



SMÅLAND AND THE ISLANDS [REGIONAL ACTION PLAN] JANUARY 2022

LC Districts

Interreg Europe



European Union
European Regional
Development Fund

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1 Introduction

Global climate change is probably one of the highest priority issues of our time. If greenhouse gas emissions continue at the current level, the risk of serious, pervasive, and irreversible effects on humans and ecosystems is expected to increase. New reports have emerged on what happens if we do not meet the 1.5-degree target.

The government of Sweden decided that Sweden will be a leader in the implementation of the Agenda 2030 and Paris Agreement, setting targets above EU's ones. For this reason, a climate policy framework was adopted in 2017, which consists of climate goals, climate laws and climate policy councils. The framework aims to provide a coherent climate policy to guarantee the long-term adjustments required to combat climate change. The national Swedish climate goal is to have net zero emissions of greenhouse gases by 2045, by then to achieve negative emissions. However, the climate policy framework was not the first initiative to combat climate change in Sweden. Fossil-free Sweden was started by the government ahead of the climate summit in Paris in 2015.

The Swedish building sector, among other sectors, was responsible to take relevant actions, thereby ensuring the attainment of national targets. The government of Sweden assigned responsibilities to different ministries, from which the ministry of the infrastructure and ministry of the environment had a more direct duties to propel actions toward a low carbon built environment. The ministries included several agencies with diverse responsibilities. The Swedish Energy Agency, as subordinate to the ministry of the infrastructure, and the Swedish National Board of Housing, Building and Planning, as subordinate to the ministry of the environment, worked more directly to ensure achievement of national energy and climate targets. The Swedish Energy Agency contributed with analysis of supply and use of energy in Sweden and worked to secure the energy supply in this country. While the Swedish National Board of Housing, Building and Planning was responsible to analyse housing market in Sweden and issue building regulations. Full implementations and enforcement of national energy and climate targets was considered both in new construction and retrofitting existing buildings.

The Swedish energy policies are based on law-making within the EU. These policies advance the competitiveness of the country in terms of sustainability and security of clean energy supply. The energy production in Sweden is mainly dependent on domestic renewable energy resources: hydro, wind, solar and biofuels. The final energy use in Sweden is divided into the industrial, residential and service as well as transport sector (figure 1), from which the residential and service sector made up the greatest share in final energy use in 2017.

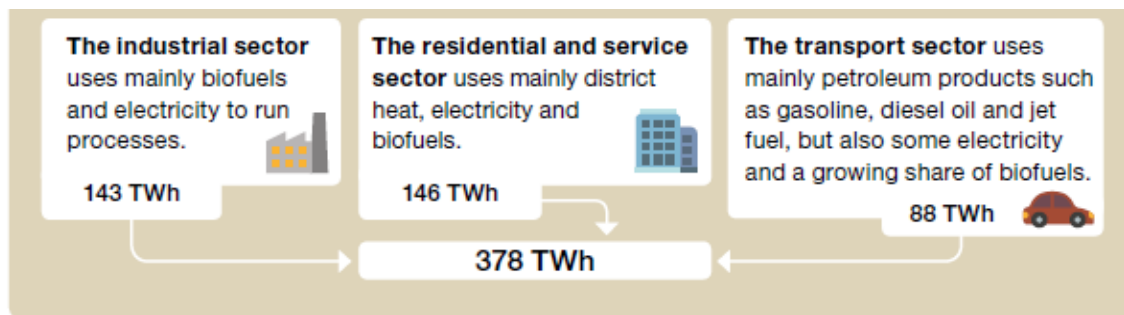


Figure 1. An over view of energy system in Sweden in 2017.

This document, the Regional Action Plan for Småland and the islands seeks the moving from goals and policies to actions that will reach the targets of decarbonizing of the building environment aiming by those policies.

1.1 Regional policy instrument 2014-2020

The region Småland and Islands, Figure 2, had a priority to support the shift towards a low-carbon economy in all sectors. During the period 2014-2020, the European Regional Development fund was about 532 million for growth and employment in Småland and The islands. The program area includes Jönköping, Kronoberg, Kalmar and Gotland Counties. The purpose of the program was to increase competitiveness and employment also promote growth in the region. The program for the European Regional Development Fund in Småland and the Islands contributed to the fulfilment of the European Union's strategy for smart and sustainable growth for all and to achieve economic, social and territorial cohesion between 2014 and 2020.

The program area was strategically located in south-eastern Sweden. The area had 34 municipalities and just over 800,000 inhabitants. The program area, which had traditionally been industry dependent and with a high proportion of the population, and lacking higher education, was facing a structural transformation with a need to develop a more knowledge-based economy for increased competition cleaning power. Altogether, this created challenges and opportunities for the area, which in regional growth policy and with the EU Regional Development Fund as a tool.

The program comprised four focus areas: To strengthen research, technological development and innovation, To increase the availability, use and quality of information and Communication Technology (ICT), To increase the competitiveness of small and medium-sized enterprises, and To support the transition to a low-carbon economy in all sectors.



Figure 2. Småland and the islands

2 Part I – Background

2.1 General information

Project Name	Towards low carbon city districts through the improvement of regional policies
Project Acronym	LC Districts
Partner organisation(s) concerned	Linnaeus University
Country	Sweden
NUTS2 region	
Contact person	Jimmy Johansson
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2.2 Policy context

2.2.1 Policy Instrument

The Action Plan aims to impact:

- Investment for Growth and Jobs programme
- European Territorial Cooperation programme
- Other regional development policy instrument

Name of the policy instrument(s) addressed:

ERDF ROP of Småland and the islands 2021-2027

2.3 Regional policy instrument 2021-2027

The policy Instrument OP 2021-2027 is not yet made official but the goals are settled, and the involved bodies have reviewed and approved the policy document. During spring 2022 the operational programme is planned to be presented.

