholders involved?	❐	❐
◄ Have you demonstrated the practical applicability of planned measures to your stakeholders?	❐	❐
◄ Have you ensured obtaining feedback from stakeholders on the draft RE development plan?	❐	❐
◄ Have you established a procedure for stakeholder involvement in progress monitoring of RE development plan implementation?	❐	❐

3.5. Stakeholder involvement in the feasibility study

The feasibility study of RE development aims to test the feasibility of a specific action (e.g. a renewable energy project) and to determine and define any issues that would argue against this action. The key of the feasibility study is to evaluate whether this specific action makes sense from a technical, economic, legal or operational standpoint.

Context to the spatial planning and renewable energy is on assessment for potential use of renewable energy sources in particular applications, e.g., offshore wind, solar energy, geoenergy and/ or industrial waste heat. Fostering the application is largely linked to the acceptance of technology transition (e.g. from fossil to renewable energy) taking into account the relationship between human, environment and techno-economic determinants.

Spatial coverage	Stakeholder coverage	Desired outcome	Setting
Local	Regional Local	Project	Real-life implementation

Possible key issues to address:

- To narrow the scope of the project: to clarify the renewable energy **potential** and to investigate the possibility of **implementation** (of particular importance to the project developers);
- To position an open discussion on **technological innovation** specifications to achieve wider public acceptance;
- To represent personal values and interests of stakeholders and to find **compromises** among stakeholders;
- To provide valuable **information** for a "go/no-go" decision for the project;
- To enhance the success rate by evaluating **multiple parameters**;
- To identify and validate **reasons** for not proceeding with the project.

Several sequential steps can be distinguished during the feasibility study of renewable energy development at regional/local level (see Figure 3.2.). Implementation of each step can benefit from stakeholder involvement.

The innovative approach of stakeholder involvement during the feasibility study of a renewable energy project comprises early involvement and interaction with various stakeholders representing public, private, and civic sectors. Understanding stakeholder values and perception in the initial - project concept - stage paves the way towards achieving community acceptance and to the subsequent project implementation. Involving local stakeholders in communications during the elaboration of feasibility aspects is an important pre-condition to increase acceptance; however, when discussions are limited to 'elite groups' public protests may emerge in response[101].

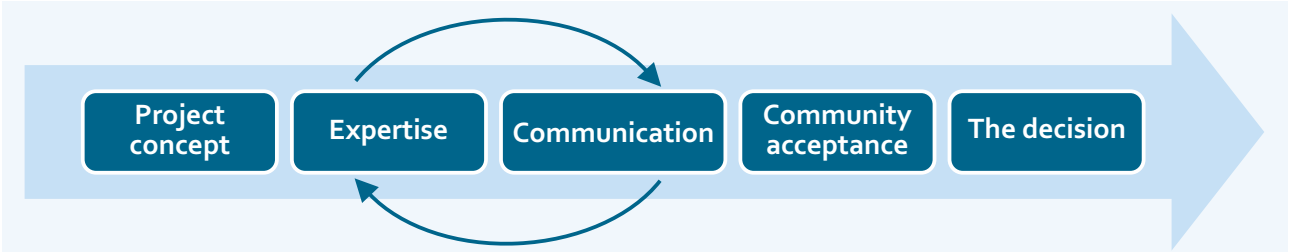


Figure 3.2. Sequential steps in the feasibility study of renewable energy project(s)

Various methods and tools are applicable for approaching and involving stakeholders at various stages (phases) in the feasibility study of RE development, which leads to the decision either to introduce a project, or to oppose it, if the project is not suitable for the community.

Project concept	Expertise	Communication	Community acceptance	The decision
Assessing stakeholders and their preferences:	**Elaboration of feasibility aspects:**	**Consulting local residents, local groups:**	**Assessing community attitude:**	**Project documentation:**
◀ Q methodology	◀ Expert consultations and working groups	◀ Workshops ◀ Stakeholder targeted hand-outs	◀ Surveys	◀ Involvement of authorised stakeholders

Project concept

Application of renewable energy technologies requires a certain level of acceptance to ease decision-making and, most importantly, the support for effective implementation of the project during subsequent stages. Here, the personal values of stakeholders at local and, in some cases, also at regional level must be accounted for. A 'social gap' can occur at different spatial perspectives: the nation-wide support of certain renewable energy technologies and the opposition from local communities bearing the consequences of real project implementation (e.g., erection of wind farms). Often, the elements provoking resistance towards a project are not the technology itself or the distance, but rather how the project and process is designed, such as fairness, environmental impact, how people value the land used for siting and the information on the specific project people receive to form their attitudes[102].

How?

Identification of stakeholder groups and investigating their perspectives on renewable energy at regional or local level can be implemented by various methods e.g., questionnaires, focus groups. An innovative approach is to use the Q methodology which offers a mixed method combining the qualitative and quantitative phases. It allows investigation of the local stakeholder perspectives regarding the social, environmental and economic impacts (positive or negative) of the RE source.

Q methodology

Initially a set of statements expressing potential stakeholders' attitudes about the particular issue has to be developed (desk study, literature review). This should ensure coverage and balance of the topic. The set of statements (Q-set) is the collection of 'heterogeneous items' which the participants will sort.

