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Inspiration Paper

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Key points

- *Around the Baltic Sea Region there is a number of pockets of smartness that showcase how more traditional resources can be replaced with new more sustainable ones; how resources can be upgraded to create higher value products; how resources can be circulated to benefit from waste and side streams and how such benefits can be achieved through collaboration between public and private partners.*

- *There is a rather strong – and growing – presence of policy enabling frameworks at the local, regional, national and macro-regional level that bio- and circular economy and Industrial Symbiosis initiatives can benefit from to get traction in efforts.*

- *Together this provides great opportunity for upscaling bio- and circular economy development efforts – and with that for the macro-region to become genuinely smart.*

- *Because of the of the complexity of bio- and circular economy development – and the novelty of many such efforts – regional and local authorities are encouraged to collaborate on: experience exchange; peer-to-peer policy learning; and to provide joint policy recommendations from the regional level to national and macro-regional policy makers, including by proposing flagship projects for inter-regional cooperation in the Baltic Sea Region.*

- *Similarly, because of the complexity and novelty of bio- and circular economy development the practitioners working in sustainable development clusters, Industrial Symbiosis organisations and other green business hubs are encouraged to collaborate on experience exchange and peer-to-peer learning. Also, collaboration between such partners could prove productive by providing new bridges for internationalization of SME – both within the Baltic Sea Region and beyond.*

Accelerating the pursue of the bio- and circular economy in the Baltic Sea Region - the role regional authorities and business development organisations

The Nordic Council of Ministers, Nordregio, the Swedish Agency for Economic and Regional Growth – together with regional development athorities and business organisations – are hosting an event on 8-9 May 2017 on bio- and circular economy and Industrial Symbiosis in the Baltic Sea Region.

The event takes place as part of cooperation efforts within the the framework of the European Union Strategy for the Baltic Sea Region, Policy Area Bioeconomy[1], and the Interreg project BSR STARS S3[2].

The event aims to share insights and lessons learned from Industrial Symbiosis – and more generally circular economy – development efforts in Kalundborg, in Helsingborg and elsewhere in the Baltic Sea Region. Also the event aims at exploring opportunities for further accelerating such sustainable development efforts through cooperation between partners from national and regional authorities, knowledge institutions and business in the Baltic Sea Region.

This paper discusses *the particular role of regional authorities and business development organisations in actually and practically pursuing the bio- and circular economy through efforts such as Industrial Symbiosis*. Also, the paper aims to provide food for thought to support a dialogue between regional authorities and business development organisations on *opportunities for enhanced inter-regional cooperation on sustainable development and business cooperation*.

1. The rationale: It's been done, tried and tested. We are ready to upscale

The recent report "Nordic Bioeconomy – 25 cases for sustainable change" by Sustania for the Nordic Bioeconomy Panel[3] demonstrates that "the bioeconomy holds great potential in addressing major challenges such as climate change and producing sufficient nutritious food, materials and energy for a growing population". Four fundamental strongholds of the Nordic region (and we can argue for the larger Baltic Sea Region) are identified in the report: replace, upgrade, circulate and collaborate.

- Replace is about replacing fossil-based and other unsustainable materials with bio-based alternatives. The Nordic/Baltic Sea Region has experience and excellence in areas such as sustainable building solutions; replacement of petroleum-based to bio-based additives; wood-based pharmaceuticals; and biodiesel.

- Upgrade is about creating higher value products and services from resources throughout the whole value change. Here the macro-region has experience and excellence in areas such as fish and animal (full) utilization; production of new nutrition supplements from slaughterhouse side

[1] www.bsrbioeconomy.net
[2] http://www.bsr-stars.eu/bsr-stars-s3/
[3] http://www.norden.org/en/news-and-events/news/four-nordic-bioeconomy-strongholds

streams; turning waste into new products; and upgrading of plant materials to high-value products.

- Circulate is about creating a circular bioeconomy that utilizes waste and side streams as input into production of other goods and services. In this area the macro-region has quite unique experience and excellence in areas such as: Utilization of seaweed for food, feed and fuel; and a number of industrial symbiosis initiatives.