Similar to the previous period, the programme area of Småland and the islands covers the four counties: Jönköping, Kronoberg, Kalmar and Gotland. The Kalmar County includes Öland as well. These counties comprise 34 municipalities, with a total population of over 800,000. This region is still dependent on industries. Unfortunately, problems in this region remains almost the same, as the Småland and the island region faces sparse and unbalanced population structure, as migrated inhabitants are mainly away from rural areas. Any such problem poses challenges considering the working and living outlooks in this region. In addition, the Småland and the island region faces further challenges in terms of unbalanced business structure, weak rate of growth among small and medium-sized enterprises, few knowledge-intensive enterprises, low level of investments in research and development, limited access to broadband, and high emissions from transport. The operational programme under the regional policy for the Småland and the islands region focuses on sustainable development throughout this region. But, a great importance is put on gender equality, prohibiting discrimination, and boosting environmentally sustainable growth. However, the Småland and the islands region excluded a special focus on sustainable urban development, due to unbalanced population structure in this region. Three target areas have been identified for the region according to:

- Strengthened competitiveness, increased degree of innovation and secured benefits of digitalisation
- Strengthened competence for an accelerated adjustment and smart specialization as well as an equal labor market
- Increase the pace of climate change for a better environment

The latest regional policy instrument supports sustainable and inclusive growth in Småland and the islands, and its objectives' follows the Cohesion Policy targets to support smarter Europe:

- Smarter Europe: by boosting innovation and digitalisation to support small and medium-sized businesses,
- A Greener, carbon free Europe: through investing in renewables and energy transition, thereby implementing the Paris Agreement to fight against climate change,
- A more Connected Europe: by further developing strategic transport and digital networks,
- A more Social Europe: by delivering on the European Pillar of Social Rights,
- A Europe closer to citizens: by supporting strategies for integrated and sustainable development across the EU.

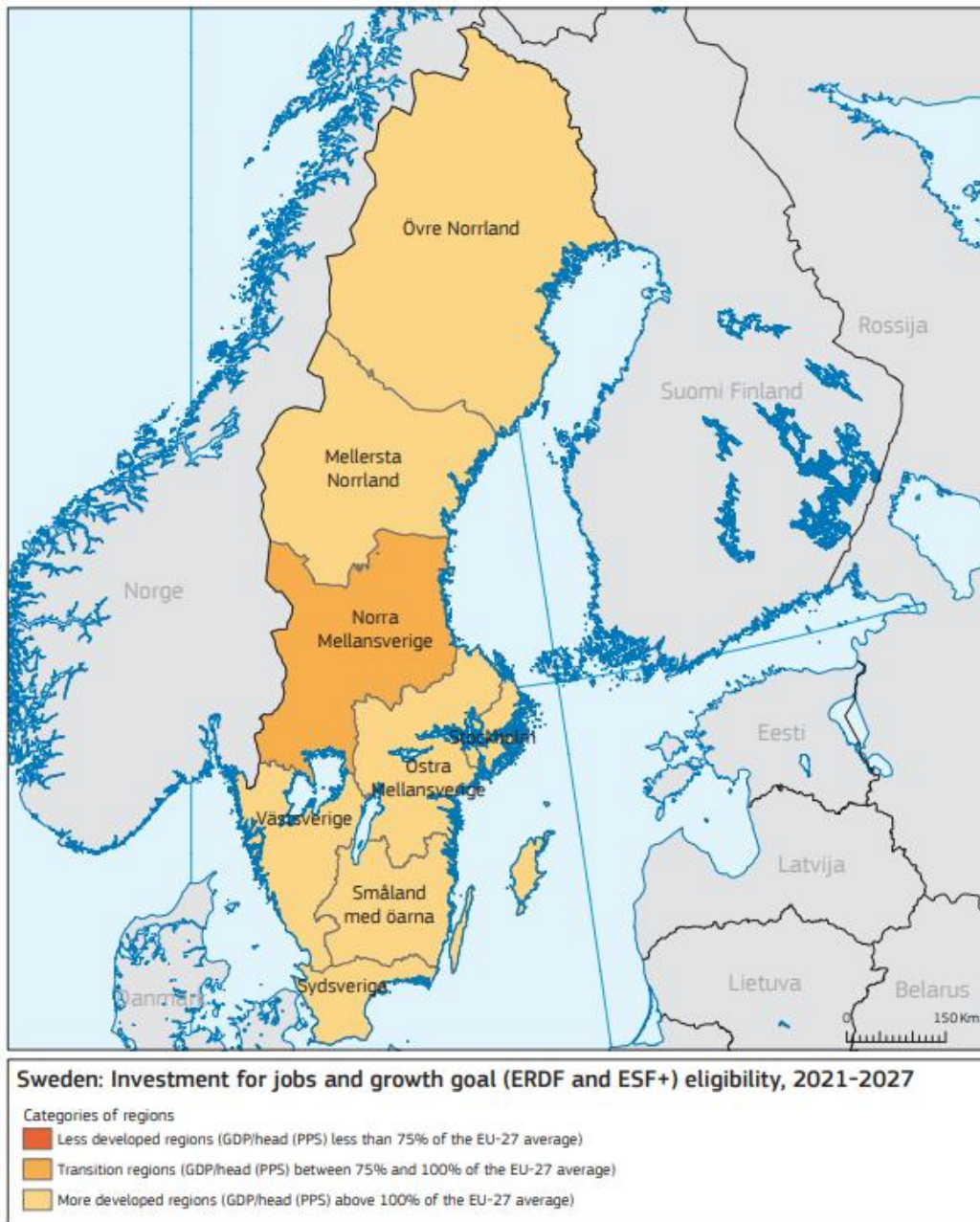


Figure 3. Investment for jobs and growth goal 2021-2027

Currently, the Swedish Agency for Economic and Regional Growth develops an operational programme for the policy instrument 2021-2027 to deliver the Cohesion Policy targets for smarter Europe, through the opportunities available in the national ERDF programme and ESF¹. The operational programme:

¹ The ERDF fund invest in the social and economic development of all EU regions and cities. While the EFS support jobs and create a fair and socially inclusive society in EU countries.

- Included four main axes included in the previous regional policy (2014-2020): (1) to strength research, technological development and innovation, (2) to enhance access to, and use and quality of, information and communication technologies, (3) to enhance the competitiveness of small and medium-sized enterprises, and (4) to support the shift towards a low-carbon economy in all sectors.
- Specified two new policy objectives: (1) to implement skills development initiatives linked to smart specialization, initiatives for circular economy, the development of smart energy systems with energy storage units, (2) to support initiatives that lead to sustainable water management

The LC-Districts project was initially developed to satisfy the forth axes through (1) supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions and increased use of renewable energy, and/or (2) testing and demonstrating new technologies. However, its focus area was later broadened to cover the first policy objective through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects.

2.3.1 Link to the RIS3

Following the smart specialization Strategy, Sweden identified and selected 11 different priority areas with potential for growth. In addition, Kronoberg, Jönköping, Kalmar, and Gotland County specified a limited number of priority areas for knowledge based investments in these regions (Figure 4).