The Q methodology aims to reveal some of the main viewpoints that are favoured by a particular group of participants (probably, most effectively with a group of 40-60 participants). This group of participants will rank the statements if they agree or disagree based on their own perspectives. The Q methodology neither tests its participants nor imposes meanings *a priori*: instead, it asks its participants to decide what is meaningful and hence what does (and what does not) have value and significance from their perspective.

Further, the factor analysis is used to identify patterns in the ranking. In this way correlations or major differences in group attitudes can be identified. [103, 104]

Expertise and communication

Expertise underlies the assessment of the potential, and investigation of the possibility, for implementation of the energy project idea. The early involvement of developers, local energy companies and experts-consultants is deemed necessary. This approach allows technical experts to participate at the early planning phase and to provide objective information on resource availability. Developers might value the opportunity for communication of their own plans and intentions to the community. Such an approach can be useful to avoid possible conflicts at a later stage when the actual installation of energy systems is carried out. Here, the developers are invited to take the initiative and make additional efforts beyond their legal obligations to ensure interaction with local and regional stakeholders.

A valuable asset is integration of local knowledge to obtain a more comprehensive insight into the community system and processes. This knowledge is useful to evaluate the potential of technical and market solutions for the local environment. Interaction between experts and communication usually takes several rounds to address the relevant issues e.g., technology, economic aspects, environmental considerations.

How?

Gradual intensification of stakeholder involvement by application of well-known communication methods e.g., consultations, workshops during the expertise and communication stages to prepare stakeholders for collaboration at a later stage of the RE project.

World Café

The World Café method can be applied at workshops when the aim is to explore a topic from multiple perspectives and allow everyone's contribution during the discussion. Initially a set of discussion aspects is created (usually 4-6 aspects). Participants are divided into smaller groups corresponding to the number of the discussion aspects identified. The essence of this method lies within the opportunity provided for each participant to express their opinion about all identified aspects.

Each Café facilitator hosts the discussion on a particular aspect by recording the views of participants, takes notes and prepares a summary after the session. Evolving rounds of dialogue occur along with participants vising each host. Time allocation for the World Café discussion session can range from 60 - 90 minutes. Each round can last for 15-20 minutes depending on discussion aspects and the number of participants (time flexibility is suggested with a longer session at the start and a shorter reflection time towards the close).

Community acceptance

In a previous subchapter, communication with experts and representatives from stakeholder groups was described. Given the limited number of views expressed it is recommended to seek for involvement of a wider group of stakeholders e.g., the local community. Community acceptance or disagreement with a RE project plays a pivotal role in the subsequent process and outcome of project development. Findings from earlier projects indicate that local residents and groups often rate themselves as being misunderstood, not heard, ignored or unsure whether they have been heard.[105]

How?

Surveys

Personal communication for feedback from a large number of local community inhabitants is extremely time-consuming and a challenging task. An alternative option for a survey is to use indirect communication methods, e.g., questionnaires in online or printed format, questions should cover social, economic and environmental aspects.

A package of supplementary materials providing background and main findings from expert communication on the feasibility study is recommended. Acknowledging the important role of targeted information to local residents (simple, clear, straightforward, unbiased statements) helps to avoid confusion and misperception caused by poor information, insufficient or poorly produced materials.

Survey findings can help developers, investors and local decision-makers to find strategic compromises to enhance community acceptance towards RE project development.

The decision

Based on feasibility study results, the decision on RE project development is taken by an authorised group of stakeholders. The decision needs to be channelled to wide groups of stakeholders and the community to ensure the transparency of the process.

Table 3.8. Checklist for stakeholder involvement in the feasibility study of renewable energy development at regional/local level

Question	Yes	No
◄ Have you considered and selected a set of methods and tools for stakeholder involvement in implementing the feasibility study of RE development in your region/municipality?	❐	❐
◄ Have you planned to investigate the perspectives of the local community about the selected RE application in the particular region/municipality?	❐	❐
◄ Have you secured relevant expertise and stakeholder groups to communicate various aspects of RE development?	❐	❐
◄ Have you ensured feedback can be obtained from a wide range of stakeholders aimed at investigating the level of community acceptance?	❐	❐
◄ Have you selected tools to channel the decision to a wide group of stakeholders and the community?	❐	❐

3.6. Stakeholder involvement in project implementation

At the implementation phase of the project or action plan, the focus of stakeholder involvement is on addressing practical/ technical issues and solving possible conflicts on these grounds.

Spatial coverage	Stakeholder coverage	Desired outcome	Setting
Local	Local	Project	Real-life implementation

Possible key issues to address:

- Participation of local stakeholders by setting partnerships for implementation of RE project;
- Reaching acceptance from stakeholders on siting decisions;
- Reaching acceptance from stakeholders on construction and operation of facilities.

Several sequential steps can be distinguished during the implementation of a renewable energy project at local level (see Figure 3.3.). Implementation of each step can benefit from stakeholder involvement.