- Collaborate is about facilitating cross-sectoral strategic co-operation between public and private partners (from authorities, research institutions, industry and civil society), supporting them to work together towards ambitious societal transformation goals for sustainable development. A number of such regional and national efforts are ongoing. There is opportunity to leverage from these efforts at the macro-regional level.

Another report "Innovation in the Circular Economy - Industrial Symbiosis and Smart Specialisation in the Baltic Sea Region" by Innogate for the Nordic Council of Ministers and the BSR STARS S3 project, provides a snapshot of a number of Industrial Symbiosis development initiatives in the Baltic Sea Region. These efforts are propelled mostly by local and regional partners – and they aim in various ways also to replace, upgrade and circulate resources to increase production efficiency, competitiveness and sustainable development.

Similar findings are well documented in a number of studies by Nordregio, including by the report "The potential of industrial symbiosis as a key driver of green growth in Nordic regions" from 2015[4].

Early Industrial Symbiosis efforts such as those in Kalundborg and Helsingborg have proven their attractive benefits for sustainable development. In Denmark and Sweden this provides inspiration for additional efforts. It also attracts attention from neighbouring countries in the Baltic Sea Region. In Finland the Industrial Symbiosis drums beat particularly loud currently – but also in Norway and Lithuania the beat is picking up.

In summary: Replacing, upgrading and circulating resources are cornerstones in sustainable economic growth and development. Industrial Symbiosis efforts have demonstrated that the frameworks exist that are effective in delivering growth and sustainable development benefits in regions throughout the Baltic Sea Region. This propels a growing interest for launching more such efforts in the Baltic Sea Region.

[4] http://www.nordregio.se/en/Publications/Publications-2015/The-potential-of-industrial-symbiosis-as-a-key-driver-of-green-growth-in-Nordic-regions/

2. The role of regions and regional business organisations

So "it's been done, tried and tested – and it's time to upscale".

Before heading into to opportunities for inter-regional cooperation to support such upscaling it is useful to note some of the key existing regional development policies and efforts that provide a platform from where bio- and circular economy development could grow.

Source: European Union

Smart Specialisation Strategies

The European Commission[5] defines "National/Regional Research and Innovation Strategies for Smart Specialisation (RIS3 strategies) as integrated, place-based economic transformation agendas that do five important things:

- They focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development.
- They build on each country/region's strengths, competitive advantages and potential for excellence.

[5] http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_en.pdf

- They support technological as well as practice-based innovation and they aim to stimulate private sector investment.

- They get stakeholders fully involved and encourage innovation and experimentation.

- They are evidence-based and include sound monitoring and evaluation systems."

"Focused policy support"; "knowledge-based development"; "building on regional strengths and excellence"; "supporting technological as well as practice-based innovation"; "stakeholder involvement"; "innovation and experimentation"; and "evidence-based development efforts" … all the bells are ringing – it is all cornerstones in bio- and circular economy and industrial symbiosis development efforts.

Currently there is little direct mentioning of the bio- and circular economy in regional Smart Specialisation Strategies in the Baltic Sea Region – and there is no mentioning of Industrial Symbiosis. Instead current or future efforts in these areas are covered under broader "Green Growth" themes such as sustainable energy and environment, agro-innovation and food technology; and health, inclusive and creative societies.

