GLOBAL UTMANING

CIRCULAR BALTIC 2030

CIRCULAR ECONOMY IN THE BALTIC SEA REGION AND BEYOND

A CATALOGUE OF REGIONAL AND GLOBAL BEST PRACTICES ON CIRCULAR ECONOMY

JUNE 2019

Interreg Baltic Sea Region
EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND
BSSS

CIRCULAR BALTIC 2030

CIRCULAR ECONOMY IN THE BALTIC SEA REGION AND BEYOND

AUTHOR

JOEL AHLGREN, GLOBAL UTMANING

LAYOUT

JOEL AHLGREN, GLOBAL UTMANING

ADVISORS

TOVE AHLSTRÖM, GLOBAL UTMANING

ELIN ANDERSDOTTER FABRE, GLOBAL UTMANING

STAFFAN LAESTADIUS, GLOBAL UTMANING

ANDERS WIJKMAN, GLOBAL UTMANING

OLGA ZUIN, COUNCIL OF THE BALTIC SEA STATES

ISBN: 978-91-88331-19-9

PUBLISHED: JUNE 2019

FRONT COVER: Inspirationfeed on Unsplash

This report has been commissioned by the Interreg Baltic Sea Region Programme and the Baltic Sea States Subregional Co-operation (BSSSC) and is published with the financial support from the Council of the Baltic Sea States. This publication reflects the views of the authors only, and the Baltic Sea States Sub-Regional Cooperation, the Interreg Baltic Sea Region Programme and the Council of the Baltic Sea States cannot be held responsible for any use which may be made of the information contained therein.

GLOBAL UTMANING

Birger Jarlsgatan 57 C 113 56 Stockholm | info@globalutmaning.se

EXECUTIVE SUMMARY

CIRCULAR BALTIC 2030 - Circular economy in the Baltic Sea Region (BSR) is a report produced by the Swedish independent think tank Global Utmaning. It is a collection of best practices of circular economy supporting the implementation of the European Union Strategy for the Baltic Sea Region for the EU member states Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden and partner countries, Norway and Russia.

The report showcases 28 examples that can inspire other actors in the region and globally. Together, these illustrate some of the current trends and future needs of a shift towards a circular economy. It concludes that while many of the examples concern practices of industrial symbiosis, waste, resource management, reutilisation of used products and materials, the potential of a truly circular economy goes much further. This encompasses the need to adopt and move towards a proactive approach to a circular economy whereby all services, materials and products, in their core design, are made to support a circular flow of resources. Furthermore, it highlights examples of how regions, countries and cities are adopting legal frameworks, other incentives and new methods to support a broader, society-wide, transition towards a circular economy. A common theme among all practices is the importance of cooperation; multi-sectoral and holistic approaches are necessary in order to facilitate partnerships between public actors, private actors and citizens whereby one person's waste becomes another person's resource. This is why the cases conclude that policy coherence and partnerships for a circular economy are key to the necessary advancement.

The cases in this report highlight opportunities for a circular economy to accelerate local, regional, national and global sustainable development. Each case is related to the United Nations 2030 Agenda and its Sustainable Development Goals and Targets; this is to underscore the importance of the transition towards a circular economy for the successful implementation of the 2030 Agenda.

The report is developed as a part of the 10th Annual Forum of the EU Strategy for the Baltic Sea Region organised in Gdańsk in Poland in June 2019. The report has been financed by the Interreg Baltic Sea Region Programme and the Baltic Sea States Subregional Co-operation (BSSSC).

CONTENT

PREFACE

The Baltic Sea States Subregional Co-operation (BSSSC) is an open, non-political, network organisation, which represent the interests of all regions around the Baltic Sea. The BSSSC was established in 1993 in order to improve subregional cooperation in the Baltic Sea Region (BSR) as a result of the establishment of the Council of Baltic Sea States (CBSS) in 1992. I have had the pleasure of being involved in the BSSSC since 2011. First as a Member of the Board, and since 2017 as the Chairman of the Board.

Cooperation between regional actors in the BSR has been growing rapidly and gained additional momentum due to the EU enlargement in 2004. The BSR is a prosperous region where economic growth pushes the overall level of activity. But the region also faces socio-economic and environmental challenges alongside its demographic changes.

