GREEN TRANSFORMATION! A POLICY TOOL FOR REGIONAL SMART SPECIALIZATION

POLICY BRIEF ON GT FOR RIS3 STRATEGIES

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INTERVENTION AREA: SUSTANIBLE ENERGY/HYDROGEN

COUNTRY/REGION: REGION VÄSTERBOTTEN

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Summary

Policy recommendations from the Västerbotten region (Sweeden) center on sustainable energy in general with a particular focus on hydrogen. It is a relatively new area that has grown stronger at the national and EU level due to its potential to contribute to CO2 reduction and sustainable development. It's a great paradigm shift in the energy sector that is pushing for the "green industry". The momentum for hydrogen and finding new energy solutions in North Sweden is high on the agenda for stakeholders and politicians. It is considered, that the Västerbotten region needs to *transform the regime* with policy actors ahead. The next steps to implement are based on Responses, identified during the DPSIR analysis and are precisely explored here, in these Policy Briefs from the Västerbotten region.

1. Introduction

The selected intervention area for the Västerbotten region is **Sustainable energy with a focus on hydrogen**. It's related to the Västerbottens regional innovation strategy Smart Specialisations (RIS3) focus are *Sustainable energy and environmental technology.* The new Regional Smart Specialisation Strategy is currently being prepared and will be approved by the regional council in the spring of 2022. Many opportunities relate to hydrogen as an energy carrier that enables to reduce or completely eliminate the fossil carbon dioxide emissions and contribute to the Green Transition (GT). Hydrogen connects the electricity system and other energy sectors and simplifies the integration of renewable energy into the system.

Västerbotten has an opportunity to be a pioneer in the transition to reduced impact on the climate and the environment. The region has competitive advantages such as natural resources (mining, forestry, wind water, etc), renewable energy sources, research, knowledge, a driven business community, civil society, and residents, which gives Västerbotten an advantage in developing preparedness for climate change and changing to a circular society with reduced climate emissions and conservation of biodiversity where hydrogen has potential to strengthen the sustainable energy system. The political and industries will is high and Västerbotten has several strategies on national and regional level contributing to the national goal to become carbon neutral before 2030.

The Västerbotten strategy vision for sustainable development says that Västerbotten should be a Predecessor in transition. It also has the vision to be the world's permanent world exhibition for sustainability. Many of the visions are linked to EU, national and regional strategies/goals that exist for energy and climate. The focus on the vision might change depending on the stakeholder, but mainly all the visions go in the same direction as the national one. Conflicts in the region can be seen in prioritizing the implementation.

There are large investments in developing hydrogen in northern Sweden (Green Steel, Green Fuels. Hybrit, Northvolt, etc). The ability of hydrogen to store energy thus gives it a special role in Västerbotten's more integrated energy system of the future and can, through its various areas of use, contribute to a more robust and flexible energy system and are therefore emerging. Hydrogen also has other positive attributes; its storage has a large-scale effect i.e. the cost per stored unit decreases with increasing size.

Västerbotten faces several challenges as the industries transition to carbon-neutrality. This transition represents comprehensive changes to the industry and the mining activities that are part of the industry. As part of the transition, and to benefit from the vast supply of renewable energy in the regions, new industries will be established in the regions. Upper Norrland has an important need to attract a new workforce and it is estimated that the population may grow by about 100,000 people over the next 15 years.

The biggest challenges for Västerbottens relate to financial and public support and long-term commitment, which is required to establish new projects for future energy production facilities and investments of scale such as test sites. Companies/business clusters are not just hoping to gain funding for investment in their own business development, but they also aim for interaction with different stakeholders for knowledge sharing, since the challenges to find right skills, housing, infrastructure as

well as picking up in early-stage innovation (this, etc. depends on better collaboration between different levels and sectors).

The biggest gaps GT of the Västerbotten stakeholders were the Universities. They have a strong legitimacy role and have had a strong "Green profile" before the new policy development so it's not communicating a "new green profile" as can be seen from the industry. The companies still have difficulties collaborating with the Universities and "get a foot in the door and finding the right contact". If they can initiate new partnerships and test facilities that include actors in the whole value chain in the supply chain together, it would help the capacity to be more proactive for the opportunities that occur.

2. The policy context

The hydrogen intervention area has been gaining increased recognition in many EU strategic policy documents in the past years as a factor for fostering green transformation. The expectation for hydrogen is very high in Sweden. In 2050, hydrogen is estimated to account for 24% of Europe's total energy needs and to create 5.4 million jobs. The European Commission, together with European business, is investing EUR 8.7 billion in the coming framework program period in the sector, which has also been designated as a focus area for the restart of Europe following the Corona crisis within the Green Deal.