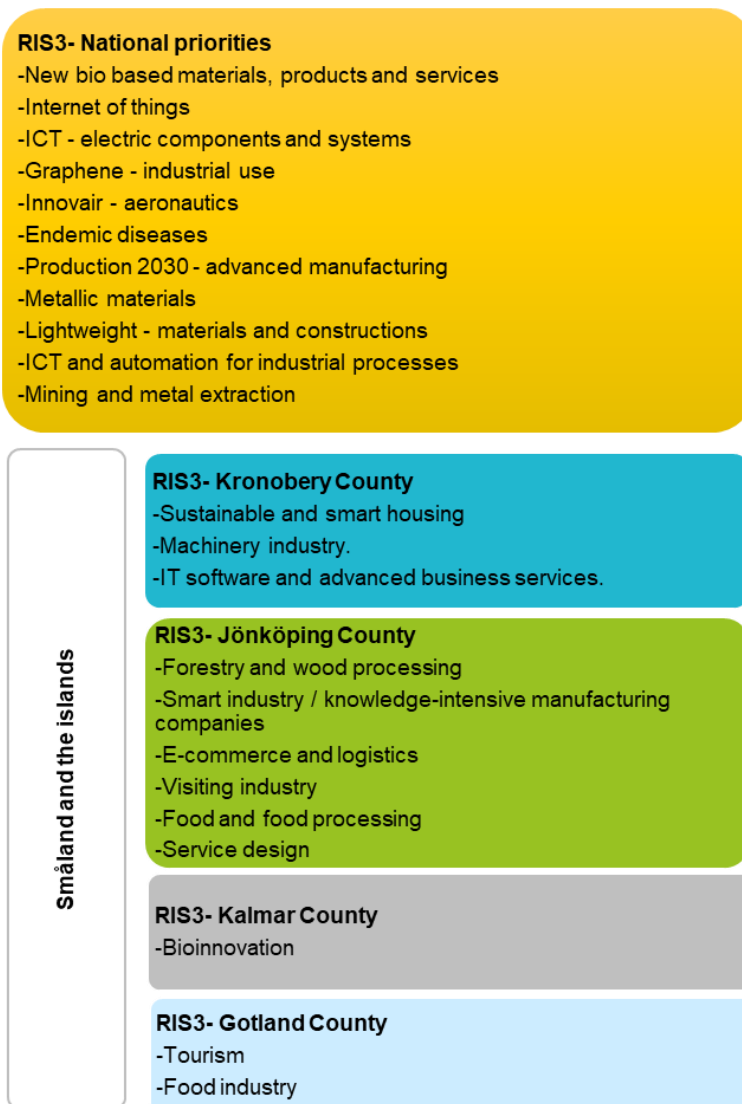


Figure 4- Priority areas in Sweden, Småland and the islands

The LC-District project in Sweden utilized scientific research and academia-industry collaborations for the benefit of different stakeholders (e.g. the building and construction industry, the County Councils, and municipalities) in Småland. Hence, the project increased the critical competence in academies, the building industry; also, it helps to spread knowledge to other regions, thereby advancing sustainable development progress. However, the project satisfied certain national and regional priorities, including:

- At the national level: New bio based materials, products and services
- Kronoberg County: Sustainable and smart housing
- Jönköping County: Forestry and wood processing
- Kalmar: Bio-innovation

2.4 Main findings from the Regional Diagnosis

During the last decades, great efforts have been made in Sweden to speed up transitions to low carbon energy resources in the building and service sector. As, the utilization of fossil fuels (oil and natural gas) for supporting the heating and domestic hot water demands was decreased from 33% in 1990 to 3% in 2017. The reduction in the utilization of the fossil fuels allowed diminishing the emissions of carbon dioxide from Swedish building and service sector approximately by 90% since 1990 (figure 5).

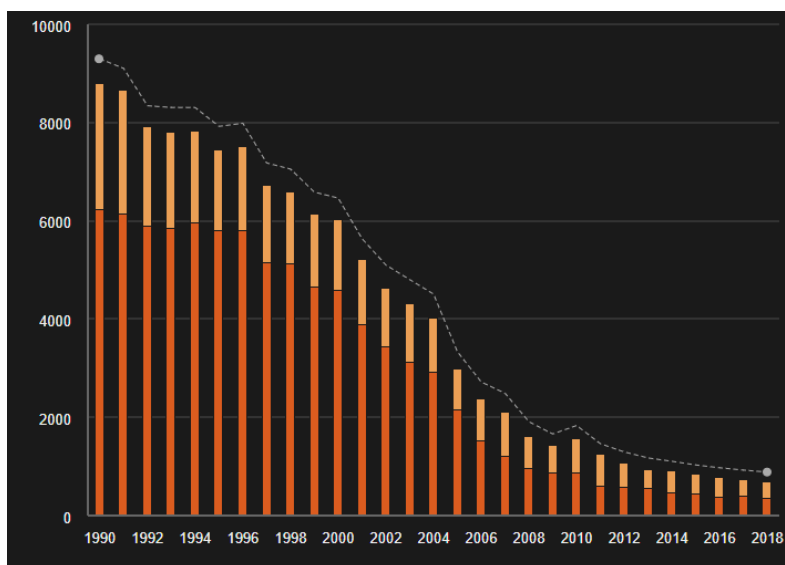
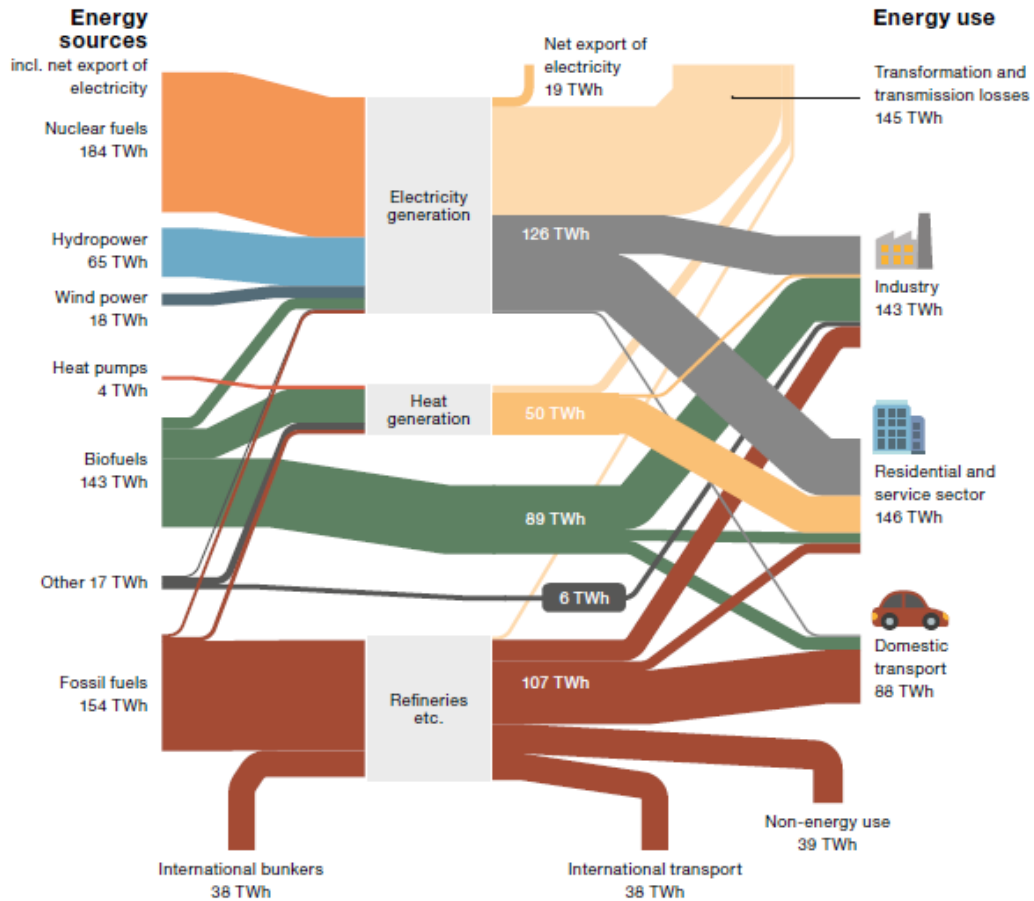