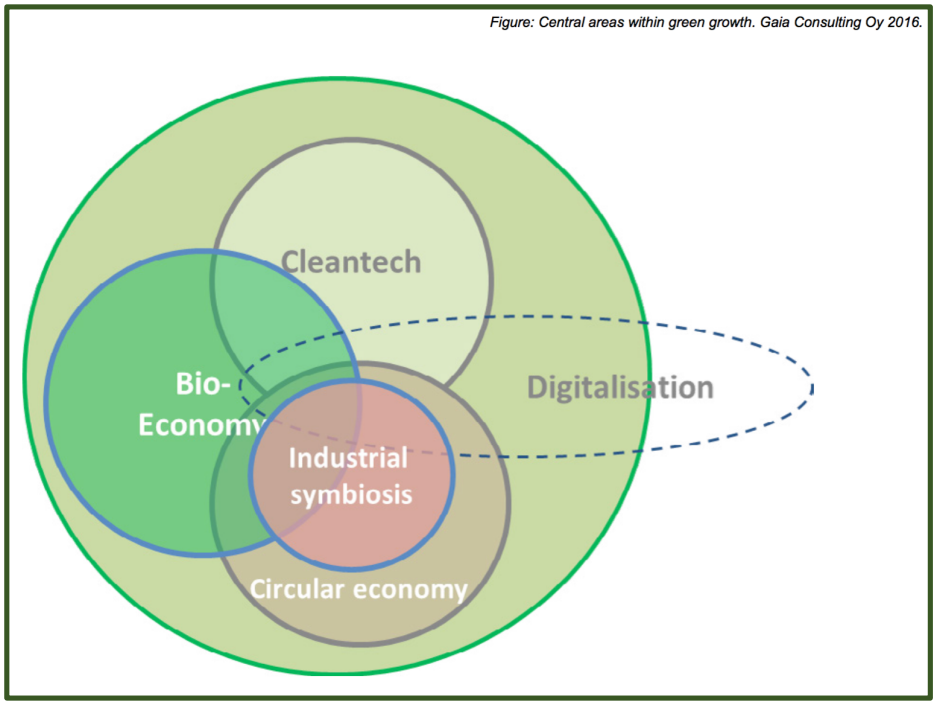


Figure: Central areas within green growth. Gaia Consulting Oy 2016.

So although there may no specific mentioning of circular economy or Industrial Symbiosis it appears that a number of core strategic objectives aligns with the fundamentals for implementing such initiatives. To further provide a platform for efforts, most countries have developed national

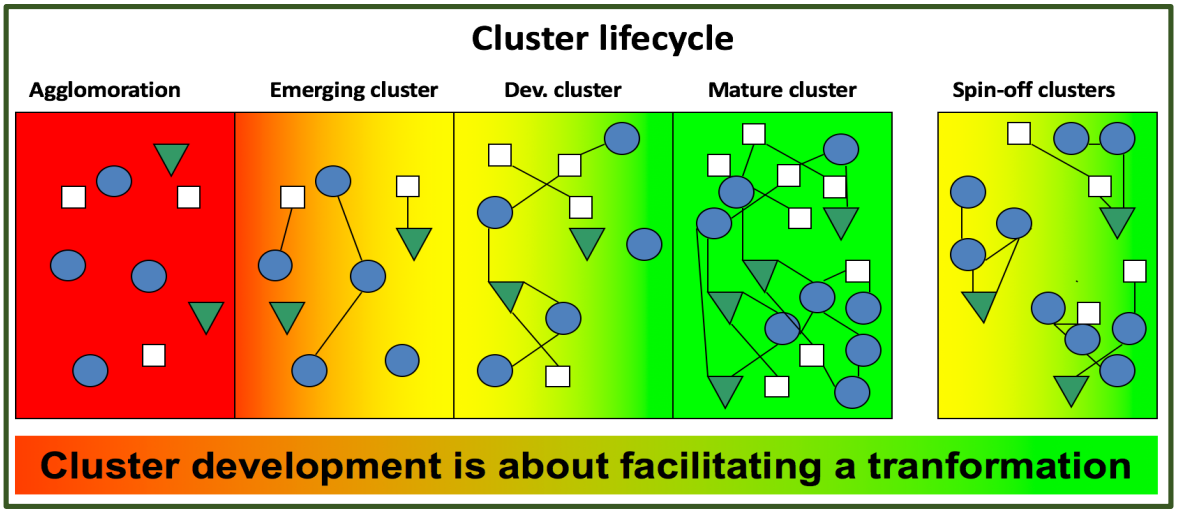
bioeconomy strategies. In the near future it is expected that all countries in the Baltic Sea Region will have such a strategy.

The Nordic Working Group for Green Growth illustrates in its 2016 "Synthesis Report on collaboration on innovation and entrepreneurship" the various components of "Green Growth" and how this includes cleantech, the bioeconomy and Industrial Symbiosis – as well as cutting into other areas such as digitalisation[6].

A number of regional bio/green/clean/sustainable development clusters

In "*The Competitive Advantage of Nations" (1998*) Michael E. Porter, Harvard Business School, defines industry clusters as "geographically proximate groups of interconnected companies and associated institutions in a particular field linked by commonalities and complementarities. Clusters encompass an array of linked industries and other entities important to competition… including governmental and other institutions – such as universities, standard setting agencies, think-tanks, vocational training providers and trade associations".

