GREEN TRANSFORMATION! A POLICY TOOL FOR REGIONAL SMART SPECIALIZATION

POLICY BRIEF ON GT FOR RIS3 STRATEGIES

PARTNER: OSTROBOTHNIA

INTERVENTION AREA: ENERGY TECHNOLOGY AND CIRCULAR ECONOMY

COUNTRY/REGION: OSTROBOTHNIA

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Summary

Ostrobothnia had two intervention areas; energy technology and circular economy (CE). Inspection of the two intervention areas shows that when one of the intervention areas i.e. energy technology is working on products, which reduce CO2 emissions, GT comes through general development of the innovation ecosystem and export activities since the "product" is going to help in the battle against climate change. The more the energy technology cluster can produce and sell the product, the better the environmental benefits will be.

Circular economy in Ostrobothnia´s case was related to reducing and re-using waste flows to create "green cash", i.e. additional profits from reduced material costs and through the selling of recyclable waste as raw material for other industries. In CE public support is needed more, since material flows need to be on a certain level in order to enable new business opportunities. Public support is required in order to establish a globally potential circular economy ecosystem within the region. One solution is to either increase awareness and thus, material flows, or look for new actors (such as sustainable battery industry) and use that upcoming development to increase CE activities.

EDP (Entrepreneurial discovery process) remains mostly the same in both cases since the region has already established EDP as a forum for regional development discussion. This forum can be seen as one way in increasing sustainable value and can turn out to be a useful addition for spreading GT knowledge for different actors, as well as for hearing stakeholders' thoughts and initiatives on solutions for GT. Public organisations should be experimental and offer both clear directions as well as guidance on GT.

1. Introduction

Ostrobothnia´s intervention areas were decided to be **circular economy and green energy technologies**; as these are the central focus in the GRETA project and are both focus areas in the regional smart specialization strategy (Regional Council of Ostrobothnia 2020). The circular economy is seen as a future possibility in the region and there has been a development towards CE lately, with the publication of the circular economy roadmap (Knuts, Östberg & Hautala 2021). Furthermore, Ostrobothnia has the largest energy technology cluster in the Nordic countries, and in many ways, it is a very relevant region concerning future solutions for GT. Solutions developed in Ostrobothnia could help in global energy challenges, which are a huge part of the battle against climate change.

GRETA project is an extension of former LARS (Learning among regions on smarts specialization) and energy technology was an intervention area in the previous project. However, due to the importance and recent developments, such as the launch of the circular economy roadmap, it became evident that circular economy is also very relevant in order to achieve GT in Ostrobothnia. Because of this, it was decided that Ostrobothnia will also look at circular economy besides energy technologies. Energy technology is therefore mainstream area and circular economy is an emerging one.

Ostrobothnia does not have a strategy for green transformation. However, the circular economy roadmap and regional energy strategy are the most relevant strategies. Several global companies, universities and other organisations do have their own strategies and also the city of Vaasa (regional capital) is aiming to become carbon neutral before 2030. Finland aims to do that before 2035, so regional and national goals are really ambitious when compared to the aims of the European Green Deal.

It is probably green transformation strategies are to be written in the future and will most likely be based on regional smart specialization strategy, as European funding comes through that instrument. Smart specialisation also offers a regional development forum through EDP (entrepreneurial discovery process) which may help in reaching regional stakeholders and aiding them towards green markets. This is an important step towards making green transformation a reality across several sectors. The regional council is also updating regional strategy, where environmental aspects have been included as one important focus area. Energy technology is already covered in RIS3, as well as circular economy as well.

The biggest challenges for the Ostrobothnian energy cluster relate to public support, which is required in order to establish new projects for future energy production facilities and test sites. Companies are not just hoping to gain funding in order to get money, but they also aim for interaction with public organisations, since this sort of knowledge will be important to have in the future energy business. As there is rising demand for new solutions and those are to be sold more than individual products, it is no wonder that the ability to listen and offer these solutions is now more important than ever and the companies hope to practise this.

Gaps towards GT of the Ostrobothnian stakeholders were quite small. The companies simply lack some legitimacy and are looking for it with close cooperation with public organisations. If they are able to initiate new test facilities together, then that would promote the route of companies towards GT.

Public organisations are in a good position in general and this is mostly due to EU green deal initiative, which will help public organisations with the implementation of sustainable solutions. Universities and NGOs, on the other hand are a little lagging behind the public organisations and companies but are definitely following the others.