Figure 5. Total carbon dioxide release from the heating technologies in building and service sectors.

In 2017, the total energy use of the building and service sector in Sweden was about 146 TWh, corresponding to 39% of the total energy use in this country at the same year. Considering detached houses, electricity was the most common energy resource, used to support heating and domestic hot water demands, followed by biomass-based energy resources, district heating, oil and natural gas. With respect to multi-family houses and commercial buildings, the district heating system made up the highest share among other energy resources, followed by electricity, bio-based energy resources, oil, and natural gas. The electricity used by building and service sector is largely based on hydropower and nuclear power, but the expansion of wind power is steadily increasing and so is the use of biofuel for electricity production.

Energy system 2017



The regional diagnosis summarized outputs, achieved during the first and second periods (PRs) of this project.

Table 1. Stakeholders' information and assessment services and methodologies

Summary (from the regional diagnosis)	Challenges#
Lack of a tool, which enables evaluating multiple sustainability measures.	1-Lack of an applicable method.
Lack of a tool to assist stakeholders during the decision-making process.	2-Lack of an applicable tool.
Low knowledge-intensive enterprises and limited access for technical teams	3-Insufficient training of specialist.
High investment costs of renewable energy resources or energy renovation measures were considered as main challenge when trying to improve energy performance of buildings.	4-High investment cost.

Table 2. Information and management structures at the municipality and district level

Summary (from the regional diagnosis)	Challenges
Lack of a governance model to manage complicated policies.	5-Lack of implementation plans, which would manage governance and knowledge

	related challenges, to satisfy national and/or regional policies.
Lack of information about benefits of implementing energy renovation measures.	6-Lack of information for beneficiaries.
Lack of collaborations between academia and industries, which make it difficult to use newly developed method or models in practice.	7-Lack of efficient collaborations between academia and industries.

Table 3. Policies and programmes governance and management

Summary (from the regional diagnosis)	Challenges
Lack ambitious political decisions to stimulate energy efficiency measures.	8-No political decisions to stimulate energy efficiency measures
Low energy price, which negatively affects the profitability of the energy renovation measures.	9-Low energy cost
Difficulties in changing norms in construction companies to motivate the implementation of energy efficiency measures. This occurs due to financial considerations.	10-Difficult to change norms in construction industry

3 Part II – Methodology

3.1 Interregional approach and conclusions

The Interreg Europe programme focus on the exchange of experiences between regions in different European countries. The principle is that all regions have similar challenges and, in this way, good ideas and feasible solutions are shared. In the Interreg Europe LC Districts project study visits to the 5 included regions was made. The partners identified and presented 2 and 4 good practices in the field of low carbon principles related to the building sector. Due to COVID-19 pandemic situation, only the visit to Navarra could be done in person (September 2019). The visits to the remaining regions were held virtually: Marche-Italy (October 2020), Småland-Sweden (December 2020), Zlín-Czech Republic (January 2021) and Croatia (March 2021).

First study visit by lead partner (Navarra region) in 2019: The study visit provided insightful information regarding energy renovation of different neighborhoods, designing and constructing passive-energy residential buildings, and replacing the existing energy resources with a biomass based district heating system. Interesting approaches had been employed to support projects' implementation costs. The Navarra region had executed an interesting energy renovation solution and they had developed and executed a very successful one-stop-shop approach by involving several stakeholders.

Second study visit by Marche region in Italy: this study visit included two good practices: ITACA protocol and joint SEAP Vallensia. The ITACA protocol was an environmental certification tool, which allowed evaluating buildings' performance in terms of indoor comfort, energy consumption, and costs during their lifetime. The joint SEAP Vallensia was a Sustainable Energy Action Plan for a group of municipalities from the Marche Region. It referred to a plan performed by a group of neighbouring cities to achieve more effective results, when comparing with business as usual cases. Although, the administration and implementation of the ITACA protocol and its documentation added on investment costs, it did not have an overwhelming effect on the total budget required for executing the project. Implementing joint SEAP Vallesina allowed defining better strategies and/or actions for climate change adoption, managing collaborations between all authorities and transforming actions into an executable plan could be a challenging task. It was very interesting to know how involved parties worked together to accomplish the mission. The overall impression of communities working together was interesting to hear.

The third study visit by Linnaeus University from Småland and the island: In total four good practices were presented. The first good practice showed a project concerning renovation of residential buildings with several new technologies included and focus on energy efficiency. The second good practice was Växjö's new municipal and station house. The municipal and station house was built using wood and glass, reflecting the long tradition of the region in using wood for constructing new buildings. The third good practice was a series of passive detached

houses, which were built in Öland one of the islands included in the region. The fourth good practice was about a decision-making method allowing user to suggest design alternatives for constructions considering energy consumption, life-cycle cost, and indoor comfort. Below, one finds a summary of partners' feedback to Swedish good practices (Table 4).

