

T3.1.2 'Energy Village' Strategic Plan

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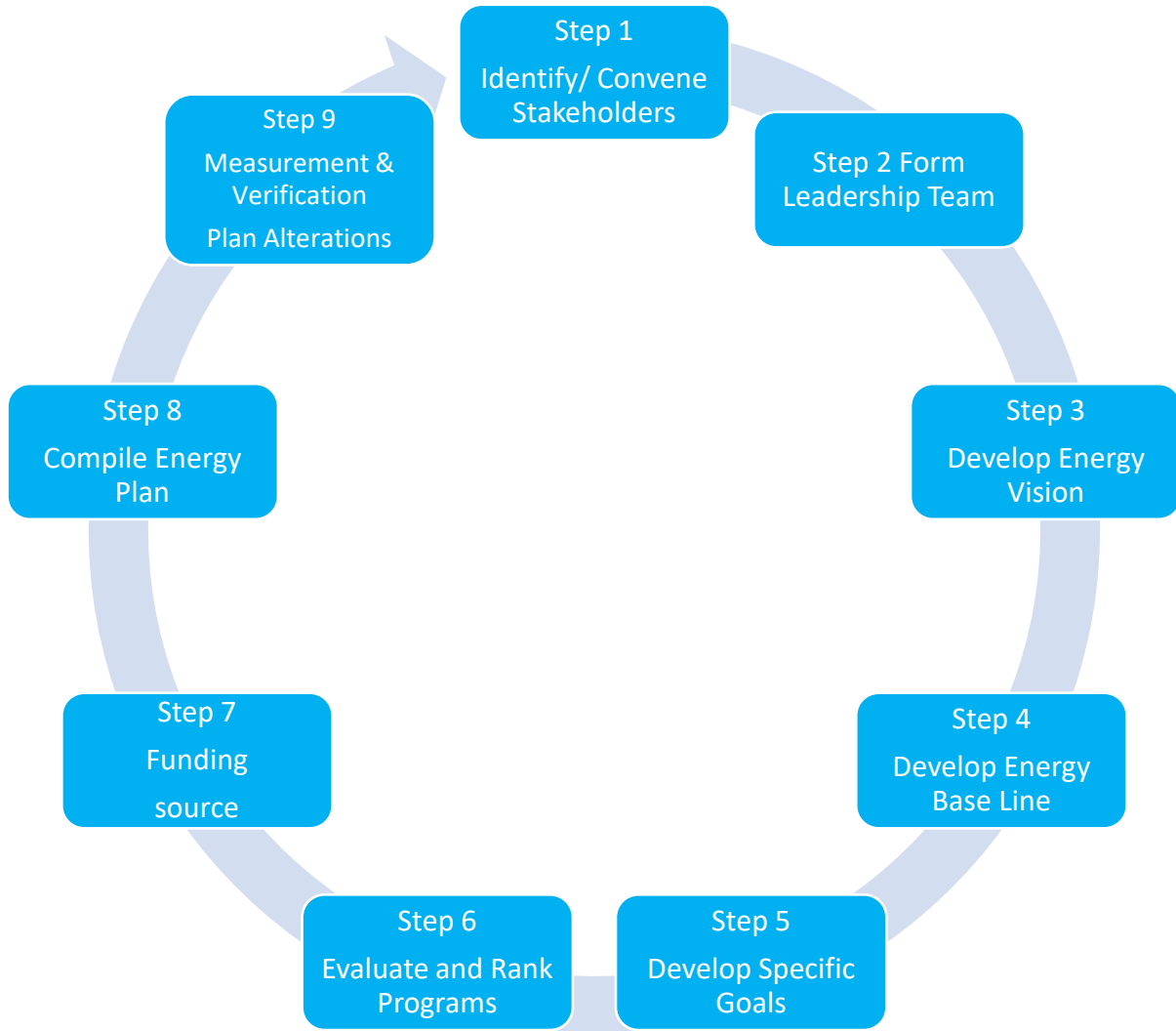
1.0 INTRODUCTION

This 'Energy Village' Strategic Plan provides an overview and a guide on how to develop a strategic energy plan within a community. These plans are highly likely to succeed as a number of stakeholders are involved as well as a political commitment. Communities may not need to follow all steps in this process but this plan is designed to encompass all parties, create solutions and develop a plan that can be implemented by community leaders.