Project outline

A clear and well-developed concept of the project helps to shape stakeholder involvement by setting a core team and selecting a specific approach through a series of small working meetings to keep an overview on the process. In addition, when ensuring participatory engagement of local stakeholders (e.g., landowners, farmers) it is important to offer shared ownership schemes, establishment of local energy co-operatives already at the project outline phase.[106] Setting public-private partnerships, local cooperative initiatives help to reduce opposition and NIMBY concern.

Project plan for specific stakeholder involvement

The main principles for elaboration of the stakeholder involvement plan are summarised in Chapter 2 of this handbook. By implementing an RE project several important aspects are highlighted:

- stakeholder groups of the specific project located within the neighbourhood of the RE project area shall have priority consideration. These stakeholder groups shall be addressed for feedback and comments on the RE project;

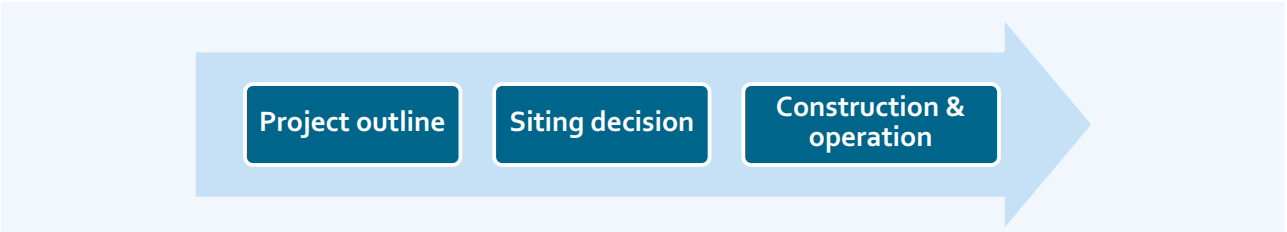


Figure 3.3. Sequential steps in renewable energy project implementation

Project outline	Siting decision	Construction and operation
Assessing stakeholders:	**Communication with local community:**	**Ensuring transparency and maintaining trust:**
◀ Establishment of the core team ◀ Setting participatory governance models (e.g., public-private partnerships, local energy cooperatives)	◀ 3-D models, presentations, targeted handouts ◀ „Hands-on" experience	◀ Open days for visitors

- stakeholder involvement planning, including the setting of participatory governance models, is usually designed for outreach to the local community. Close collaboration and consultations among stakeholders are seen as a solution to solve potential conflicts. It is important to separate the professional expert debate from public hearings, where different levels of expertise, perceptions and expectations mean that emotions may be stirred. Having received comprehensive information on an RE project, local stakeholders will be better prepared for public hearings.

Example from the BEA-APP project on involvement and communication with stakeholders in the pilot project on the planning process for establishment of a biogas plant in Odsherred Municipality, Zealand, Denmark.

Project phase	Meetings	Communication tools and methods	Remarks on stakeholder involvement
Design of biogas plant	Series of small working group meetings (<10 participants)	Discussions	◀ Key stakeholders to discuss development path and procedures → overview on the process
	Informative meetings (~30 participants)	Presentations, group sessions, development of mind-map	◀ Further cooperation with new potential stakeholders → further meetings with stakeholders
	Citizens' meeting at a biogas facility (~600 participants)	A guided tour of the plant, questions session	◀ An open dialogue and „hands-on" experience → led to acceptance of the facility

Siting decision

A siting decision may play a different role in the erection of renewable energy facilities at locations depending on the RE technology used. Siting decisions are a frequent cause of struggles and conflicts (examples are provided in Chapter 1 of this handbook).

Set of tools to communicate with stakeholders on siting decisions

Visualisation tools (e.g., 3D models, presentations, targeted handouts) are useful to help stakeholders form an impression about the envisaged RE project in the given landscape and local conditions. Application of visualisation tools will be convincing if professionally designed and explained by experts.

Using the **"hands-on" experience** is seen as an efficient conflict-resolving approach to avert criticism from local stakeholders. Some conflicts with inhabitants are easy to solve via discussion and positive actions, while others (e.g., with those having business interests) are more complicated. Gaining practical information by visiting similar RE projects in operation and testing of prototypes may help to overcome constraints and dissolve misperceptions.

Construction and operation

Construction and operation are seen as the mature stage of RE project implementation. Nevertheless, involvement of stakeholders should continue, to ensure the transparency of the process of RE production.

Open days for visitors

Operators of RE installations are encouraged to offer the opportunity for stakeholders to visit the installation/company and occasionally organise open days at their premises. This is a good opportunity for developers to introduce stakeholders with the vision and plans for the future development of renewable energy use. Such an approach fulfils stakeholder expectations about early involvement and the building of trust.

Table 3.9. Checklist for stakeholder involvement in implementation of a renewable energy project

Question	Yes	No
◄ Have you considered setting public-private partnerships, local energy cooperatives for RE project implementation?	❐	❐
◄ Have you created a project-specific stakeholder involvement plan?	❐	❐
◄ Are you planning to use professionally designed visualisation tools to help the siting decision?	❐	❐
◄ Have you planned to provide an opportunity for gaining a «hands-on» experience?	❐	❐
◄ Have you planned continuation of stakeholder involvement during RE project construction and operation?	❐	❐

4. Lessons learned about stakeholder involvement in pilot projects in project partner regions

A broad spectrum of renewable energy uses has been covered by the pilot projects implemented in the BEA-APP project (see Table 2.1.). This chapter provides an insight to the lessons learned from stakeholder involvement in renewable energy pilot projects in the BEA-APP partner regions.