Challenges are very well aligned with the landscape level, as most energy technology companies are simply offering solutions that will help regions and nations to meet the sustainability goals, which are often decided upon on the EU and national levels. However, these solutions are operating more on a regime level and will also include niche-level development in order to make them work in specific cases. It is more and more probable that customisation and individual solutions are the end goal and this means that all levels are important to consider while working on the field.

2. The policy context

Sustainable growth is everywhere and almost every stakeholder has to share this vision to be able to progress and grow. Most visions come from the national or regional level; Finland has its own carbon neutrality vision for the year 2035 and City of Vaasa has its own for the year 202x (before 2030).

Several stakeholders verified that they follow closely national and regional visions and aims, as these are stricter than the EU´s goals. Even though companies feel that the goal becomes quite fast, they also see the tight schedule as an opportunity to develop themselves for future markets and possibly gain a bigger market share by being among the first on the newly emerging green markets.

The most relevant visions were mentioned to be the regional as well as a national vision for carbon neutrality. Both visions see that carbon neutrality is achieved in many ways, but the main outcome will be carbon neutrality either before 2030 (City of Vaasa) or before 2035 (Finland in general). As Vaasa´s vision becomes sooner, we´ll look at how it describes carbon neutrality. Vaasa has the vision to be “The energy capital of the Nordics” and the vision is based on five keywords:

Energicity, agility, internationality, historically and well-being.

Vaasa has a climate programme, but no strategy. However, the climate programme is part of a city strategy, so technically it can be considered as a strategy. When one inspects the city climate program, it is clear that energicity is the part of vision, where this goal relates, as the program states:

The city will no longer use fossil-based energy and will replace its energy needs with renewable energy. It will also ensure that the carbon blueprint will be neutral, meaning that all pollutions are compensated by using carbon capturing mechanisms. (Vaasan ilmasto-ohjelma 2015: 19). According to one respondent, roughly 80% of the climate goals are achieved through replacing pollution with greener solutions, and 20% is based on carbon capture.

Vaasa is using global climate panel calculations as an indicator of its climate neutrality. It will also get annual resources and the leader of the climate working group will present the work done annually to the city council.

One outcome was that British battery manufacturer Johnson Matthey is aiming to build a battery factory in the region. One reason was the fact that the city is taking environmental effects seriously

and it has clean energy solutions. The region is also working on several interesting projects which develop future energy solutions (Power to x, Clean propulsion technologies).

The connection between energy and carbon neutrality is also shown in the Finnish national strategy, as it is titled as "Energy and climate strategy". However, it is still under development, although publishing was planned for the summer of 2021. This was a little bit strange as many stakeholders mentioned the national strategy as something that is clear already. However, the vision for being carbon neutral in 2035 is well known and the respondents most likely referred to this overall goal, rather than the strategy or vision itself. Strategy development has been waiting for the European Commissions approval of the national operational programme and the energy and climate strategy will most likely be finalized after it gets the green light from the EU.

National level will most likely involve all aspects of society and Vaasa´s strategy as well. Respondents in Ostrobothnia mentioned that regional cooperation is very fluent and that it has been easy to work with different actors.

Landscape level sets the direction and both funds and laws, and regulations are important for guiding actors towards sustainable goals. However, in Finnish case the EU does not always understand the national conditions and this creates challenges for implementing the actions. It was also lifted up that political parties do not necessary base their decisions on facts, but do political compromises. These are dangerous regarding the environment. More knowledge exchange could therefore be useful; even if nowadays one has to consider what are the "facts" that one can trust upon.

Regime level is the one, which transforms landscape level actions into concrete reality for niche level. Therefore, it has an important role of knowledge provider and should also act as a beacon which sends knowledge back to landscape level. This is why regions are so important in GT. Regime level is also useful for establishing and maintaining innovation networks and offer a forum to go through the GT issues and how to solve them.

Niche level is the one, which interacts most with citizens, for example through their role as consumers. Niche level actors may be in a difficult spot now, as knowledge of the climate challenges are increasing and customers are more and more demanding. However, it also offers them a way to make different products and offer new solutions; which can then help transform the system. It is especially important to support experimentation, as this may spur up new, green innovations.

