LECo
Local Energy Communities

Northern Periphery and Arctic Programme
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EUROPEAN UNION
Investing in your future
European Regional Development Fund

**T3.1.2 'Energy Village' Strategic Plan**

## Contents

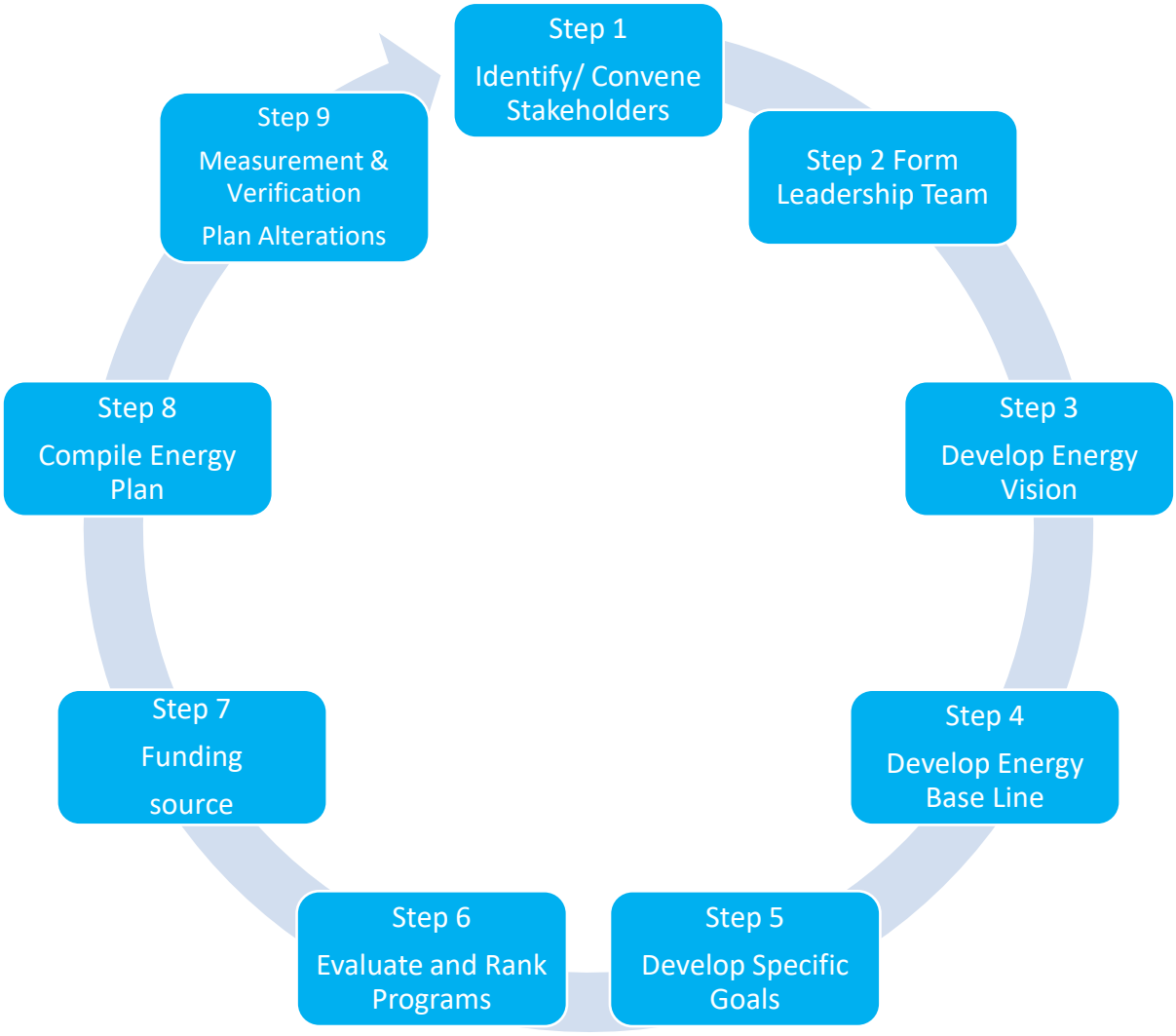
## 1.0 INTRODUCTION

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 choses 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 **t**he 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 on 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 grows. 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 summaries 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

## Strategic Energy Plan from - Ageragas Innovation Ltd.

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

| Stakeholder | Name/Title | Organization | Contact Information |
|---|---|---|---|
| Vice Chairman of the Board | Veijo Hernesniemi | Ageragas Innovation Ltd. | hernesniemi.ranch@kotinet.com |
| Chairman of the Board | Hannu Kainu | Ageragas Innovation Ltd. | Hannu.Kainu@kyyjarvi.fi |
| Dairy farmer and Shareholder | Jari Hekkala | Ageragas Innovation Ltd. | |
| Dairy farmer and Shareholder | Marjo-Riitta Ala-Kopsala | Ageragas Innovation Ltd. | |
| Dairy farmer and Shareholder | Minna Laakso | Ageragas Innovation Ltd. | |
| Shareholder | Marko Puhto | Ageragas Innovation Ltd. | |
| Crop Farmer | Marjo Perttula | Ageragas Innovation Ltd. | |
| Business Development | Villa Honkala | City of Kannus | ville.honkala@kannus.fi |
| Agricultural Secretary | Pekka Siirilä | City of Kannus | pekka.siirila@kannus.fi |
| Bioreactor expert | Heikki Junttila | EVP | |
| Bioreactor expert | Timo Heusala | Elbio Ky | |
| Bioreactor supplier | - | Tara-elementit Ltd. | |
| Infrastructure / pilot area -expert | Pekka Peura | Levon Institute | pekka.peura@univaasa.fi |