Table 2.1. Renewable energy pilot projects in the project partner regions.

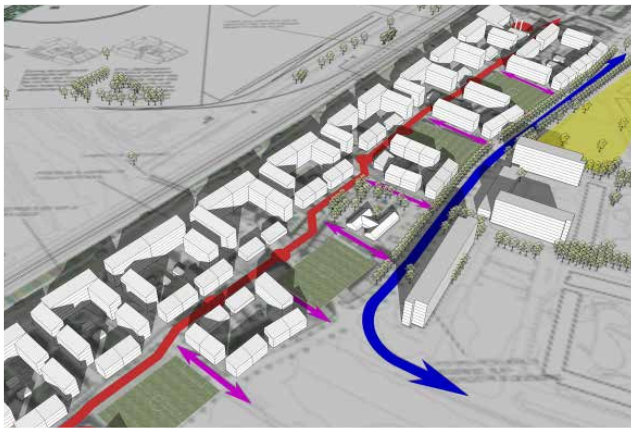
Pilot project	Region/area	Partner(s) responsible
Green industrial areas (RES mix)	Mecklenburg-Vorpommern, Germany	Ministry of Energy, Infrastructure and Digitalisation Mecklenburg-Vorpommern, Germany
Urban planning for solar energy	Lund, Skåne, Sweden	Skåne Energy Agency, Sweden
Offshore wind power	Blekinge, Sweden	Region Blekinge, Energy Agency for Southeast Sweden
District heating	Ronneby, Blekinge, Sweden	Region Blekinge, Energy Agency for Southeast Sweden
Geoenergy use in a new residential area	Äänekoski city, Central Finland	Regional Council of Central Finland
Renewable energy mix in peripheral regions (renovation project of a village hall)	Rõuge village, Southern Estonia	Tartu Regional Energy Agency
Sustainable district heating system	Kaunas Region, Lithuania	Lithuanian Energy Institute
Sustainable energy approach in public spaces located in the town centres	Central Functional Zone, the West Pomeranian Voivodeship, Poland	Regional Office for Spatial Planning of West Pomeranian Voivodeship
Smart heating system	Zealand, Denmark	Roskilde University

4.1. Green industrial areas in Mecklenburg-Vorpommern, Germany

Place	Mecklenburg-Vorpommern, Germany
Type of RES	The pilot project deals with an optimal RES mix in industrial areas in peripheral Mecklenburg-Vorpommern (M-V). The focus is on wind energy and solar energy. In addition to the promotion of electricity generation from renewable energies, the use of potential heat supplies is a key issue. Furthermore, the improvement of energy management and energy efficiency as well as an increased linkage of electricity in the mobility and heat sectors (sector coupling/integrated energy) play an important role in the pilot project.
Background to pilot	Mecklenburg-Vorpommern is the federal state with the lowest population density in Germany and has a gross domestic product which is below the national average. The designated industrial and commercial areas in Mecklenburg-Vorpommern are not used to full capacity. The motivation is to establish green industrial areas to attract new companies as a kind of marketing instrument and in this context to create new jobs. The focus is on the generation and direct marketing of RE on-site to raise the regional added value of RES in the region. Additional goals are an increased cooperation and collaboration of the companies (industrial symbiosis) as well as the promotion of sectoral integration. During the first months, the interest and support was so high that the topic became part of the coalition agreement of the state government. Instead of elaborating a feasibility study, a state initiative on green industrial areas was prepared and implemented within the BEA-APP project.
Stakeholder involvement: groups	For the implementation of the pilot study the dialogue forum was established at the very beginning to discuss the definition, criteria and marketing strategies for green industrial areas, as well as to identify suitable areas. The following stakeholders participated in the dialogue forum: Ministry of Economics M-V; Regional Offices for Spatial Planning; Regional Planning Associations; Invest in M-V; Chamber of Industry and Commerce; Energy and Climate Protection Agency M-V; Association of Municipal Companies; municipalities; municipal utilities; companies producing renewable energies and other stakeholder groups.