Table 4. Partners' feedback

Practice #1 Project READY
<p>The best aspects:</p> <ul style="list-style-type: none"> - The amount of dwellings retrofitted. - wide and well-structured consortium - involving tenants - being affordable
<p>Things to improve:</p> <ul style="list-style-type: none"> - establishment of a long-term strategy - The analysis of the reduced CO₂ emissions
<p>Things to replicate:</p> <ul style="list-style-type: none"> - The project can be replicated as a whole.
<p>Mirror practices per region:</p> <ul style="list-style-type: none"> - MLEI-PDA Efidistrict project and H2o2o-PDA SustaiNAVility Project - Renovation of the social housing of via Zanella in Senigallia
<p>Ways to scale up:</p> <ul style="list-style-type: none"> - Developing a network of One-stop-shop - creating a policy - Integrating this renovation approach into the building codes, master plan rules and urban development laws of cities and towns.
Practice #2 Project City Hall
<p>The best aspects:</p> <ul style="list-style-type: none"> - The size of the building and the use of local materials Zero-emission target, higher use of renewables, pleasant indoor environment - Excellent interior and exterior building planning - Strong urban planning with the aim of solving traffic issues.
<p>Things to improve:</p> <ul style="list-style-type: none"> - The integration within the urban area and socio-economic context
<p>Things to replicate:</p> <ul style="list-style-type: none"> - It is difficult, because the amount of money necessary - Higher use of wooden materials - in the few bigger cities, characterized by a more dynamic socio-economic system - Model for solving traffic issues related to railway transports - Integration of parking and PV/heat pumps in urban areas where no DHS is available.
<p>Mirror practices per region:</p> <ul style="list-style-type: none"> - The new medical college of Public University of Navarra (UPNA). - Almost similar Energy Centre Bračak
<p>Ways to scale up:</p>

- New specifications in bidding documents in order to use local resources
- Combination of different aspects, not only energy consumption
- Facilitating to mainstream and integrate the approach into the regional and municipal planning tools, building codes and master plans.

Practice #3: Project Vickleby

The best aspects:

- The use of local materials
- keeping traditional architectural design with low energy consumption at the same time
- Combination of the use of traditional and social architectural design values together with high standard of energy efficiency.

Things to improve:

- Higher use of renewables – e.g. PV system
- Creating a specific brand and a customer oriented promotional campaign
- Integration of RES energy (i.e. PV + heat pumps combined with underfloor heating systems)

Things to replicate:

- Combination of low energy consumption with traditional architectural design
- Similar projects are/were commonly accomplished in Italy.
- these models can be integrated within renovations of private households (and social housing which will have an increase in our country)

Mirror practices per region:

- New residential building for elderly people in Pamplona.
- There are several similar project in Marche Region
- There are several public «social» housing programmes in the Zagreb County

Ways to scale up:

New specifications in bidding documents in order to use local resources.

- Put more emphasis on maintaining the traditional look while meeting the conditions for energy efficiency

Facilitating to mainstream and integrate the approach into the regional and municipal planning tools, building codes and master plans.

- Connection of multiple sectors (i.e. heating and electricity in combination) should be taken into account in order to have more effective programme.

Practice #4: Decision-making method

The best aspects:

- The amount of solutions, which have been analysed.
- The multi-criteria optimization approach aiming at two different target groups providing data which may be presented to the stakeholders
- the integration of building information, modelling, and simulation in exploring big-data in the built environment, energy, and cost sectors, a useful method to select a trade-off construction solution.

Things to improve:

- It is not clear enough how use the approach to the stakeholders in order to decide which type of works execute.
- While the computer- based optimization was performed, an actual stakeholders' decision based on the data is not reported.
- It would be useful to include more optimization variables in the analysis of the performance of construction solutions

<p>Things to replicate:</p> <ul style="list-style-type: none"> - The process at a whole in renovation decision-making process. - The idea is universal for all regions
<p>Mirror practices per region:</p> <ul style="list-style-type: none"> - MLEI-PDA Efidistrict project and H2o2o-PDA SustaiNAVility project. - There have been multiple energy savings optimizations performed for different stakeholders also by the UCEEB CTU
<p>Ways to scale up:</p> <ul style="list-style-type: none"> - Developing a network of One-stop-shop - A detailed methodology should have to be prepared - Testing the method with all the optimization variables identified at the regional level, in cooperation with all the relevant regional stakeholders, and creating common standards based on the results obtained.

Fourth study visit by Zlin region in Czech Republic: The fourth study visit provided brief information about the energy situation in Czech Republic. In addition, the national operational program on environment (OP environment program) and green saving scheme were presented in the fourth study visit. The OP environment program protects and ensures the quality of the living environment, promotes the efficient use of resources, and eliminates the negative impacts of human activities on environment and climate change mitigation. Application of the OP environment program allowed renovating and improving the energy efficiency of several buildings in Czech Republic. While, the green saving scheme supported the implementation of the energy measures when renovating or constructing new buildings. Furthermore, an action plan for energy efficiency of buildings, owned by the Zlin region, was presented. The action plan improves the energy performance of buildings and increases the security and reliability of the energy supply.

Fifth study visit by Croatia: the fifth study visit provided a brief presentation about policy settings in Croatia. In addition, it described Sustainable Energy and Climate Action Plans (SECAPs) and policy as well as financial perspectives related to the district heating system renewal in Croatia. Interesting aspects were the governance and management of the projects, variation in strategies used in developing district heating system among European countries, handling unpredicted incidents: earthquake and Covid-19 and technical, economic and communicational training for involved stakeholders

3.2 Regional approach. Stakeholders

The stakeholders comprise regional construction and renovation SMEs, municipalities from Kronoberg, Jönköping and Kalmar counties, Energy agency for southeast Sweden, Energy agency for north Sweden, and RISE research institute of Sweden. During the project implementation, a normative approach was addressed when collaborating with different stakeholders. Any such approach allows each stakeholder to “merit consideration for its own

sake and not merely because of its ability to further the interests of some other group”². This approach places an objective consideration of all stakeholders’ interest. The normative approach enabled Linnaeus University to collaborate with the stakeholders in different ways, while trying to fulfil the aim of the LC-Districts project (Figure 6).