The rationale and drivers for bio- and circular economy and Industrial Symbiosis development efforts are very similar to those of cluster development. In the the Baltic Sea Region there is a large number of bio/green/clean/sustainable development clusters – the vast majority of which are propelled by regional efforts engaging regional authorities, business development organisations, universities and research institutions.



Source: Innogate ApS

[6] http://www.nordregio.se/en/Publications/Publications-2017/Nordic-working-group-for-green-growth--innovation-and-entrepreneurship-2013-2016/

Clusters may emerge spontaneously or they may be a result of organized efforts. Often early developments are rather spontaneous and unorganised. Then as the clusters begin to grow – as they begin to make more connections between companies and "other entities important to competition" – cooperation efforts gradually become more organised, often including also financial support from regional authorities. The rationale for actively supporting cluster development is rooted in regional ambitions for realizing benefits of collaboration more quickly than if one relied on spontaneous cluster development.

The "nuts and bolts" in cluster development

Cluster (and bio-, circular and Industrial Symbiosis) development is not an exact science and there are no "silver bullets" – no one structure that fits all. Different regions have different opportunities for increasing resource efficiency and economic circularity and they have different bottlenecks for connecting stakeholders and resource streams.

At the outset it is important to observe that:

- Ideas are commercialized by companies – so cooperation efforts should target supporting businesses to develop and exploit new ideas.

- Universities and research institutions are powerful resources in provision of knowledge, science and technology for commercial exploitation – so cooperation efforts should aim to increase (commercial) use of these resources.

- Policies and policy incentives impacts on the preconditions for clustering ("no policy is also a policy") – so it is important to ensure that cooperation efforts provide for a (business focused) policy dialogue on challenge and opportunities.

Common elements of actively facilitating cluster development, include:

- Mapping endowments (through e.g. resource inventories to document circularity opportunities from linking resource streams and current bottlenecks preventing linkages and cooperation).

- Stakeholder mobilisation e.g. through trust building dialogue and facilitation of business-to-business and research-to-business match-making. We can call it "building bridges".

- Efforts to increase awareness about joint efforts and prove relevance of collaboration through storytelling and showcasing.

- Efforts to ensure presence of appropriate "glue agent" for pushing and pulling collaboration. The "glue agent" may be hosted by an existing organisation. It may also be by establishing a cluster/symbiosis organisation owned by the members.

- It is critical to keep a private sector focus in all efforts, meaning that the overall objective for collaboration should be about business innovation and competitiveness, and more specifically about issues such as: research and development relevant for companies; technology transfer; skills development; business incubation; business internationalisation; access to finance; and other supportive efforts for business development.

Recommendations on Industrial Symbiosis and regional cooperation by Nordregio

In 2015 NordRegio published the report "The potential of industrial symbiosis as a key driver of green growth in Nordic regions". The report provide a number of policy recommendations regarding industrial symbiosis as a key driver for green growth[7]:

Nordregio report (2015)
The potential of Industrial Symbiosis as a key driver of green growth in Nordic regions

The report provides detailed insights on a number of Industrial Symbiosis efforts in the Nordic countries, more specifically: Kemi–Tornio Industrial Symbiosis (Finland), Svartsengi Resource Park (Island), Eyde Cluster (Norway), and Norrköping/Händelö Industrial Symbiosis. The report also provides a number of policy recommendations on Industrial Symbiosis development, including:

- A call for long-term national public support framework for circular economy and Industrial Symbiosis development.

- A call for and regional authorities, regional clusters or similar organizations to facilitate and promote Industrial Symbiosis at the regional level.

- A call for bottom-up approaches ensuring that new business opportunities is the driving force behind Industrial Symbiosis development efforts i.e. that efforts are based on private sector needs and resource demands.

- A call for raising awareness and building knowledge on the Industrial Symbiosis concept including by further identification and showcasing of Industrial Symbiosis activities.

[7] www.nordregio.se

3. Inter-regional cooperation on bio- and circular economy and Industrial Symbiosis

In Nordic intergovernmental cooperation the Nordic Bioeconomy Panel has established the following key criteria and objectives for cooperation on sustainable development:

- Sustainable use of national resources – and more specifically addressing (local) resource scarcities, optimize resource use and contribute to circularity.