There is momentum as the EU is prioritizing the GT through the Green Deal and has introduced a hydrogen strategy with an announced investment of up to 430 billion euros by 2030 to stimulate both production and use of hydrogen. Sweden has signed the hydrogen declaration that Austria presented during its presidency in the EU. Many countries are developing their own strategies for using hydrogen and Sweden will present its own strategy in 2021.

Västerbotten has its own Regional development strategy that is setting its own broad vision, they also have many regional subject area strategies such as Regional innovation strategy, S3, climate and energy strategy, forest strategy, etc.

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Also, in Västerbotten it is important to remember that the EU level is controlling the direction of the visions with their legislation and strategies and we can see conflicts at the EU. For example, access to metals and forests is a prerequisite for the Green Transformation. Hydrogen, new fuels, wind turbines, batteries, and other climate-efficient solutions require these raw materials, but the mining and forest industries are not part of the sustainable energy solution.

As much of the development is dependent on the EU and national funds, a multilevel perspective is important. It is important to continue to develop the links between the different levels. As mentioned, the EU has the political power and legitimacy to set the vision, but the goals need to be realized at the

regional and local levels. Therefore is crucial to strengthen the cooperation between all levels and actors in the innovation systems it creates new needs for development that also looks at social aspects within, for example, sustainability, gender equality, and more flexible and long-term financing.

Västerbotten has been successful in developing a strong ecosystem for sustainable energy with leading experts in the field, but more development is needed.

3. Instruments and initiatives targeting the GT

There has been a rapid increase over the last year in the number of governments pledging to reduce greenhouse gas emissions to net-zero. EU as a power actor pushing for green growth and with the new industrial policy and the European Green Deal. With the new green policy, we can see a financial opportunity to develop our sustainable energy ecosystem as well as reduce our CO2 emission with the regional ERDF, ESF+, and Just transition Fund.

Swedens national energy agency, as well as Vinnova (Swedish innovation agency), have national operational programs that will distribute funds to further develop sustainable solutions in the energy sector and will be relevant.

For further capacity building and international cooperation, the Horizon Fund, InvestEU, and Digital Europe are seen as an instrument to further strengthen development as well as the Interreg programs. Other relevant funding instruments are the related Interreg programmes (Interreg Baltic Sea and new Interreg Aurora).

4. Challenges and opportunities focusing the GT

Significant investments are under the way in Upper Norrland for the transition of the existing industry, new green technologies, and new establishments

Västerbotten faces several challenges as the steel and metal industries in these regions transition to carbon-neutrality. This transition represents comprehensive changes to the industry value chains. As part of the transition, and to benefit from the vast supply of renewable energy in the regions, new industries will be established in the regions. Upper Norrland has an important need to attract a new workforce and it is estimated that the population may grow by about 100,000 people over the next 15 years.

The transition represents an important challenge for public actors that need to act jointly to manage power supply and generation, investments in infrastructure, construction plans, traffic, services, skill supply, etc. In the area of land use, conflicts of goals affect social sustainability, justice, permit processes, and the pace and local acceptance of transition processes. This type of conflict of goals is a national regulation and where the local and regional levels do not have much power.

Insufficient regional planning risk producing negative consequences for the climate transition of the industries transformation. Examples of consequences include protracted permit processes and low levels of acceptance at the local level due to delayed coordination and dialogue. There is a risk of suboptimal timing of decisions related to critical infrastructure required for the transition at the local level, for example in areas of electricity network and production, freight and passenger transport, broadband, charging infrastructure, and climate adaptation. Lack of coordination in the

housing market can negatively affect the attraction of the workforce needed for the transition of the industry. Planning at the municipal level risk missing functional connections that could positively impact sustainability and climate transition at a greater level.

Finally, there is a risk that municipalities and target groups not directly affected by the industrial establishments are deprioritized or left out at planning stages.

The ongoing transition of the industry to climate neutrality in Västerbotten involves extended production of renewable energy, access to metals resources for electrification, and other land use issues that relate to the rights and interests of the indigenous population, Sami.

The Green transition will not only put pressure on the economical system that needs to be more long-term as much of the development is project-based. The Industrial transition will need more sustainable electricity, which is already happening in Västerbotten and people are needed to work in the industry. Challenges are very well aligned with the landscape level, as the stakeholders in the energy sector are simply offering solutions that will help regions and nations to meet the sustainability goals, which are decided upon on the EU /national level. However, the policy is not always taking into account the supporting regulations. It is more probable that the niche level will have an important role to develop energy solutions. How the regime level will include niche-level development in order to make them work in the regional innovation system will therefore be important.

4.1. The emergence and growth of new activities with potential in innovation focusing on GT

Västerbotten has been optimistic about GT and sees opportunities for our businesses and industry. The region is active in future-oriented solutions and the opportunity to be more competitive on the global markets as we have a strong energy sector and diversification of expertise of sustainable energy solutions. The raw material is important for future sustainable development but is also affecting our natural footprints, however, we need to use our natural resources sustainably and contribute to the climate challenge.