A strategic energy plan is essentially a short-term and long-term blueprint of how communities can achieve energy goals. These initial goals are set by stakeholder input which allows for local buy-in and therefore strengthens the likelihood of success of the implementation of the project.

'Energy Village' Strategic Plans allow for stakeholders to take into account the best use of the locally available renewable energy resources and reduce the impact of climate change on the community. These plans can also increase comfort level for citizens and reduce long-term energy costs.

1.1 STRATEGIC ENERGY PLANNING PROCESS



The above diagram illustrates the basic cycle for community energy strategic planning. (U.S Department of Energy, March 2013)

Step: 1 Identify/ Convene Stakeholders and Establish a Community Group

A broad base of stakeholders allows for more engagement in the process and will in turn lead to a more successful project with more broad based support. The strategic energy process can involve all individuals and organisations that the plan may effect. It is important to seek those with ideas, expertise, support as well as those with the ability to fund and provide resources for the plan. It is also important to get 'buy-in' from stakeholders. Stakeholders must feel that the plan is made by the community for the community.

The following stakeholders should be considered:

1. **Utility Representatives:** Utilities have in-depth knowledge of the network as well as access to energy data. In Ireland the utility companies are assisting in the energy transition to a low carbon future. ¹
2. **Government – Municipal/ County Council/ Local authority Level:** Political support is important and provides confidence in the process. This political input will also ensure compliance with national and regional energy strategies including Local Development Plans. Political support can also assist with project implementation.
3. **Community leaders:** Support from local committees, community leaders and schools would also increase participation on allow for broad consensus.
4. **Community business and industry:** Community business and industry are needed in order to maintain and grow economic development.
5. **Local facilities managers:** These managers have practical knowledge on energy use and local infrastructure.
6. **Residents:** Individual residents can also input and can be useful in the planning process.
7. **Energy Champions:** In Ireland, many communities have energy champions through SEAI schemes. These champions are passionate about energy and can drive a project forward with vision. (Doris)
8. **Technically Skilled Private Citizens:** Community owned energy projects underline that technically skilled private citizens (e.g. civil engineers) offer tremendous help in projects and maintenance issues.

Stakeholders require effective engagement with open and informed dialogue. Stakeholders can be engaged through the following approaches:

- Meetings, Interviews and focus groups
- Attending their meetings
- Workshops/ open houses
- Surveys/ questionnaire
- Interactive websites and social networking
- Public displays
- Municipal Bulletin and
- Informational campaigns (U.S Department of Energy, March 2013)

¹ For example Gas Networks Ireland are involved in the Causeway Project in delivering a sustainable alternative fuel for Irish transport. The project will see the development of a Compressed National Gas Network (CNG) refuelling network, a renewable gas injection facility and the roll out of CNG vehicles. ESB Networks are also involved in a RE project and has chosen the Dingle Peninsula for a three year project designed to plan Ireland's future renewable energy needs and the deployment of new technologies on different parts of the electricity network.

Step 2: Establish a leadership team

Effective leadership is key to the success of any energy plan. When selecting a leadership team it is necessary to choose a group that has the ability to make decisions, avail of funding opportunities and promote the project. A few advocates should be selected in order to encourage transparency and a broad spectrum of ideas.

- **Committee Level:** An executive level authority
- **Plan Advocates:** On the ground stakeholders driving the process daily with management, co-ordination and administration skills.
- **Leadership Team:** A formal leadership team.

Step 3: Develop a Common Energy Vision

The main purpose of the strategic plan is to provide a long term vision or energy plan for the community. It is important to agree on this common vision in order to keep focused on the tasks and ensure continued community support. It is also important to ensure that all priorities are agreed and shared making them easier to accomplish. Vision statements should be circulated among stakeholders to ensure consensus and broad agreement to the plan. Clear goals must be defined as well as a priority list of projects.