- Technological innovation – and more specifically development and application of new technologies adding to sustainable development.

- Environmental benefits – and more specifically reducing emissions and other forms pollution.

- Societal benefits – and more specifically creating new jobs, engage local communities and improve health and well-being.

- Business model innovation – and more specifically development of new products and services that improves revenue streams and has potential to create new markets.

These criteria and objectives link closely with global ambitions for sustainable development as laid out by the United Nations 17 Sustainable Development Goals.

From section 1 and 2 I this paper it is obvious that regional partners have a critical role to play for realizing these objectives – and more importantly: that the (sub)regions in the Nordic and Baltic Sea macro-region have diverse, vast and complementary experiences in the area of sustainable socio-economic change.

Finding a model for interregional cooperation in the Baltic Sea Regions could take the form of: Regional sustainable development policy learning; Implementing bio-, circular and Industrial Symbiosis efforts – cooperation among practitioners; and Market development – business-to-business collaboration and internationalization.

Regional sustainable development policy learning

Bio- and circular economy and Industrial Symbiosis efforts cuts across a number of different policy areas requiring stakeholders to connect and collaborate in new types of partnerships. Hörður G. Kristinsson, chair of the Nordic Bioeconomy Panel, expressed it like this in 2016: "We need to have the courage to think very differently, find new solutions and come together in collaborations that transcend sectors and involve partners we never imagined working with before"[8].

[8] http://www.norden.org/en/news-and-events/news/nordic-bioeconomy-panel-we-need-to-think-very-differently

To facilitate this new way of collaboration at the national level a number of national bioeconomy and green economy development strategies have emerged. An important element in these strategies are to create new platforms/meeting points for collaboration, new types of research and development policies, new types of business development initiatives etc. At intergovernmental level the BSR Bioeconomy Council[9] has been established to provide a platform for experience exchange and policy learning among proponents of national bio- and circular economy efforts.

At the regional level Smart Specialisation Strategies, regionally funded cluster programmes and similar regionally supported "green development hubs" also aim to create such new meeting places for collaboration between regional partners from authorities, universities and business.

Because of the of the complexity of bio- and circular sustainable development efforts – and the novelty of many such efforts – there would seem to be good opportunities for experience exchange and peer-to-peer policy learning among regional and local authorities.

Practically it could be considered to establish a "BSR Network of Sustainable Regions". Such a network could meet for example twice annually. The format could be with each meeting zooming in on a few themes of significance (opportunity/challenges) when attempting to propel the transition towards the bio- and circular economy at the regional and local level, including: policy design; policy implementation; monitoring and evaluations; stakeholder engagement; technology development and transfer; enabling business development services; supporting internationalization efforts etc.

The network could also make it their task to develop fundable proposals for additional bio- and circular economy regional policy related cooperation activities in the Baltic Sea Region – e.g. in the form of flagship projects. The regional network could present these proposed to the BSR Bioeconomy Council and the Nordic Council of Ministers who could advance these in the context of Policy Area Bioeconomy of the European Union Strategy for the Baltic Sea Region. Making these connections would benefit multi-level governance by joining local, regional, national and macro-regional sustainable development efforts, thereby realizing benefits from complementarities and synergies in efforts.

Implementing bio-, circular and Industrial Symbiosis efforts – cooperation among practitioners

At the operational level – among regional practitioners of on-ground bio- and circular economy and Industrial Symbiosis initiatives – there also seem to be a number of opportunities for cooperation:

- Facilitating bio- and circular economy and Industrial Symbiosis initiatives/programmes – such as through mapping endowments; resource inventories; opportunities for linking resource streams; bottleneck preventing linkages and cooperation; etc.

[9] http://bsrbioeconomy.net

- Stakeholder mobilisation e.g. through "bridge building" such as trust building; promoting stakeholder dialogue; facilitate company match-making; etc.

- Awareness raising about joint efforts and prove relevance/value of collaboration.

- The role of management including through efforts by an appropriate "glue agent" to push and pull collaboration.

- Business service delivery such as market relevant research; technology transfer; skills development; business incubation; business internationalisation; access to finance; and other business development services.