Stakeholder involvement: process	The regular involvement of stakeholder groups took place within the framework of different event and discussion formats: dialogue forums; workshops; thematic dialogues. Presentations; group discussions; brainstorming sessions; reflection from the perspectives of stakeholders; bilateral/round table discussions on specific topics were held in order to not only inform and educate, but also interactively involve stakeholders in the planning process and the implementation of the state initiative. In total, 16 stakeholders' events were held between September 2016 – March 2018.
Stakeholder involvement: lessons learnt	◀ Clear and transparent internal and external communication is very important to ensure the effective flow of information and involvement process of stakeholders; ◀ Early and interdisciplinary involvement of experts is a crucial aspect to get feedback and specialised evaluation based on specific knowledge; ◀ Constructive culture of open criticism and discussions as part of the feedback and source of multifaceted evaluation; ◀ Practice/feasibility checks over regular intervals as well as confidence-building.
To find out more:	Ministry of Energy, Infrastructure and Digitalisation Mecklenburg-Vorpommern Department Energy and State Development Schloßstraße 6-8, D-19053 Schwerin Mail: gruene.gewerbegebiete@em.mv-regierung.de Website: www.gruene-gewerbegebiete.de

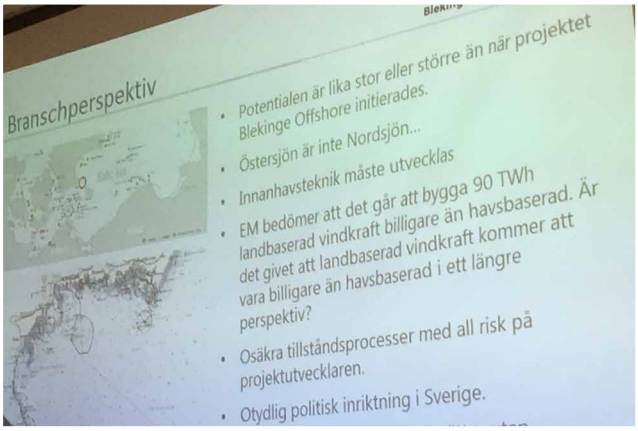
4.2. Urban planning for solar energy in Lund, Sweden



Place	Skåne, Sweden
Type of RES	Solar energy
Background to pilot	The city of Lund with 115 000 inhabitants is planning for the development of a new urban district, Sydvästra Lund (Southwest Lund), which also includes a new train station. The train station is planned for operation in 2024. Ensuring a high share of renewable energy supply is an important aspect in planning for this new district. The city of Lund is especially considering possibilities for solar energy installations. This pilot project investigated the best prerequisites in the planning process for solar energy installations.
Stakeholder involvement: groups	City architect for Sydvästra Lund, City of Lund; officer at the planning department, City of Lund; environmental strategy officer, City of Lund; senior lecturer, Department of Energy and Building Design, University of Lund; business developer, local energy company "Kraftringen"; expert planning consultant, Ramboll
Stakeholder involvement: process	Skåne Energy Agency had an initial meeting with the Environment Strategy Department, University of Lund and Kraftringen to define the process. A series of meetings followed with the planning group to define the tasks of the expert planning consultant. An expert consultant was contracted and joined the meeting with the planning group. The expert consultant developed a 3D visual model of how the area could look when optimised for solar energy installations. In total, 14 stakeholders' events were hold between September 2016 – August 2018
Stakeholder involvement: lessons learnt	◀ The pilot study has worked to prepare for solar energy installations in a new urban area, early in the planning process. There have not been many conflicts about solar energy installations at this stage or between stakeholders in the planning group. The conflicts are likely to occur at a later stage of the process when the solar energy installations are installed. Conflicts can occur from an architectural point of view, a technical point of view or a customer-oriented point of view; ◀ Lesson learnt was that staff at the planning department of a city are very busy. It is important to involve them early in the process and to as large an extent as possible.

To find out more:	https://www.balticenergyareas.eu/regional-pilot-projects/skane

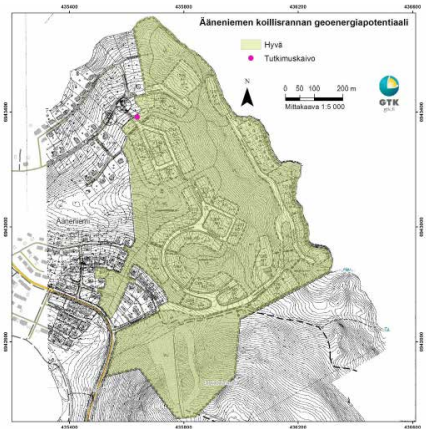
4.3. Increasing RES share: district heating & offshore wind power, Blekinge, Sweden



Place	Ronneby and Blekinge, Sweden
Type of RES	The increase of RES in Ronneby, and another pilot with a focus on offshore wind power outside the coast of Blekinge.
Background to pilot	In 2013, Blekinge adopted an ambitious climate and energy strategy, for the years 2013-2016 with an outlook towards 2020. By 2020, 80% of energy supply in Blekinge should come from RES, and greenhouse gases should be reduced by 50% compared to 1990. Energy consumption should be reduced by 20% using 1990 as the base year. In 2018, this action plan was updated. To reach this goal – a model was elaborated in the Blekinge pilot to identify how the construction of offshore wind power plants will affect the municipalities and the labour market in Blekinge. The other pilot in Ronneby had the focus: how a manufacturing industry with a significant surplus energy could potentially be utilised in the district heating system.
Stakeholder involvement: groups	The Ronneby pilot; the manufacturing industry; the DH Company; land owners; municipalities; municipal housing company; university and experts; associations; the county administrative board of Blekinge; climate corporation of Blekinge; consultants.
Stakeholder involvement: process	The methods used in stakeholder involvement have mainly been to use discussions as a tool in spatial meetings, or by phone. The pilot cases have used interviews and meetings as a tool to involve stakeholders. The project has increased the knowledge about renewable energy in the pilots and gained possible implementing solutions. The main conflicting issues in the Ronneby pilot was the length of working time put into the project, in relation to the overall workload. In total, 8 stakeholders' events were hold between September 2016 – April 2018 in Blekinge and 20 stakeholders' events in Ronneby and its surroundings.