Some key visions in strategic energy planning include:

- Ensure energy reliability
- Use locally available natural resources
- Reduce carbon emissions
- Strengthen economic development
- Build job skills
- Save local money
- Support the community

Step 4: Develop Energy Baseline

A community energy baseline will be the starting point for all analysis. An understanding of energy use in the community will assist in prioritising certain projects regarding cost and benefit.²

A review of the current energy use should include the following:

- **Current usage and forecast usage in government, residential, commercial and industrial buildings**

² In Ireland the SEAI encourages Sustainable Energy Communities (SEC's) to enter a partnership with them in order to access support to assist communities in establishing a baseline Energy Master Plan. (<https://www.seai.ie/sustainable-solutions/community-projects/community-partnerships/>)

- **Current usage for government operations in vehicle fleet and other transportation as well as the broader community transportation.**
- **Identify the energy sources currently available as well as information about cost, advantages and problems with these sources:** It is important to include this information in order to achieve a sustainable energy mix and the potential for renewable energy projects.
- **Become familiar with the Local Development Plans at a local level and with Regional and National plans:** In Ireland the planning system in Ireland aims to create sustainable social and economic development in line with national policies and therefore encourage improvement in the environment and living standards for citizens. At national level the Department of Housing, Planning and Local Government is responsible for planning policy. However, this function is carried out by the 31 county and city councils, also known as local authorities and also referred to as planning authorities. (Relate - Citizens Information Board, 2018). All planning authorities are obliged under the Local Government (Planning and Development) Acts, 2000 to 2018, to set out the overall planning policies of the local authority every six years. The Planning and Development Act 2010 (as amended) requires each development plan to include objectives to mitigate against climate change and reduce reliance on fossil fuels. Any future planning applications must comply with the objectives set out in the development plan. Local authority development plans must also consider the National Spatial Strategy (NSS). The NSS is a twenty year framework designed to achieve a national balance on social, economic and physical development between regions as populations grow. Ireland also has three regional assemblies regarding planning guidelines. These are the Northern and Western Regional Assemblies, the Southern Regional Assemblies, and the Eastern and Midland Assemblies. These assemblies have functions regarding spatial planning and economic development.
- **Identify human and organisational resources:** These resources would include supports from the SEAI, County Council funding, involvement in pilot projects with utility companies or involved in European funded projects such as LEADER or NPA projects.
- **Investigate possible previous studies and surveys:** In Finland there is a process called “Uusiutuvan energian kuntakatselmus” (Renewable Energy Municipal Review). It is a comprehensive procedure where a Motiva-certified expert reviews the municipality’s renewable energy potential. The procedure and its content is defined and financially supported by the Ministry of Employment and the Economy (Työ- ja elinkeinoministeriön). The goal of a municipal survey is to find solutions that can economically replace fossil energy usage with renewable energy. By promoting renewable energy in the municipality, in addition to cost savings and positive environmental impacts, the municipal survey can contribute, among other things, to the emergence of new business opportunities. In addition, the municipal survey can provide useful information to residents and thus influence their attitudes and behavior.
The review includes:
 - Identification of current energy production and use
 - Exploring the possibilities of increasing renewable energy with profitability calculations
 - Reporting on measures and follow-up proposals

In order to avail of the best use of locally available renewable energy resources consideration must also be given to the community strengths, weaknesses, opportunities and threats to projects at this state.

Step 5: Develop Energy Goals and Strategies

At this point in the process very often a general goal will become more specific and define the scope of the strategic energy plan. Energy goals and Strategies can be developed using SMART goals;

- **Specific:** Ensure goals are clear and detailed
- **Measurable:** Ensure the goal can be assessed
- **Attainable:** Realistic goals
- **Relevant:** Related to the vision set out in the strategic plan.
- **Time-bound:** Specific time-frame in order to achieve these goals.

It is more beneficial to focus on specific attainable goals and then expand the plan at a later date. This will avoid the disappointment of struggling to achieve vague goals which would lead to a lack of confidence in the process.