The driving force is climate change and we need to stop our unsustainable development to be able to cut CO2 emissions. This has led to SDGs and sustainable strategies, which impact and steer the direction of development and economy.

The biggest challenges lie in creating an ecosystem that can respond to the GT where the regional, national, and EU-level are integrated, which is required to find global solutions. Companies are looking for public organizations regarding leadership and cooperation since they see that it adds to their legitimacy and building capacity, which makes them more attractive global actors. To build this we need long-term policy and finance, better structure how we organize and cooperate, as well as more pilot projects.

4.2. Entrepreneurial discovery bringing environmental and social benefits into existing innovation activities

Västerbotten has a very strong ecosystem in the energy sector with global competitive companies, universities, public organizations, and NGOs. Even though we have great opportunities we need to find better ways to connect to scooters in the region, but other regions and countries.

As the regional innovation strategy is being revised we can see that the GT is having a stronger impact and including both the environmental and social benefits. Still, we need to work to understand the GT impacts in Västerbottens and integrate this as a part of our regional planning.

The Universities are part of the majority of the platforms and development projects for hydrogen at the regional and global level and are contributing with the experts.

Region Västerbotten as the public sector representative is more an enabler than the driver but has a leading role especially since it will deliver the regional ERDF, ESF, and just transition funds. As the main organizer of regional EDP, it is also a very important actor during the new regional operational programme and RIS3.

4.3. Critical networks of stakeholders with the potential to develop RIS3 strategies based on the GT

A new regional operational programme is currently being prepared. It includes a RIS3 strategy in which the new energy solutions will be a focus.

We have strong clusters in the Energy sector both at regional (cleantech, bioeregion, Bio4energy, etc.) and national (Hydrogyn Sweden) levels. We are also preparing a cluster joining all the biggest companies in the new energy sector in Upper Norrland and will act as a dialog part in further planning.

Through ongoing ERDF, Interreg Europe, and Interreg Baltic Sea Region -projects, such as Bioregio, Biosykli, and BSR S3 Ecosystem, it has been possible to build networks of bio-circular economy experts and policymakers in particular. All these projects have produced knowledge and information for our RIS3 process.

5. Next steps in policy innovations concerning the GT, RIS3, and RIS4+ strategies

5.1. Driving forces-based next steps

EU and national strategies, together with the SDGs (sustainable development goals) and the Green deal have been drivers for the hydrogen sector as reducing CO2 emission. SDG is considered and followed by almost every organization and we can see in Västerbotten that our industry is shifting to cut their CO2 emission.

5.2. Pressure-based next steps

Hydrogen as one of the solutions for sustainable energy use has become important to reduce CO2. This has been promoted by the EU as well as the nations themselves. Battery factories, Hydrogen, electric flights, and boat are seen as a response to the changing markets.

5.3. State-based next steps

Companies have seen that high national and regional environmental goals help them in leading the markets, as they have to work ahead of others and can have a competitive head start. Just transition Found transforming the metal and steel industry together with the investments for sustainable energy is an opportunity for a new project of scale to involve the value chain transition and hydrogen development.

5.4. Impact-based next steps

Impact-based responses are aligned with the responses on drivers, pressures and state, mostly. New partnerships in the innovation system are driving new projects and solutions are developed to respond to the green economy and policy. Regional politicians together with companies are also active in EU-level lobbying regarding the legislation, in order to ensure effects on drivers that open up for diversification for energy solutions (wind, forest, hydrogen, etc.).

6. GT and RIS3 prospects: from the GT-driven regions to the European RIS3 and RIS4+ strategies

In order for GT to be able to accelerate, we understand during the project that we need particular actions at the EU level, at the national level, and at the regional level.

Starting from the EU level, companies need to have guidelines where goals are clear and distinct. From the regional perspective, it is not always the case that policies that emerge create synergy, where for example the Forest Strategy and the new strategy Fit For 55 and create difficulties for the forest industry as bioeconomy was not considered sustainable.

At the national level firstly it is important to define new long-term sustainable strategic measures for GT that include cross-sectoral issues such as the need to act jointly to manage power supply and generation, investments in infrastructure, construction plans, traffic, services, skill supply, etc. In the area of land use, conflicts of goals affect social sustainability, justice, permit processes, and the pace and local acceptance of transition processes. This type of conflict of goals is a national regulation and where the local and regional levels do not have much power.

At the regional level, the public sector needs to become even better at value monitoring. simplify administration around project financing, create better conditions for the niche level, more expressive projects, and create better systems that create innovations for the GT and co-create and express. We must be able to work more on pilot projects at the same time as we need to create capacity for innovations in the scaling-up phase.

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