Stakeholder involvement: lessons learnt	◄ Important to involve stakeholders early in the project development phase and clearly present their role in the project. Maintain continuous dialogue with stakeholders while waiting for the project to be approved; ◄ Political decisions at national and regional level can really affect the results; ◄ A plan would have been useful to enable the handling of the heavy workload.
To find out more:	Annica C. Lindh http://energikontorsydost.se

4.4. Geoenergy use in a new residential area in Äänekoski city, Finland



@maanmittauslaitos and HALTIK (2013)

Äänekosken kaupunkisanomat 7.8.2017

Place	Central Finland
Type of RES	Geoenergy
Background to pilot	Geoenergy is a prominent, new renewable energy source in the Central Finland region. The existing geoenergy utilisation is at household scale, and larger (apartment building/ residential area) scale use is very new in Finland. A regional level study on potential geoenergy sites already exists; based on the bedrock materials and the depth of the soil layer, geoenergy is also included in the present process of updating the regional land use plan. In order to progress with the utilisation of geoenergy in Central Finland, a more detailed study was required. This geoenergy pilot study was carried out for the Ääneniemi residential area in Äänekoski city.
Stakeholder involvement: groups	Land use planners, City of Äänekoski; the Geological Survey of Finland; municipal land use planners; regional council of Central Finland; other municipalities; potential new residents in the area; municipality development companies.
Stakeholder involvement: process	It is notable that these kind of pilot studies can act as a driving force for municipality level planning and thus land use planners now have an example of geoenergy potential in detailed planning, and implementation. Municipality level land use planners are the gatekeepers and they were contacted throughout the study and met with at regularly organised meetings: the results were discussed in an annual land use planning seminar for municipalities in Central Finland (2018). In total, 6 stakeholders' events were held between September 2016 – August 2018.
Stakeholder involvement: lessons learnt	◄ Municipalities are key players in implementation. They will provide the framework via land use planning, e.g. by giving recommendations for energy types; ◄ Residents are important in implementation. In new areas this is problematic, since no residents exist during the planning phase; ◄ General promotion of RES is a necessity, but the target group is not easy to reach; ◄ No conflicts. General approval exists, but no reference cases on a larger scale (residential areas) - an unfamiliar type of energy so still potential for further communication, involvement of stakeholders and capacity-building.

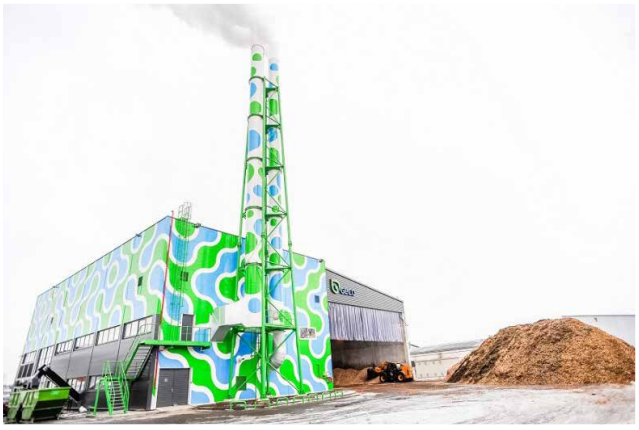
To find out more:	https://www.keskisuomi.fi/filebank/25672-Poster_Geoenergy_potential_of_aaneniemi_7_5_2018.pdf https://www.keskisuomi.fi/filebank/25673-Report_Geoenergy_potential_of_aaneniemi.pdf (in Finnish, with abstract in English)

4.5. Renewable energy mix in Southern Estonia

Place	Rõuge, Estonia
Type of RES	RES mix of ground source heat pumps, photovoltaic panels and traditional wood-burning stoves
Background to pilot	The local energy centre was established by the municipal government in 2001 which has been developing the Rõuge Energy Park, promoting innovative energy-saving solutions, supporting sustainable and low-tech engineering and constituting a tourist attraction in this agricultural region. Thus, the activities of the energy park follow two pillars: (1) innovation and engineering, and (2) visiting and training. The Rõuge Energy Park, promoted by local leaders and implemented by local communities, has an essential role in raising awareness for renewable energy technologies and the solutions these can bring in the wider context of sustainable development in a peripheral and remote rural area. The pilot project sets out the planning and renovation of the Rõuge village hall (built-up area of 1116 m^2), including the optimal selection and installation of renewable energy technologies, as well as sustainable and smart landscaping of the surroundings in the memorial park (1,83 ha). The energy and heating systems will integrate ground source heat pumps with photovoltaic panels and traditional wood-burning stoves.
Stakeholder involvement: groups	Municipality officials; users of the village hall; neighbouring land owners; tourism and other entrepreneurs; community members; cultural and local societies; council members; designers; engineers; all participated actively in the planning and design drafting process.
Stakeholder involvement: process	The open moderated workshop was the key event, warmed up and introduced by the Rõuge mayor. A comprehensive and attractive visualisation was provided by the architect and handouts of drafts were given out. Multiple events were organised to inform, involve and discuss the pilot project. In total, 5 stakeholders' events were held between September 2016 – August 2017.