## STEP 2: Establish a Leadership Team

| Role and Strategic Purpose | Name | Organization | Contact Information |
|---|---|---|---|
| Committee: Elected leader(s) that support(s) the planning process | Veijo Hernesniemi | Ageragas Innovation Ltd. | hernesniemi.ranch@kotinet.com |
| Plan Advocates: Coordinator that manages the planning process and activities | Hannu Kainu | Ageragas Innovation Ltd. | Hannu.Kainu@kyyjarvi.fi |
| Leadership Team Member | Einar Nystedt | Centria University of Applied Sciences | Einar.nystedt@centria.fi |

## STEP 3: Develop a Common Energy Vision

| *Energy Priority* | Biogas production and liquefaction |
|---|---|

*Energy Vision Statement:*

Agera Innovation Ltd is a company made up of six farmers from the Ostrobothnia region in Finland. Agera Innovation Ltd was established in 2016. The main drivers in the company are Veijo Hernesniemi and Hannu Kainu both of which are dairy farm owners, and actively work to improve the environmental aspect of the dairy farm industry.

Ageragas Innovation Ltd's focus point is to solve the unprofitability issues regarding small-scale biogas production on dairy farms in Finland. The self-use of the produced biogas is in general not profitable.
One of their proposed solutions is to liquefy the methane gas produced on the farm. In liquid state, the methane is in a much denser form, which in turn allows the fuel to be more effectively transported and sold. The company's goal is to develop new technology which enables biomethane liquefaction on site.

The liquefaction of the methane gas would provide many benefits for small-scale biogas producers. The long distance transportation of the substance would be a lot more cost effective, and the liquid methane could be more widely used for instance as transport fuel. Ageragas Innovation Ltd is also designing a more cost effective biogas reactor at a fraction of the cost of existing plant solutions.

## STEP 4: Assess Energy Needs and Resources

### STEP 4.1 Develop a Current Energy Baseline

The biogas production potential on Veijo Hernesniemi's farm is approximately 85 000 – 95 000 Nm^3/a, which corresponds to an annual energy production of 640 – 710 MWh.

Currently, a significant part of the biogas produced on farms in Finland is utilized on the farm in the production of electricity and heat, and not, for example, as transport fuel, where it is the environmental impact would be by far the largest.

Studies show that biogas production generates the highest returns to the producer, when it is refined to biomethane and sold. From the biogas producer's point of view this is challenging. The sale and transport of the raw biogas from the farm is generally not cost-effective. In order for the methane to be used in transport, the biogas also needs to be purified and refined. Therefore, the biogas is often used on the farm. However, personal use is generally not that profitable either, because the heat produced is often left unused and the revenue from the sale of electricity is low.

In 2016, approximately 650 GWh of biogas was used for electricity generation, the transport sector utilized only about 24 GWh of this amount. It is estimated that Finland's biogas production potential is about 9.2 TWh, which corresponds to 18 % of the total energy consumption of the Finnish transport sector.

The heavy transport sector generates about one third of the transport sectors greenhouse gas emissions in Finland. There are about 95,000 lorries and 12,500 buses on the Finnish roads with a combined emission of approximately 4.2 M tonnes CO2. According to studies, using only domestic raw materials, biogas production could maintain more than 40 % of heavy road transport in 2030. Large-scale use of biogas would significantly reduce greenhouse gases total emissions and improve air quality.

### STEP 4.2 Consider Community Strengths, Weakness, Opportunities and Threats

| | |
|---|---|
| Strengths (Internal)<br>*Ex: Informed energy staff with experience building retrofits*<br>• Motivated and committed shareholders<br>• Experts in their field<br>• Multidisciplinary knowledge | Weaknesses (Internal)<br>*Ex: Turnover in staff has presented challenges for the Village*<br>• Lack of own research environment<br>• Lack of support systems/subsidies<br>• Not theirs full time job |
| Opportunities (External)<br>*Ex: Many natural resources available in the area*<br>• An interesting new approach<br>• Low-carbon solutions are needed<br>• The current state is not sustainable | Threats (External)<br>*Ex: Power cost equalization is currently suspended*<br>• Big organizations taking over the market<br>• Lack of capital<br>• Political atmosphere |

## STEP 5: Develop Specific Energy Goals

| | |
|---|---|
| Community Energy Goal | Build biomethane liquefaction unit, pilot the unit at dairy farm. |
| Community Energy Goal | Build bioreactor, and pilot it at Hernesniemi's farm. Annual energy production estimation of 640 – 710 MWh. |

STEP 6: Prioritise Energy Projects and Programs

| Potential Project | Project Description | Cost and LCOE Estimate | Priority Level | Project Timeline | Relationship to Community Energy Goals |
|---|---|---|---|---|---|
| Biomethane liquefaction unit | Product development and pilot-scale equipment | 100 – 140 000 € per unit | 1 | 2020-2023 | 1 |
| Bioreactor unit | Product development and pilot-scale equipment | 50 – 80 000 € | 2 | 2022-2025 | 2 |

## References


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