Step 6: Evaluate and Rank Programmes

Using all the information from the previous 5 steps develop a system to evaluate the cost-effectiveness of each project.

- Establish a system to evaluate ideas
- Identify policies, programmes and projects that need to be considered
- Measure the options against goals and strategies.

Common evaluation criteria include effectiveness in reducing energy use and related costs, the timeframe for implementation and payoff as well as the feasibility of the activities. (U.S Department of Energy, March 2013)

A Register of Opportunities as part of the Energy Master Plan ranks potential projects according to their feasibility taking into account economic value, payback and potential barriers. This will allow communities to have a clear vision of the order in which projects can be completed.

Step 7: Identify and Secure Funding

IRELAND: In Ireland, through SEAI's Better Energy Community (BEC) and also the Sustainable Energy Community (SEC) programmes, communities can avail of the following grant aid:

- 50% capitals grant aid for any energy efficiency, renewable energy and/or smart energy project.
- Through the SEC programme, communities can avail of limited feasibility and planning grant aid, although the mentors can provide them with expertise.
- As part of the upcoming Renewable Electricity Support Scheme (RESS), there is an initial provision for "*Financial supports for community-led projects across early phases of the project development including feasibility and development studies (grants, legal and technical assistance*" although the details have yet to be finalised.

In Ireland there are a few options of low interest community loans.³

FINLAND:

In Finland, energy aid can be granted for investment or projects that promote renewable energy production, energy efficiency or projects that otherwise further low carbon energy production. This includes electricity and heat production projects, transport biofuel production projects, and projects that pilots new technology. Applications for funding are mainly handled by the Innovation Finance Center Business Finland.

MuniFin (fi=Kuntarahoitus) is a credit institution that offers funding for the municipal sector in Finland. MuniFin also offers specific loans for environmentally friendly projects. This so-called “Green finance” is offered to projects that promote the transition to low-carbon:

- Renewable energy
- Energy efficiency
- Sustainable public transportation
- Waste management
- Water and waste water management
- Sustainable buildings
- Environmental management incl. nature conservation

Another financing company is the state owned Finnvera. Finnvera provides financing for the start of enterprises and strengthens the operating potential and competitiveness of Finnish enterprises by offering loans and guarantees.

SWEDEN:

In Sweden there is no targeted funding for community’s energy projects at present. Municipals/local authorities raise their own tax payer’s money (a share of income tax) and can use own funds to initiate and implement energy projects for own facilities and/ or with communities.

The public sector has possibilities to get loans and one important player is Kommuninvest, which is under way to issue a new green bond. Under its Green Bonds framework, Kommuninvest finances Swedish municipal investment projects in eight areas, including renewable energy, energy efficiency, green buildings, public transport, water management and waste management.

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- ³ The Western Development Commission offer community loans at 3% interest rates for communities within the WDC region,
 - Clann Credo is a social finance institution that provides low interest loans. Clann Credo has a designated Community Climate Action Loan Fund of €10 million for local projects that support people taking climate action with rates of between 4.95% and 6.75%,
 - Community Finance Ireland is a Charity which provides loans exclusively to other third sector organisations such as community groups, charities, sports clubs and social enterprises in the Republic of Ireland with competitive lending rates dependent on the applicant.
 - Credit unions will typically have a community loan rate of 6%.

As of 31 December 2018, Kommuninvest's Green Loan Portfolio amounted to SEK 26.1 (19.9) billion in disbursements, related to 232 (146) investment projects in 109 (81) municipalities and regions. The Green Loan Ratio, ie Green Loans as a share of total lending, was 7.4 (6.5) percent. Comparative data for year-end 2017 in parentheses. Kommuninvest finances the Green loans through Green Bonds issuance. To date, Kommuninvest has issued a total of SEK 20.4 (14.4) billion in five transactions, making Kommuninvest Sweden's largest green bond issuer. Kommuninvest expects to borrow SEK 100-120 billion in long-term funding during 2019.