Around the Baltic Sea Region clusters – in a number of different industries – have collaborated around such efforts for a number of years. ScanBalt Bioregion[10] is one example. Experiences and lessons learned from such cooperation efforts could provide valuable inputs to accelerate business-focused collaboration between bio- and circular economy and Industrial Symbiosis initiatives/programmes in the Baltic Sea Region.

Market development - business-to-business collaboration and internationalisation

Throughout the Baltic Sea Region one can observe that it is large companies that drives export volumes. In the case of Denmark – that has unique data on SMEs shares of export per country – SMEs account for only 18% of total export, and the further away the markets are the smaller the SMEs share of total export. To Sweden for example, SMEs share is 24% of total Danish export, to China it is only 2%[11]. Compiling different sets of statistics from other Baltic Sea Region countries paints a similar picture.

Increased export creates obvious benefits in terms of new jobs and prosperity – benefits that would increase if SMEs could find ways to participate more in international trade. Therefore, countries and regions make many efforts to accelerate the growth of SMEs participation in trade.

Regional bio- and circular economy clusters and other regional green development hubs – such as Industrial Symbiosis initiatives – have a particularly important role to play in facilitating internationalization of SMEs. Regional organisations are well positioned to engage SMEs in trade. In fact, regional organisations can be more effective in trade facilitation efforts than national export promotion agencies, the reason being that regional organisations are better networked / closer to local companies.

Practically, regional bio- and circular economy clusters and other regional green development hubs could work together to promote SMEs participation in export in two important ways:

[10] http://scanbalt.org
[11] http://um.dk/da/eksportraadet/markeder/statistik-smv

Within the Baltic Sea Region a network of partner regions could act as bridge-builders / intermediaries for SME internationalisation by organizing e.g.: joint business matchmaking events; joint innovation challenges where regional authorities presents sustainability challenges and opportunities and companies are then invited to offer practical solutions (the Demola[12] framework in Finland could provide inspiration, so could the Nordic Innovation Accelerator[13]); and through "Business Roaming Agreements"[14] (a framework whereby regional partner organisations reciprocally offer network access and basic infrastructures such an office and a meeting room to SMEs from one region exploring new markets in a partner region).

Beyond the Baltic Sea Region, a network of partner regions could work together to gain access to new markets. For partners in e.g. the United States, South Africa or China there is generally some awareness about "cleantech from Scandinavia" – but only little awareness that for example Sweden has a strong forestry-based cluster in Paper Province, that Denmark has Kalundborg Symbiosis, and that Finland from Li Municipality has particular excellence on making the transition to a carbon-neutral society.

In 2015 regional cleantech partners from Denmark, Finland, Norway and Sweden made a joint trade promotion visit to South Africa. A South African government stakeholder welcomed the effort: "For us, we much prefer to deal with one large Scandinavian delegation than multiple smaller delegations. We know that Scandinavia has developed many attractive sustainable development technologies that offers solutions to a number of South Africa's challenges. We are also aware that the different small countries have different strengths in the green economy – but frankly, we do now care about who offers the solutions. We care about gaining access to solutions that can help drive green development in South Africa"[15].

Thus, if regions would join forces in export promotion efforts in selected markets they could benefit more from the macro-region's strong green/sustainable development brand, and together they would be able to offer "a broader package" of solutions than each of the regions would be able to individually. This would improve the attractiveness of sourcing sustainable development solutions from the Scandinavian/Nordic/Baltic macro-region and with that provide improved access for SMEs in global markets.

"Together we are stronger" the Nordic Prime Ministers said in a joint statement on 6 February 2014 when outlining their vision for Nordic co-operation[16]. That is indeed the case, also when it comes to propelling the bio- and circular economy – regionally, nationally, macro-regionally and globally.

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[12] https://www.demola.net
[13] https://www.nordicinnovationaccelerator.com
[14] https://www.clustercollaboration.eu/cluster-networks/clusterize-business-roaming-agreement-bra
[15] Nigel Gwynne-Evans, Chief Director, Provincial Government of the Western Cape.
[16] http://www.norden.org/en/nordic-council-of-ministers/ministers-for-co-operation-mr-sam/declarations/the-nordic-region-together-we-are-stronger