One of the prioritised policy areas of the BSSSC is sustainable development and climate change. We believe that an innovative circular economy can bring us one step closer in reaching several of the key targets of the Sustainable Development Goals (SDGs). We therefore need to raise awareness on how an innovative circular economy can bring us closer in reaching several of the key targets of the SDGs. According to the OECD, 65 percent of the 169 targets of the SDGs will not be reached without the commitment of local and regional governments as they are responsible for almost 60 percent of all public investments in the OECD area (2016) and for almost 40 percent worldwide. This highlights the important role that local and regional authorities have in the work on reaching the SDGs.

This highlights the necessity of raising awareness on how an innovative circular economy can bring us one step closer in reaching several of the key goals and targets. The important role that local and regional authorities play in this process should not be underestimated.

I hope this collection of 28 best practices of circular economy in the BSR and beyond, will be an inspiration for all stakeholders in the region, from politicians to civil servants, for representatives from NGOs and the private sector. Also, that this collection will foster more public-private partnerships within the circular economy.

I would also like to, on behalf of the BSSSC, thank all our partners in the BSR for their cooperation over the past decades, and that we continue to work closely together for many years to come.

Mr. Roger Ryberg
Eastern Norway County Network
BSSSC Chairman 2017-2019

PREFACE

The Council of the Baltic Sea States (CBSS), a platform for inter-governmental cooperation among the Baltic Sea Region (BSR) countries, has a long tradition of joint work on sustainable development. The CBSS puts great efforts towards sustainability issues and has adopted *Sustainable and Prosperous Region* as one of its three long-term priorities. Through the CBSS Expert Group on Sustainable Development (EGSD) – Baltic 2030 we help national ministries to engage with other pan-Baltic organisations, including Strategic Partners such as the Baltic Sea States Sub-regional Cooperation (BSSSC), the Baltic Sea Commission (CPMR), the Union of the Baltic Cities and other organisations working with sustainable development. We strive for the UN 2030 Agenda to become a framework for all actions in the Baltic Sea Region. The Sustainable Development Goals (SDGs) can help us break up silos and prevent trade-offs, and provide an occasion to strengthen our joint work on common challenges, as well as to learn from the good examples in which our region is so rich. The Baltic 2030 Action Plan, adopted in June 2017 by the CBSS Member States, helps us to identify how we can adapt the global goals to the specific context and the needs of our region. Among the key identified areas is the *Transition to a sustainable economy* – an area where we still have much work to do, as was highlighted by the report "Baltic 2030 Bumps on the Road – How the Baltic Sea States are performing on the SDGs" (CBSS, NCM 2018). Particularly challenging are the questions of consumption and production (SDG12), climate (SDG13), sustainable use of land and marine resources (SDG14-SDG15), as well as the sustainability of our cities and regions (SDG11).

At the same time, when it comes to sustainability, it is widely recognized that the BSR is among the frontrunners in the world. This publication provides an excellent opportunity to learn from the good practices of our neighbours, to share our knowledge with the whole world, and to learn from other countries with which our economies and supply chains are so strongly interconnected. I wish to take the chance to thank the BSSSC for the initiative, and to welcome this contribution to the implementation of the Baltic 2030 Action Plan.

Maira Mora
Director General
Council of the Baltic Sea States Secretariat

INTRODUCTION

The purpose of this report is to share best practices of circular economy in support of the implementation of the European Union Strategy for the Baltic Sea Region for the EU member states Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden and partner countries, Norway and Russia. The report showcases 28 examples that can inspire other actors in the region and globally. 17 cases are regional examples from the Baltic Sea area and 11 are global. The report is presented at the EU Strategy for the Baltic Sea Region Annual Forum and has been made possible through funding from the Interreg Baltic Sea Region Programme and the Baltic Sea States Subregional Co-operation (BSSSC).

Context

The European Union Strategy for the Baltic Sea Region (EUSBSR) aims to reinforce cooperation in the region. Challenges are commonly faced by working together, and a more balanced development in the BSR is also promoted. Since 2010, an annual forum to support the EUSBSR has been organised. The 10th Annual Forum of the EUSBSR will take place on 12 – 13 June 2019 in Gdańsk, Poland. The forum will be organised in cooperation between the Pomorskie Voivodeship (PV) and the BSSSC, with support from the Polish Ministry for Foreign Affairs and the European Commission.