3. Instruments and initiatives targeting the GT

Most relevant funds are regional ERDF, ESF and the new just transition funds, which will be distributed via national operational programme called "Uudistuva ja osaava Suomi 2021-2027" [Renewing and capable Finland 2021-2027]. For the next programming period the region of Ostrobothnia is receiving nearly three times as much funds as it received in the last programming period. However, ERDF-based funds (that are used for smart specialisation) do not increase, but are in fact decreasing from 11,2 millions into around 11 millions for the next programming period. ESF and just transition funds are therefore forming majority of new funds for the region. However, during the last programming period the region decided to combine ERDF and ESF funds in order to support smart specialisation, which

might happen again. This would help in increasing the share of funds for smart specialisation activities and implementation of green deal as well.

Some of the funds from national operational programme will be distributed to national development agencies (Business Finland) and national officials (ELY- and AVI-centers), where they will be distributed to companies and other stakeholders based on certain criterias. These funds will also be regionally distributed but decisions are done in national level.

Other relevant funding instruments are the related Interreg programmes (Interreg Baltic Sea and new Interreg Aurora) as well as European Horizon-programme.

4. Challenges and opportunities focusing the GT

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

In Ostrobothnia one of the threats is irrational political decision making not based on facts. Risk was also seen, that the citizens are not ready to change their lifestyle. To implement GT more information, ambitious goals and regulations as well as willingness to change one´s way of thinking is needed. Everything should recycled, which needs a lot of reorganizations and re-thinking on how one uses resources and how one can recycle effectively. Some interviewees consider it a risk, that some countries might benefit from using fossil fuels longer than others, so nations which are not taking the major steps towards GT may reap the rewards, at least for some time.

In *Ostrobothnia*, GT is seen as an opportunity: sustainable living and growing economy are opportunities for global success for companies and for the whole region. Political decisions, and misallocation of financial support by the public organizations are threats, as well as legislation, which does not give enough flexibility. Views on pathways varied, but in general the region is following the direction towards GT. The whole region may transform into GT driver, as large energy technology companies are working on networks trying to benefit from the global trend towards greener future. The networks are spreading the knowledge of regional and local solutions, which then turn into business opportunities. Knowledge exchange was considered crucial, and the role of universities in enabling collaboration with companies and the city of Vaasa was highlighted. Since GT is all about changing the entire society, it requires new ways of thinking and wide collaboration to pull it through. There are no simple solutions, but definitely a need for regional ones. *C*ircular economy needs more networks and drivers for building a strong ecosystem. Energy technology already is a driver, but now the challenge is to engage citizens and SMEs in order to ensure that they are also onboard.

Opportunity for Ostrobothnia is that green transformation might help energy technology companies (to) becoming a global success. Networking led by the large companies can turn to the business opportunities. Good co-operation between stakeholders makes GT into a opportunity in Ostrobothnia.

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

Ostrobothnia had two intervention areas; energy technology and circular economy. In energy technology the entrepreneurial discovery process is already ongoing and the region has managed to set up EDP as a forum for discussion which also helps in transnational learning activities (Mäenpää 2021). This same forum can turn into useful tool for GT if it includes more proactive push from regional policy makers into finding solutions for GT. In practise this means more information sharing on what GT is and why it is important to follow it, as well general interest with any solutions, which can help in reducing CO2 emissions. One way of pushing the stakeholders is via public procurement or experimental innovation programs which help in finding new solutions for the environmental issues.

It is also notable that since the region of Ostrobothia has a large energy cluster, more "traditional" innovation activites (looking at gaps in cooperation, enhancing innovation ecosystem) are also enabling GT, since increasing collaboration and enhancement of innovation system will most likely help the local companies in finding future solutions and this enables their export to global markets where they help in reducing emissions.

In circular economy the intervention area is not fully functional yet, so EDP should look at existing activities and aim to increase material flows, which can be then developed further into a functional circular economy. The process is ongoing and will propably get new boost via battery manufacturing (Häyry 2021). Circular economy presents an interesting new avenue for the region and offers lots of potential so it should be considered also in EDP processes in the future.

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

Ostrobothnia is very lucky in that regard that it has leaders and networks concerning all helices: companies, universities, public organisations and NGOs. As EnergySampo (2021) initiative has demonstrated, companies within the region are keen on discovering new collaboraton ventures in order to better reach new, green markets. EnergySampo is developing entire energy ecosystems and the idea is that customer can order everything through EnergySampo, meaning that instead of contacting several companies one only has to contact a representative of this new joint institution in order to beging the process. Leading companies are the larhest within the region, ABB, Wärtsilä, VEO, Danfoss etc. which are well known in the region. Any support to EnergySampo initiative will help in delivering new, complete solutions for new regions on a global scale.