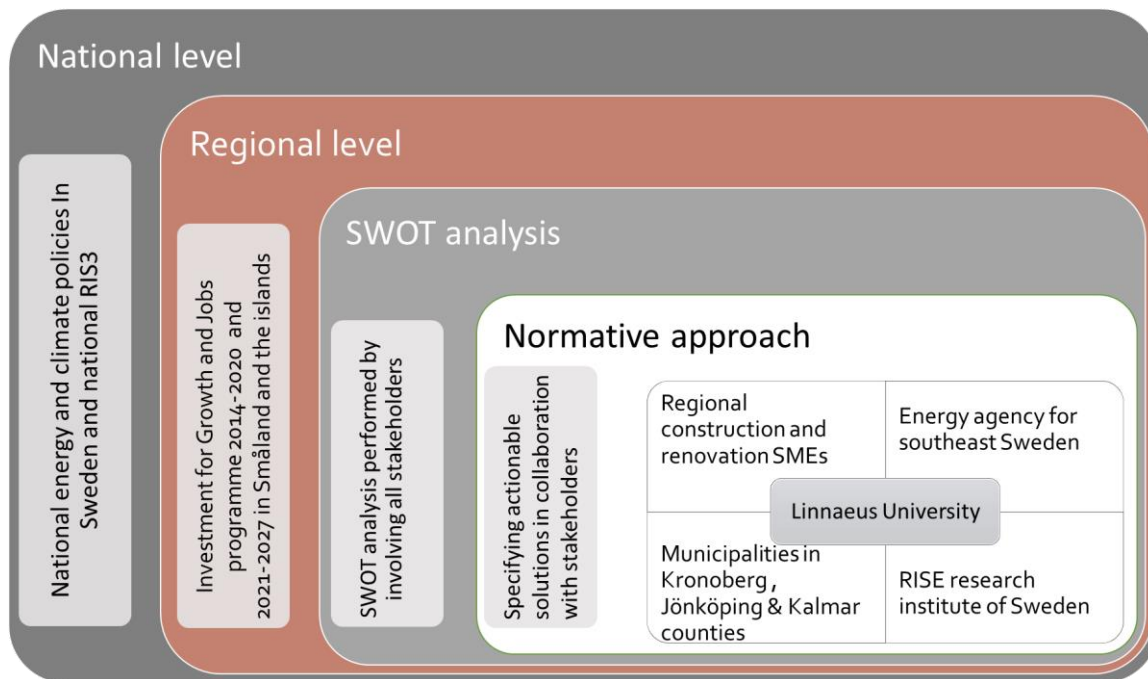


Figure 6. Normative approach used when collaborating with stakeholders

PR1 State of art

Several activities were carried out to perform a state of art analysis to determine the level of development achieved in the region in terms of energy efficiency and low carbon transition.



Regional diagnosis PR2

A regional diagnosis report was prepared for the region Småland and the island, which summarised outputs from PR1. Furthermore, a SWOT analysis was performed to bring objectivity to the planning process.

Figure 6. The first and second periods of LC-Districts

PR1: the research group at Linnaeus University performed a state of art analysis to determine the level of developments archived in the region in terms of energy efficiency and carbon transition. The analysis was performed by (i) overviewing previous regional policies and funds (ii) specifying programs and initiatives, which support low carbon transitions, and (iii) determining current challenges related to the buiding and construction industry in Småland and the islands.

² Thomas Donaldson and Lee E. Preston, “The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications,” *The Academy of Management Review* 20, no. 1 (1995): 65–91.

PR2: the analysis was later expanded in PR2 by organizing a large workshop with stakeholders representatives and multiple small-scale physical and online meetings with different stakeholders. The small-sale meetings were more constrcutive, resulting in informed and on-target discussions with stakeholders. Furthermore, relevant data were gathered using available databases to perform scientific analyses. A SWOT analysis was also performed to specify strengths, weaknesses, oppurtunities, and threats for low carbon transition.

3.3 Regional strategic thinking process

Following the normative approach, separate discussions were carried out with stakeholders to match strengths and opportunities and understand the vulnerability to threats based on the building and construction industry’s weaknesses, thereby specifying actinable solutions. More specifically, these discussion tried to answer how one can:

- Use their strengths to exploit opportunities (strengths- opportunities)
- Use their strengths to reduce threats (strengths-threats)
- Improve weaknesses through exploiting opportunities (weaknesses- opportunities)
- Reduce weaknesses to avoid threats (weaknesses-threats)

PR1 State of art

Several activities were carried out to perform a state of art analysis to determine the level of development achieved in the region in terms of energy efficiency and low carbon transition.



Regional diagnosis PR2

A regional diagnosis report was prepared for the region Småland and the island, which summarised outputs from PR1. Furthermore, a SWOT analysis was performed to bring objectivity to the planning process.

PR3 Strategic thinking process

Discussions were further carried out with stakeholders to (i) match strengths and opportunities and (ii) understand the vulnerability to threats based on the building and construction industry’s weaknesses, thereby specifying areas where actions were required.

Figure 7. Strategic thinking process

3.4 List of relevant objectives and possible solutions

The outcomes of discussions with stakeholders were actionable solutions presented in table 5

. The solutions, which have already been implemented, were specified using green font color.

Table 5. Actionable solutions	Opportunities (O)	Threats (T)
	1-More digitalized industries to cope with costs 2-More automatized industries to cope with costs	1-Profitability 2- Risk of low energy saving or poor indoor comfort after renovations

	<p>3-Collaborations between actors</p> <p>4-Contributing in national economic growth</p> <p>5-More timber buildings</p> <p>6-Modern technology development to use traditional materials</p> <p>7-Develop alternative materials</p> <p>8-Possibilities to exchange experience and knowledge between actors</p> <p>9-Positive environmental balance</p>	<p>3- Too much transport may be needed</p>
<p>Strengths (S)</p> <p>1-Use of local materials</p> <p>2-Health indoor environment</p> <p>3-Low operation costs</p> <p>4-Increased value</p> <p>5-Benefits in global level</p> <p>6-Reduced emissions of greenhouse gases</p>	<p>S1O3: Support Sustainable wood constructions for social housing in European cities. A research proposal was developed with academic partners in Germany and Finland.</p> <p>Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions.</p> <p>RIS3: Kronoberg</p> <p>S1O3 and S1O4: support the increasing demand for sawn wood for construction in Sweden. A research proposal was developed with Växjö municipality.</p> <p>Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. And through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects.</p> <p>RIS3: Kronoberg</p> <p>S2O3: enhance the wellbeing of seniors of elderly homes in Sweden. A research proposal was developed with Chalmers University.</p> <p>Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions.</p> <p>RIS3: Kronoberg</p> <p>S5O3O4O8O9: Consortium for LEVELs, which included several partners across Europe.</p> <p>Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. And through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects.</p>	