The main topic of the 10th Annual Forum is a circular and sharing economy as a response to demographic changes and environmental challenges in the BSR. The aim of the forum is to highlight the regional potential for the development of a circular economy in areas such as food, health, tourism, transport, cities, bioeconomy, industry, education, migrants, climate, labour market and demography. In this regard, a part of the BSSSC's contribution to the forum is this report on best practices on circular economy in the BSR and beyond, to provide inspiration to the participants of the forum. The Swedish independent think tank Global Utmaning has developed the report as a part of its Climate & Resource programme and Localising Global Agenda project. The report will be disseminated before, during and after the 10th Annual Forum as a part of the continuous work on Sustainable Development and in support of the implementation of the Baltic 2030 Action Plan.

Background

Socio-economic challenges and demographic changes in the BSR such as ageing, depopulation, migrations, and urbanization, influence our everyday behaviours and attitudes. They require new solutions to ensure sustainability and prosperity in the region. These solutions are expected to generate significant change to several areas such as mobility, employment, healthcare and social security systems, social structure, family policy and cultural patterns, production and consumption models, use of natural (non-renewable) resources, mature and emerging markets and business sectors. A shift towards a more circular economy will be crucial for the region's possibility to meet the United Nations 2030 Agenda and its Sustainable Development Goals (SDGs). The Agenda provides a framework for transforming economies and societies towards more sustainable models, where a circular economy is strongly connected to several areas of the agenda, such as sustainable food production, investments in clean energy research and technology, higher productivity through diversification, innovation, resource efficiency, employment, climate action, technology development and sustainable industrialization, sustainable management of ecosystems including the marine and coastal life.

A circular and sharing economy has environmental benefits as it decouples the economic development from the consumption of limited resources. As a result, it minimises negative impact on the environment, and stimulates the development of innovations and new technologies. It creates employment opportunities and increases system efficiency. It also provides opportunities for businesses, but at the same time is a great challenge for both private and public sectors.

With regards to the 2030 Agenda, circular and sharing economy is particularly related to SDG11: Sustainable cities and communities, SDG 12: Sustainable consumption and production, SDG 9: Industrial innovation and infrastructure, and SDG 13: Climate Action. Achieving these SDGs will foster sustainable cities designed with circularity at its core. This would be manifested in sharing and renting services, where innovative partnerships between industries foster greater resource efficiency by making use of what would otherwise be waste materials, and where production and consumption follow a cradle-to-cradle, rather than cradle-to-grave approach. The SDGs are interlinked and interconnected. As a framework and approach, a circular economy provides an opportunity to integrate the 2030 Agenda in every aspect of everyday life, realising how resource efficiency may have social benefits in several aspects.

An overlooked issue and shared challenge among the BSR countries are how to establish behaviours and attitudes in support of responsible consumption and production. Achieving SDG 12 will require a complete overhaul of our take-make-waste patterns of production and consumption in favour of a circular system with a regenerative system in which all products are designed and marketed with reuse and recycling in mind, informed by a radical shift in policies, behaviours of people and business models.

Aim

The aim of this report is to provide BSR stakeholders with an overview of possible solutions to transform the regional economies towards more sustainable models. The examples also show how the economic benefits of circular systems go hand-in-hand with social and environmental goals. By utilising the 2030 Agenda as a framework, the report will provide best practices and examples: What has already been done and what is being done? What is the potential for the BSR actors to adopt similar solutions to make the necessary transition towards a circular and sharing economy?

Disposition

The practices in the report respond to five questions:

- Background – What is the practice? Where is it based? Who is responsible?
- Best Practice/Good Example – What is the circular economy practice, why is it a good example and how is it a solution to the identified challenge?
- Challenges – What was the problem or challenge that the circular solution was set up to address?
- Outcome & Opportunities – What are the results and impact of the practice?
- Related SDGs and SDG targets – What SDGs and SDG targets are related to the practice?

The cases are categorized based on geographic location, starting with the Baltic Sea Region with cases from Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden and followed by global cases from Belgium, Brazil, China Hungary, India, Italy, Romania, USA, South Africa and South Korea. These are cases of best circular economy practices by public, private and public-private stakeholders, multi-stakeholder partnerships and networks. The report has been developed in collaboration with the Baltic 2030 Capacity Building Programme - Localising SDGs, a leadership programme focused on the local implementation of global agendas organised by the Council of the Baltic Sea States (CBSS) and the think tank Global Utmaning with funding from the Swedish Institute. Participants of the programme are national, regional and local SDG implementers from the BSR. In addition, participants from Belarus and Ukraine have been asked to contribute to the report. Some of their input is visible in the second part of the report, titled Understandings of circular economy - voices from the BSR.