University of Vaasa also has VEBIC platform, which is closely linked with the local companies and can help in adding research into the networks. VEBIC also has circular economy experts which makes it as an important actor concerning circular economy actions as well.

Regional council of Ostrobothnia can be considered as leading public organisation, especially since it will deliver the regional ERDF, ESF and just transition funds. As main organiser of regional EDP it is also very important actor during the new regional operational programme.

There are also two development agencies, Merinova and Vasek, which can be seen as NGOs and are very active in promoting GT. Vasek has been developing circular economy roadmap and Merinova is

working on helping energy companies so both are really relevant for the intervention areas in the future.

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

5.1. Driving forces-based next steps

Nature needs actions to retain balance and UN SDGs (sustainable development goals) have been developed to help in achieving this. Some of the responses have been pilot projects, like GRETA, RIPEET and FAIR. SDGs are followed by almost every organisation to some extent. They can be seen in Universities plans as well as within companies websites and are of course guiding European Green Deal, which will add to their relevancy in the following programming period.

Companies also lobby for legislation that ensures their development processes and of course also participate on R&D processes (sometimes with or without universities) and look for solutions.

5.2. Pressure-based next steps

Energy transformation to renewable energy sources is providing the big picture and regional companies as well as pilots should address and aid in this transition. Sustainable energy use has become important part of battle against climate change. This has been promoted by the EU as well as nations themselves. Battery factory and Aurora Bothnia -ship are seen as regional responses to the changing markets.

5.3. State-based next steps

Support has been given to turf producers in order to close down their production in a more structured manner so that environmental issues are minimal. Otherwise the companies have seen that tight national and regional environmental goals help them in leading the markets, as they have to work ahead of others. Power to x -project is one example where short-term development may open doors to new hydrogen solutions.

5.4. Impact-based next steps

Impact-based responses are aligned with the responses on drivers, pressures and state, mostly. New solutions are developed to appease the need for green innovation markets. Regional companies are also active in EU level lobbying regarding the legislation, in order to ensure effects on drivers.

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

GRETA project aims to discover how regions can implement green transformation and focus was given on stakeholders and how to make them re-align more closely into GT. Due to this aim, partner regions first identified the potential green transformation drivers and evaluated their power (resources), legitimacy (ability to act) and urgency (willingness to act) based on stakeholder typologies of Mitchell et al (1997). By looking at these typologies we were able to look how different partners align themselves towards GT and we were able to inspect which actors are closest in becoming definite stakeholders, which have the urgency (need to act), power (ability to act) and legitimacy (willingness to act) towards GT. This analysis revealed to us that public organisations are the most advanced drivers of GT in the selected fields, since they show urgency, power and legitimacy towards GT

This led us to consider on why this is the case. On some extent the answer is understandable, since many environmental agencies and officials are represented by public actors. These actors often have legitimacy and urgency, but may lack some power. However, the source for legitimacy may differ between different regions and for example universities are following public organisations in the development in some of our cases. Potential drivers for innovation are increasing.

While studying the companies within the regions, it became more and more clear that companies saw the role of public organisations as important in battling against climate change. Public organisations were seen more as strategic partners, which are enabling new, sustainable markets. However, companies also highlighted that there is a need to be more open for experimentation and mutual projects are important to gather more trust for climate actions.

These mutual projects and pilots also enable companies to learn more from this rapidly increasing market where their new customers are more often public actors than private parties. Especially energy technology companies see themselves more of a system-level solution provider, instead of seller of individual products and/or services. This has also led to collaboration between businesses as well, as they wish to offer complete regional solutions on a “keys to the hand” -basis. Closer collaboration between public and private sector was seen as one enabler for green transformation.

In order to understand this, one may look at sustainable value and what it entails. Sustainable value often consists of two public values, those representing social and environmental values. The one other value is economic value, which can be considered to be more private value than the others. As sustainable value is a combination of public and private value, this might indicate that there is a need to enable public and private partnerships, as this helps in combining different types of values in a more sustainable way.

However, the challenge lies on how to discover where one can find such value? This led us to look on the role of legitimacy (willingness to act) especially, since that is the main attribute in Mitchell et al. (1997) framework which creates trust and adds creditability to collaboration ventures. Power (ability to act) and urgency (need to act) are important attributes as well, but based on our empirical studies the ability to add trust and real interest on GT was seen as more important attribute in order to reach sustainable markets. Based on the tested methodologies we were able to draw a new way for looking at EDP (entrepreneurial discovery process), where the tested methodologies in GRETA help in

managing stakeholder interaction (see Figure 1). EDP is the main instrument of regional implementation of smart specialisation and has already been used for stakeholder inclusion in the previous programming period. It relies on looking for new niche markets together with regional companies, public organisations, universities and NGOs. We now suggest that it can also be used as a forum for creating sustainable value; i.e. a forum where willingness, ability and need to act form new initiatives for GT.