<p>Weaknesses</p> <ol style="list-style-type: none"> 1-Lack of knowledge even when new methods are available 2-Expensive solutions 3-Lack of a holistic approach 4-Difficult to implement energy efficiency measures for owners with low income 5-No clear rules regarding financial aids 6-Low energy cost 7-Lack of information for beneficiaries 8-High investment cost 9-Bureaucracy 10-No political decisions to stimulate energy efficiency measures or energy efficient constructions 11-Fire and moisture risks with timber buildings 12-Availability of research centre 13-Lack of a tool to evaluate cost, comfort, CO₂ emissions 14-High complexity 15-Reluctance of designers to leave their comfort zone and adopt new technologies or methods 16- Lack of implementation plans, which would manage governance and knowledge related challenges, to satisfy national and/or regional policies. 17-Lack of norms <p>Insufficient training of specialist</p>	<p>RIS3: National & Kronoberg</p> <p>W1W2O8Og: Effectiveness of smart solar blinds in reducing the energy consumption and costs while improving indoor environment conditions. Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. And through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects. RIS3: Kronoberg</p> <p>W12O3: Competence center for a sustainable energy system Regional policy instrument: Through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects. RIS3: Kronoberg</p> <p>W1W13O3Og: using machine-learning algorithms to successfully forecast future climate conditions and estimate occupants' behavior. A research proposal was developed with Mälardalen University and RISE. Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. And through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects. RIS3: Kronoberg</p> <p>W2W4W8T1: Profitability of various energy supply systems in light of their different energy prices and climate conditions. A research publication Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. RIS3: Kronoberg</p> <p>W2W4W8T1: Subsidies Required for Installing Renewable Energy Supply Systems Considering Variations In Future Climate Conditions. A research publication Regional policy instrument: Through supporting the development, dissemination and use of methods / models and laying the foundation for potential emission reductions. RIS3: Kronoberg</p> <p>W3W16O4Og: To develop an implementation plan for the roadmap Fossil-Free Competitive Construction and Civil Engineering Sector (more information about the roadmap is presented in section 4.1.1)</p>
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	<p>Regional policy instrument: Through initiating and building academia-industry collaborations, thereby involving additional stakeholders in the projects and provide a holistic approach, which supports the low carbon transition in the building and construction industry.</p> <p>RIS3: National including Kronoberg</p>
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4 Part III- Actions

One action was specified to fulfil stakeholders' need and overcome the challenges (Table 6).

Table 6. List of actions

Action	Objective
<p>Action 1 Type 2: improved governance</p> <p>Developing an implementation plan for the roadmap Fossil-Free Competitive Construction and Civil Engineering Sector, thereby resolving the governance and knowledge related challenges.</p>	<ul style="list-style-type: none"> Define requirements and new indicators in relation to energy efficiency in building sector for the management of the OP/ Establish new requirements and focus areas for the beneficiaries of the OP calls/

4.1 Action 1: Developing an implementation plan for the roadmap Fossil-Free Competitive Construction and Civil Engineering Sector.

4.1.1 Relevance to the project- background

The government of Sweden started an initiative, known as Fossil-free Sweden, to turn the country to a fossil-free welfare state. Within the framework of Fossil-Free Sweden industries and organizations have developed initially 13 national roadmaps to show how competitiveness can be increased by becoming fossil-free or climate-neutral. The roadmaps show the possibilities, identify obstacles, and contain proposals for solutions, both through own commitments and political proposals. They have been handed over to the government and now form the basis for continued climate work as all together, they provide a picture of what a fossil-free business life will look like in Sweden. One of the national roadmaps is the Fossil-Free Competitive Construction and Civil Engineering Sector.

The building and construction sector accounts for approximately 21% of Sweden's climate impact, which corresponds to 17.7 million tonnes of carbon dioxide equivalents. The production of building materials accounts for the majority of greenhouse gas emissions, about 80% of the climate phase's climate impact. While transport to the construction site and the construction production itself has made a small contribution, together around 20%. The roadmap indicates that the direct decisive factor for the success of the roadmap's goals is collaboration through the entire value chain in the building and construction sector including regional governance.

The roadmap enables moving from policies to actions, thereby fulfilling the energy and climate goals at the national level. To adopt and operationalize this roadmap at the regional level, municipalities, such as Kalmar municipality in Småland, develop their regional roadmaps in relation to the Fossil-Free Competitive Construction and Civil Engineering Sector. These regional roadmaps should be supported by the regional policy instruments (Figure 8). Industries

and organizations, who were responsible for the development of the national roadmap, are the enablers as they dedicated their support to boost the regional development in collaboration with the regional actors.

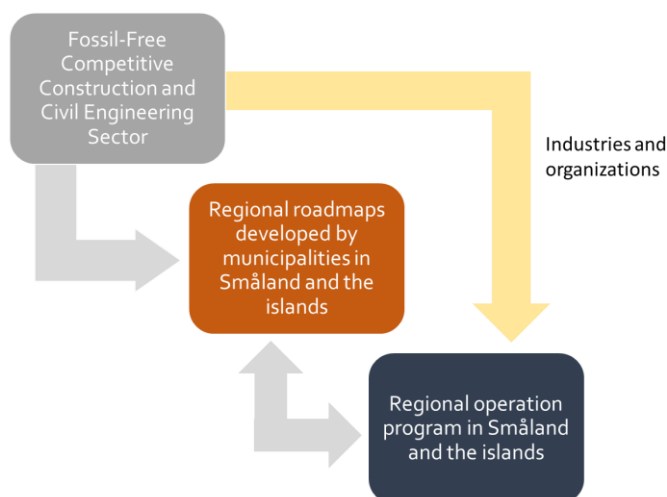


Figure 8. From national roadmap to regional policy instrument

In 2022 an implementation plan for the roadmap (Fossil-Free Competitive Construction and Civil Engineering Sector) is being developed by including not only industries and organizations, but also regional managing authorities and municipalities across Sweden (including municipalities in Småland and the islands). The implementation plan will resolve the governance and knowledge-related challenges across Sweden that also is found in Småland and the Islands.

The vision of the action plan is:

Towards a low carbon transition in the building and construction industry by supporting the development of an implementation plan for the roadmap Fossil-Free Competitive Construction and Civil Engineering Sector

4.1.2 Interregional learning

This action was inspired by Marche region, the project partner in Italy. The partner worked with multiple national and international stakeholders to specify actionable solutions such as joint SEAP Vallesina, thereby supporting the low carbon transition in the building industry. The joint SEAP Vallesina was a Sustainable Energy Action Plan for a group of municipalities from the Marche Region. It referred to a plan performed by a group of neighbouring cities to achieve more effective results, when comparing with business-as-usual cases.