Stakeholder involvement: lessons learnt	◀ Separate the professional expert debate from the public hearing and invite key actors personally; ◀ Keep information short and simple in both expert and public arenas, balancing the technical aspects of problem-solving and informal, often value-led stakeholder views.
To find out more:	Antti Roose, www.trea.ee; rouge.kovtp.ee/web/eng/general-information

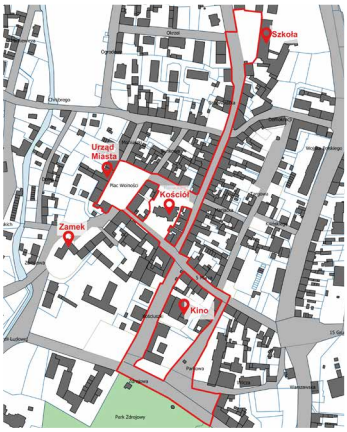
4.6. Sustainable DH System in Kaunas, Lithuania



Place	Kaunas, Lithuania
Type of RES	Mix – biomass, solar heat
Background to pilot	Kaunas City is the central city of Kaunas region and the second largest city in Lithuania with a population of 288,466 (Jan 1, 2018). Kaunas City municipality, together with the district heating company, has developed an ambitious plan for the district heating sector (~65% of total heated area) to transfer from natural gas district heating, which made approximately 96% in fuel balance in 2010, to a RES based district heating sector with biomass making 100% in fuel balance in 2020. This plan is successfully being implemented (91% biomass on Jan 1, 2018 already) via involving new capacities under Kaunas district heating company AB "Kauno energija", as well as independent heat producers, connecting to the integrated city district heating network. The pilot project discloses the full range of this ambitious plan, starting with a description of the initial situation, the planning process and criteria, public involvement and social partners, available financial support and schemes, options for development of RES, the implementation process, weaknesses and bottlenecks, as well as lessons learnt and recommendations for improving the spatial planning procedures.
Stakeholder involvement: groups	Internal: representatives from the municipality; fuel suppliers; heat producers and consumers External – professional heating and biomass associations; consultants; experts; scientists; consumers' rights bodies.
Stakeholder involvement: process	Various events were organised to inform, involve and discuss the pilot project with the representatives from internal and external groups: spatial planning issues, conflicts while developing new and reconstructing old biomass boiler-houses, operating DH network, bioenergy development, spatial planning problems concerning different RE projects. In total, 5 stakeholders' events were held between September 2016 – June 2018.

Stakeholder involvement: lessons learnt	◄ Though some conflicts (with the population) are easy to solve via discussions and some positive actions, others (with partners – independent producers) are much more complicated; ◄ Planning based on clear criteria should be introduced to avoid "chaotic" development; ◄ Introducing a new legal environment to heat producers solves some generation problems, but there are still conflicts in the activities of heat supply, which should be solved via discussions with authorities and among stakeholders.
To find out more:	Nerijus Pedišius, e-mail: Nerijus.Pedisius@lei.lt

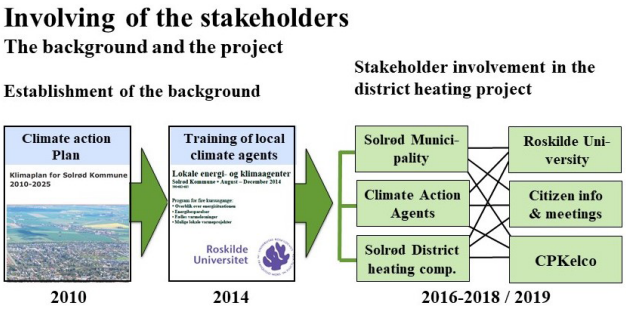
4.7. Sustainable energy in public spaces located in the town centres of the Central Functional Zone in the West Pomeranian Voivodeship, Poland