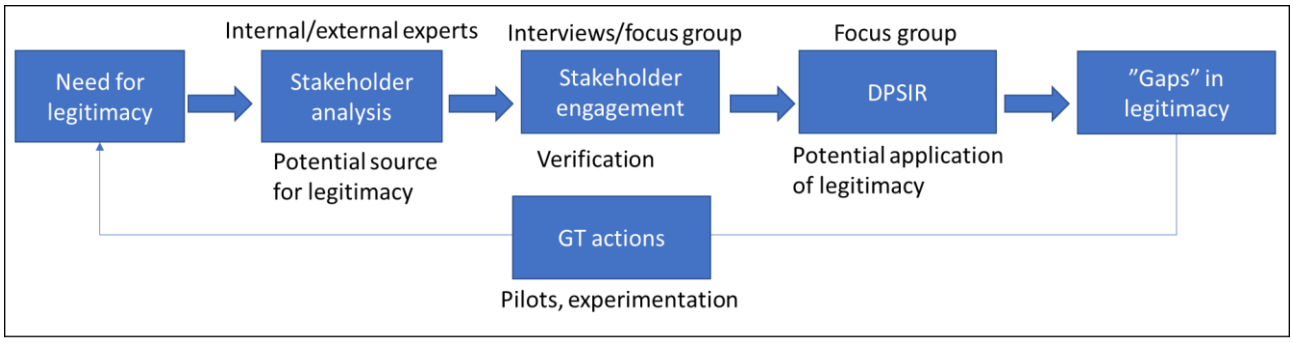

Figure 1. New sustainable EDP based on the methods of GRETA.

New EDP assumes that public-private partnerships and especially legitimacy is a key in enabling new markets for sustainable solutions. This is based on the theories of sustainable value, as well as practical discoveries done via stakeholder interaction on the 6 case study regions. Stakeholder analysis, which measures power, legitimacy and urgency is then used to look for potential sources for legitimacy. In some regions this legitimacy comes from public organisations and in some it derives from universities or even companies. This analysis may be done by internal and/or external experts which are familiar of the intervention areas and regional actors.

This is then verified via stakeholder engagement, as each region interviews at the minimum 7 regional actors which represent experts regarding green transformation. This consists of company personnel working on green innovations, public environmental experts, NGOs looking for climate issues or regional development and university experts working on the intervention area. This is also an opportunity to engage with regional actors and ask for actions that would help in GT. One can also ask for the challenges and opportunities which help in making the DPSIR-analysis.

DPSIR-analysis is then prepared based on the answers from the regional experts. This method offers extra-regional view on GT and thus complements the more intra-regional stakeholder analysis. It also offers potential application for legitimacy, as it may spur ideas on how what level (landscape, regime or niche) needs more actions in order to enable GT. This tool is also useful in drawing a regional vision for GT, especially if it discussed with wider audience.

This discussion helps in discovering "gaps" where legitimacy may be lacking. For example, the region may have lots of SMEs, which lack legitimacy since there is no vision on the direction for GT. In this case regional vision as well as related roadmaps could be developed. If there are missing industries or

experts, public organisations may look for ways to add legitimacy, for example via public procurements or new collaboration on education. These then lead to actions, which are based on regional dialogue and mutual vision for GT.

This leads to one of the most profound discoveries of GRETA-project regarding the difference between S3 and new S4+; Need for public proactivity. When S3 was more based on the idea that public sector actors ask from regional companies, what they´ll need in order to reach new niche markets, in the new S4+ (now) the public organisations are more clearly the enablers of these new markets. Only via collaboration and experiments one is able to attract legitimacy and this is the task for public organisations in many regions. This also means that EDP turns more into a model, where public organisations in charge of S4+ also tell the companies what GT requires them to do, making their innovation processes more responsible. Public organisations turn from passive innovation supporters into enablers of GT. EDP seems as one excellent forum for this new type of interaction and a suitable platform for creating more regional sustainable value. This however, also requires that public organisations have public value to share and can act as legitimate partners for companies.

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