4.1.3 Nature of the action

The action is related to the improved governance and aims to develop an implementation plan for the roadmap Fossil-Free Competitive Construction and Civil Engineering Sector, thereby supporting the low carbon transition in the building and construction industry.

This implementation plan will be designed in the basis of the National Roadmap by taking into account the recommendations for government, and will include three activities while focuses on 11 different areas. The activities include:

- Analysis of current situation and the surrounding world
- Benchmarking and examination of gaps (gap analysis)
- Proposal for a national implementation plan for the roadmap's strategy and structure and relation to the local roadmaps and regional policies.

The focus areas comprise:

- More efficient and flexible use of the existing stock.
- The importance of flexibility over time in the possibilities of using the stock through renovations, among other things based on consumption demand.
- Design of the climate impact of physical planning and design
- Increased efforts in circular economy and sharing economy
- Powerful and simple climate calculation models
- Models for Life Cycle Management
- Risk assessment models
- Models for verification, follow-up and analysis based on the objectives of the roadmap
- Sustainable and proactive business and procurement models
- Codes of conduct and policies
- Economic perspectives, driving forces and financing solutions

The resulting report of the implementation plan proposed by Småland and the islands region will be part of the nationwide regional reports, as parallel works will be done in Regions all along Sweden.

Småland and the islands region, will keep two meetings with the OP Managing Authority during 2022 (April and August). In these meetings the implementation plan will be discussed in relation to the OP. The meetings will define requirements and new indicators in relation to energy efficiency in building sector for the management of the OP as well as establish new requirements and focus areas for the beneficiaries of the OP calls.

4.1.4 Policy improvement

The implementation plan will resolve the existence of a governance and knowledge-related challenge across Sweden, including Småland and the island.

This regional roadmap with other regional roadmaps of Sweden will encompass the national implementation plan, which will ensure a complete analysis of the above mentioned issues, taking into account the peculiarities of all the regions. The implementation plan will present policy improvements related to mapping and measuring of building's climate impact and also suggest requirements on buildings in relation to climate impact. From June 2022 all new buildings in Sweden should have a climate declaration, however, there are no requirements on the level of climate impact defined. The implementation plan will further suggest focus areas of development work that regions can chose to consider to in relation to OP and its specific regional conditions.

4.1.5 Stakeholders involved

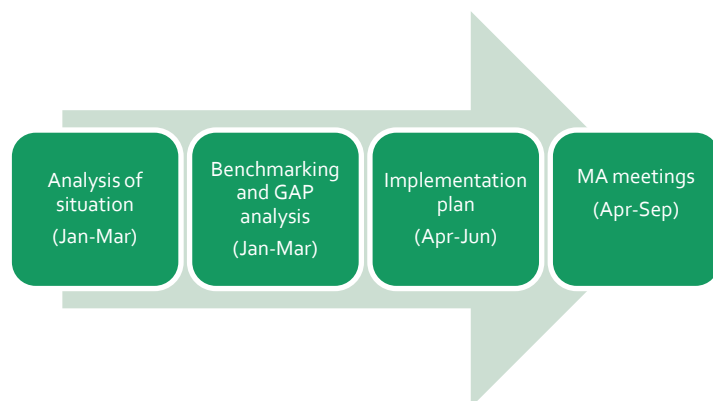
RISE research institute of Sweden is the main responsible body in the development of the implementation plan. Table 7 lists the stakeholders who contributes to the development of the implementation plan.

Table 7. List of the stakeholders, involved in action 1.

Stakeholders	Role
Linnaeus University	One of main responsible bodies
IQ Samhällsbyggnad	Influencing and monitoring
Installatörsföretagen	One of main responsible bodies
RISE research institute of Sweden	One of main responsible bodies
Fastighetsägarna	Influencing and monitoring
Byggföretagen	Influencing and monitoring
Sveriges Allmännyttta	Influencing and monitoring
Byggmaterialindustrierna	Influencing and monitoring
Byggherrarna	Influencing and monitoring
Innovationsföretagen	Influencing and monitoring
Installatörsföretagen	Influencing and monitoring
Trafikverket	Influencing and monitoring
Regions	Influencing and monitoring
Municipalities	Influencing and monitoring

4.1.6 Time frame

The project starts from January 2022 and ends in December 2022.



- Analysis of current situation and the surrounding world, First rapport: 1 March 2022
- Benchmarking and examination of gaps (gap analysis), Second rapport: 30 March 2022
- Proposal for a national implementation plan for the roadmap's strategy and structure and relation to the local roadmaps and regional policies, Third rapport: 30 June 2022
- Meeting/s with the Managing Authority: Apr and Sep 2022 and follow-up work towards possible implementation/monitoring Oct-Dec.

4.1.7 Costs

The total cost is about 150,000 euros. 90% Staff costs and 10% Other costs (meeting arrangements and travelling)

4.1.8 Funding sources

The development of the implementation plan is mainly supported by the Development Fund of the Swedish Construction Industry.

4.1.9 Indicators for the action

At the end of each activity (current situation and analysis of the surrounding world, benchmarking and examination of gaps, and proposal for a national implementation plan for the roadmap's strategy and structure and relation to the local roadmaps and regional policies) a report will be provided, which summarizes project's finding.

The reports are considered as implementation indicators of the action. In addition, stakeholders will be involved in the project by organizing three workshops. The number of stakeholders involved is measured as an indicator of success (each workshop aims to include minimum 20 participants).

	Indicator	Target
Process	Workshops	3
	Number of stakeholders	20 participants
Results	Number of reports	3 (one by each activity)
	Meeting with MA to decide the integration of the conclusions in the OP	1 with decision making

4.2 Actions Summary

A summary of the action is presented in table 8.

Table 8. Summary

Action title	Stakeholders involved	Time frame	Costs & Funding sources	Success indicators for the action
Action 1 To develop an implementation plan for the roadmap Fossil-Free Competitiveness Construction and Civil Engineering Sector	Linnaeus University IQ Samhällsbyggnad Installatörsföretagen RISE research institute of Sweden Fastighetsägarna Byggföretagen Sveriges Allmännyttan Byggmaterialindustrierna Byggherrarna Innovationsföretagen Installatörsföretagen Trafikverket Regional authorities Municipalities	January 2022 December 2022	About 150,000 euros	<ul style="list-style-type: none"> - A set of requirements and new indicators in relation to energy efficiency in building sector for the management of the OP (integration in the OP). - A set of new requirements and focus areas for the beneficiaries of the OP calls (integration in the OP)