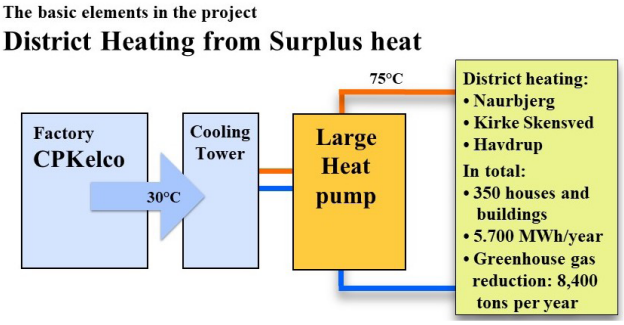


Place	West Pomerania, Poland
Type of RES	RES mix
Background to pilot	The main aim of the project was to investigate the possibilities of using RES to optimise and improve energy efficiency while enhancing the quality of public spaces at Połczyn-Zdrój. The pilot project presents the results from extensive research, analysis and field studies on public space, with using an energy mix. Conclusions and recommendations were developed, which point out the suggested approach to improving energy efficiency – in particular, in historically and culturally valuable areas, with a specific focus on the old towns and rural areas, under protection of monument conservation or health resorts. Educating prosumers of the third wave, who await not only economical, but also social and ecological benefits from an energy transition, requires introduction and strengthening of appropriate habits in the society. Introducing RES and energy efficiency is one of the basic factors which increase ecological awareness helping to create ecological attitudes of the users of urban spaces.
Stakeholder involvement: groups	Representatives of municipalities and counties of the Central Functional Zone; Regional Office for Spatial Planning of Westpomeranian Voivodeship (ROSPW); as well as representatives of planning offices and companies, municipality of Połczyn-Zdrój, Westpomeranian University of Technology and external experts.
Stakeholder involvement: process	A series of events were organised to inform, involve and discuss the pilot project and raise awareness. Also, individual meetings were held, a study visit of students and meeting with local and regional stakeholders (including the Voivodeship's Monuments Conservationists and the representatives of the heat plants) to agree on the project's results. In total, 12 stakeholders' events were held between August 2016 – August 2018.

Stakeholder involvement: lessons learnt	◀ Best practices can be used as examples of practical and location-based use of RES – a useful tool during the social awareness raising process; ◀ Practical results of the project should be discussed with all interested institutions, especially those responsible for spatial planning to prevent misunderstandings by them; ◀ The main issue in all projects is the financing. During most of the meetings, the stakeholders expected concrete suggestions about the financing sources; ◀ RES investments are risky due to the constant changes in the legal system in Poland; ◀ It is important to network stakeholders from different areas (e.g. heritage conservationists and representatives of the municipalities), so they can point out the problems and solutions on a neutral ground.
To find out more:	Regionalne Biuro Gospodarki Przestrzennej Województwa Zachodniopomorskiego www.rbgp.pl; Justyna Strzyżewska, jst@rbgp.pl

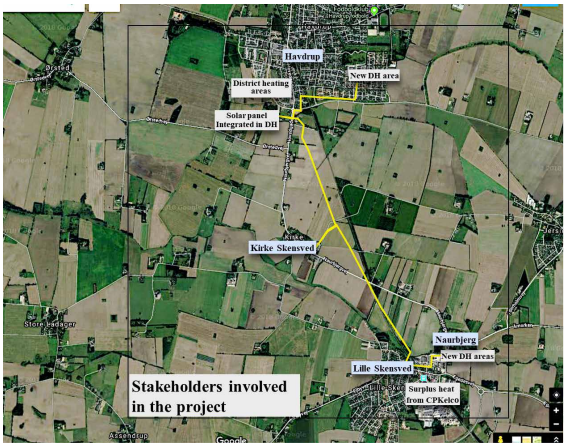
4.8. Smart heating system, Zealand, Denmark





Place	Denmark
Type of RES	Smart heating system: Surplus heat from a factory into large heat-pumps and onto the district heating system
Background to pilot	The purpose of the pilot is to investigate and support the use of surplus heat from a large industrial plant - CPKelco - in supplying DH to the cities of Havdrup, Kirke Skensved, Naurbjerg and Lille Skensved. The premise is that it is necessary to develop an energy-efficient heating system, which will ensure a sufficiently effective and inexpensive DH supply in order to be competitive in relation to the existing oil and natural gas based individual heating system.
Stakeholder involvement: groups	Energy suppliers; utility company; energy distributors; energy consumers; representatives from municipalities; citizens; local investors and Roskilde University.
Stakeholder involvement: process	There were various types of stakeholder involvement: ◄ Climate action, producing long-term political commitment and local political leadership; ◄ Local involvement - through the establishment of activities that have given insight into options for conversion of energy supply - open invitation to all interested parties in the municipality; ◄ Citizens' Meetings: Creating interest in being part of the energy transformation process; ◄ Citizens' Meetings: Suggestions and presentation of possible solutions (several public meetings); ◄ Citizens' Meetings: Tent meetings, district heating festival, etc. At the festival all were offered a calculation of the expected heating costs, when connected to the DH system; ◄ Communication through two-step communication (through climate agents to the local community); ◄ Pre-feasibility studies - presentation of solutions corresponding with expressed interests and wishes of the involved stakeholders. In total, 8 stakeholders' events were held between May 2017 – February 2018.

Stakeholder involvement: lessons learnt	◀ Successful involvement of participants is mainly based on clear political commitment (municipal climate action plan and by training of local climate agents (Klima-agenterne); ◀ Continuous involvement is important: stakeholder involvement has been formed as a continuous process through the process; ◀ Broad involvement ensures comprehensive understanding.
To find out more:	www.balticenergyareas.eu/regional-pilot-projects/11-pilot-cases/35-surplus-heat-from-industry-in-zealand-denmark https://vimeo.com/275422287; https://vimeo.com/275417913; https://vimeo.com/275419931; https://vimeo.com/275429699



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