Due to the latest election, a range of existing funding schemes for sustainable energy have been paused or cancelled and new ones are not in place. However, some are still running (2019-03-15), among others:

The Swedish electricity certificate system is one of the important policy instruments to reach the RES targets: Electricity producers receive one electricity certificate unit from the Swedish state for each megawatt-hour (MWh) of electricity that they produce from renewable energy sources. The electricity producers are free to sell their certificates, thus generating extra revenue for their electricity production.

So-called micro-producers of renewable energy can get a tax-pay back of 0,6 SEK per kWh up to 18.000 SEK a year.

There is state support for the installation of solar cells. It is aimed at all types of players such as companies, public organizations and private individuals. The subsidy is 30% for microproducers. However, funds have not been sufficient to meet the demand and future is unclear.

There are also several support schemes for companies for buying consultants on energy efficiency.

- **Step 8: Compile Energy Plan**

This involves summarising all the other steps in one document and making the document available publically. This document should provide a road map to enable communities to fulfil their energy goals. The plan should include the following elements.

- Community energy objectives and energy vision
- Specific energy goals
- Information on current energy usage
- List of prioritised projects
- Funding sources identified
- Recommendations for project implementation

- **Step 9: Measurement and Verification and Plan Alterations**

The strategic plan is now a working document and it is important to update the plan when projects are complete, goals are reached or in the event of any changes in community population or a shift in supply or demand

LECO Pilot Vuollerim (Jokkmokk) Strategic Energy Plan

STEP 1: Identify and Convene Stakeholders and Establish a Community Group

Stakeholder	Name/Title	Organization	Contact Information
Utility Representatives	Erik Fagerström	Jokkmokk District Heating	Erik.fagerstrom@jokkmokk.se
Local Government	Wolfgang Mehl Erik Fagerström Silva Herrmann	Jokkmokk municipality	Wolfgang.mehl@jokkmokk.se Erik.fagerstrom@jokkmokk.se Silva.herrmann@jokkmokk.se
Community Leaders			
Village corporation			
Community businesses and industry	Mathantverkshuset Gästgiveriet Lapland Vuollerim Vuollerim Gård Gamla Apoteket Photo Nordic		info@mathantverkshuset.se info@gastgiveriet.se info@laplandvuollerim.se info@vuollerimgard.se gamla-apoteket@telia.com alex@photoscapes.eu
Facilities Managers	Erik Fagerström Folkets hus association	Jokkmokk municipality John Viklund	Erik.fagerstrom@jokkmokk.se fh@vuollerim.se
Residents			
Energy Champions			

STEP 2: Establish a Leadership Team

Role and Strategic Purpose	Name	Organization	Contact Information
Committee: Elected leader(s) that support(s) the planning process	John viklund	Folkets hus association	fh@vuollerim.se
Plan Advocates: Coordinator that manages the planning process and activities	Kåge Nevberg	Folkets hus association	fh@vuollerim.se
Leadership Team Member	Lotta Mellows		lotta@iclapland.com

STEP 3: Develop a Common Energy Vision

Energy Priority	Photovoltaic
Energy Priority	Energy efficiency (insulation, LEC...)
Energy Priority	Heat Pump / Bioenergy / Wind Power
<i>Energy Vision Statement:</i> We in Vuollerim are building upon our history as a hydro power community. We will together develop sustainable energy solutions which we own ourselves, generating renewable energy and energy efficiency for the benefit of our community and the planet. We will become Norrbotten's Solar Village.	

STEP 4: Assess Energy Needs and Resources

STEP 4.1 Develop a Current Energy Baseline

	MWh (2016)	Scenario 2025 in MWh
Public buildings	3418	2400
Private homes	5 350	4600
Apartment houses and others	557	470
Private companies	2250	1800
Sum	11575	9270

No planned new constructions

No community electrical generation system in place

No heat recovery

Biomass (pellets) district heating: 1800 MWh/year

Solar energy

To assess the total potential for solar energy in Vuollerim, it is assessed that 30% of the private homes have roofs oriented to south-west, south or south-east and will use both solar heat and PV.

For apartment houses, only PV is calculated. In addition, a bigger plant of 80 kWp is calculated. The total installed PV capacity is assessed to 750 kWp.

What	MWh/year
108 private homes, solar heating + 5 kW PV	633
10 bigger buildings, 13 kW PV	111
Bigger PV plant, 80 kW:	72
Sum	816

Heat pump

For heat pumps, it is assessed that 50 private homes will invest in an air-to-air heat pump, and another 25 in ground or geothermal heat pump.

What	MWh/year
Air to air heat pump	200
Ground heat pump	443
Sum	643

Bioenergy

For bioenergy, it is assumed that 50 private homes invest in wood or pellets stove as a complement to direct electric heating.

In addition, it is assumed that there is an economic potential for a small scale cogeneration plant.

The calculation is done for a Spanner Re2 HKA 10 with 9 kW electricity and 22 kW heating and 6000 working hours per year.

What	MWh/year
50 Wood or pellets stove	450
Small-scale cogeneration electricity	45
Small-scale cogeneration heat	132
Sum	627

Wind Power

For wind power, different energy production scenarios have been calculated, however, now wind measuring has been done and no economic calculation is possible at this point.

Kind of project / Number of 3 MW plants	Installed effect MW	Produced MWh per year	Production in 20 years
1	3	7 200	144 000
5	15	36 000	720 000
84	252	604 800	12 096 000

Small-scale windpower:

If, despite the economic limitations, a pilot wind park for small-scale windpower will be erected, it might be possible to produce up to 500 MWh per year with about 10 smaller wind power plants.

STEP 4.2 Consider Community Strengths, Weakness, Opportunities and Threats

Strengths (Internal) <i>Ex: Informed energy staff with experience building retrofits</i> • a history in hydro power • many community members who have worked or still work with hydro power and electricity production • Local knowledge, experience and good examples with solar / PV technology exists • Collaboration possible with municipal energy advisory service	Weaknesses (Internal) <i>Ex: Turnover in staff has presented challenges for the Village</i> • A high average age of the people in the community • Low value of buildings which makes investments with long pay-back difficult • Individualism strong in the community • Fragmented community groups •
Opportunities (External) <i>Ex: Many natural resources available in the area</i> • LECO feasibility study shows clearly RES and EE potential • Investment subsidy for PV in place in 2019/2020 • In Vuollerim, ground heat pumps are more difficult to install compared to other areas in Jokkmokk so people are more interested in other technologies.	Threats (External) <i>Ex: Power cost equalization is currently suspended</i> • Investments in RES have a long pay-back in Northern Sweden (solar), or permits are a problem (wind power) • Relatively low electricity prices but high prices for being connected to the grid make PV less attractive • Banks are not easily convinced to give investment loans for buildings in Vuollerim

STEP 5: Develop Specific Energy Goals

Community Energy Goal	In 2019: - Mapping the interest in and potential of sustainable energy solutions by doing personal interviews with at least 50 homeowners and at least 15 SME companies - At least 2 community meetings on sustainable energy and 2 study visit of a solar plant - Research on possible cooperative solutions for PV and how profitable that would be in Vuollerim In 2020: - Depending on the results of the interviews: start with investments in sustainable energy, no SMART goals possible by now.
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Community Energy Goal	Mid-term goal (2025) - Reducing energy costs for at least 50 households and 10 companies which engage in the community energy project with 15% compared to 2018.
Community Energy Goal	Long-term goal: - Vuollerim has a cooperative sustainable energy project and is continuously developing new innovative projects. It is well-known as a solar and sustainable energy village in Sweden.

STEP 6: Prioritise Energy Projects and Programs

Potential Project	Project Description	Cost and LCOE Estimate	Priority Level	Project Timeline	Relationship to Community Energy Goals
Photovoltaic	Joint PV procurement of cooperative plant	10.000 SEK / kW	1	2020	1
Insulation	Joint procurement	Unclear	2	2010	2
General energy efficiency measures	Collaboration with energy advisory service	Individual	3	2020-2025	3

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