Besides the cases gathered among the participants of the capacity building programme, additional cases have been identified as good practices or innovative solutions by external actors. The cases were found in the European Circular Economy Stakeholder Platform[1] , Interreg Europe Policy Learning Platform[2], The circulars by World Economic Forum[3] and from the Ellen MacArthur Foundation[4], among others.

This report was commissioned by The Baltic Sea States Subregional Co-operation (BSSSC) and funded by the Interreg Baltic Sea Region programme.

VOICES FROM THE BALTIC SEA REGION

In the preparation of the report, the participants of the Baltic 2030 Capacity Building Programme - Localising SDGs were asked to define the meaning and understanding of circular economy.

CIRCULAR ECONOMY...

'... is often limited to waste recycling, using biofuels for district heating, waste water treatment to generated bio gas'

'... strives to save natural resources by using and re-using resources efficiently'

'Cities will play an essential part in the transmission of the economy'

'... focuses on four main areas of intervention: sustainable production, sustainable consumption, bioeconomy, and new business models'

'... is the decoupling of natural resource use and environmental impacts from economic activity and human well-being is an essential element in the transition to sustainable future'

'...is a combination of resource efficiency, climate mitigation, carbon removal and biodiversity protection policies'

'... is about to move away from linear resource management'

'... is as large and complex system, with both technical and biological cycles that ensure that there is no waste of resources while still providing added value and maintaining healthy economy'

'... is an economy that keeps pollution and waste out of the system, maintains products and materials in use, and regenerates natural resources'

TOWARDS A CIRCULAR ECONOMY

The economic theories that are commonly taught to our children and youth have for a long time focused on the economic system per se. They have primarily concentrated on the relationship between production and consumption. As a result, they have neglected the planetary consequences of rapidly growing economies and populations. In short, the planetary services provided by the natural systems have been looked upon as free gifts. This way of understanding nature - almost as a constant - risks leading to a situation where a combination of resource depletion and pollution may bring the global economy down.

Economic developments after World War II have been extraordinary, resulting in huge improvements in welfare and standard of living in many parts of the world. But the consequences for the planet have been increasingly serious. Our societies are faced by a perfect storm of problems, driven by overpopulation, overconsumption, the use of environmentally malign technologies and resulting in the rapid decline of vital ecosystems and an increasingly unstable climate system. Resource depletion in combination with chemical pollution, the dumping of sewage in the rivers, plastics in the oceans and CO2 in the atmosphere are all examples of a system in crisis. Exponential economic growth on a finite planet is no longer possible if humanity is to sustain similar living conditions as we have been used to so far.

This traditional way of organising the human economy may be labelled a linear economic model. It is a model where human creativity and manpower are used in combination with extracted energy resources to transform material from the planet's crust to produce products and new materials, most of which end up in landfills and dumping sites. This model is based on a philosophy of man as master of nature.

The drawbacks of the linear economic system went unnoticed whilst the population on the planet was small. As populations grow, the problems increase. The human population has gone from 3 billion to 7.6 billion in only half a century. The estimated population year 2100 is between 10 and 11 billion.

"Economic thinking and action simply have to transform to explicitly include nature in the process"

This population growth will mainly be concentrated to Sub-Saharan Africa and South-East Asia, where new middle-class individuals will expect the same kind of living conditions as we in Europe have enjoyed for decades. Man's collective activities have come to dominate the planetary machinery and now constitute a threat to our survival as a species.

Economic thinking and policies have to transform to explicitly include nature in the process. The notion of a circular instead of linear economy is to conceptualise this inclusion. In short, the circular economy is a metaphor for an economy that aims to be as integrated as possible with nature's resource stocks and flows. A strict definition would imply that all materials taken from stored deposits in the earth should be fully circulated and as little as possible should end up as waste.

The main thrust of the concept is to create industrial systems that are not only efficient, but essentially waste-free. The basis for this thinking is that the linear way, in which the world economy currently operates, fuels a culture of excessive consumption and creates more waste than what is sustainable long-term. In contrast, the living world operates in a circular cycle where the by-product of one species easily provides the feedstock of another. The circular economy should aim to mimic the natural cycle of life.

The dominating business model of today, implying fast turnover of most consumer products, means that a lot of things are discarded even if they are still fully functional. The circular economy as a concept implies recycling and reuse and would be strengthened by extending the use-life of products. Hence the main business case to explore would be to preserve the embedded labour, energy and material value in finished products for as long as possible. It goes without saying that a change of business model – from selling more goods to offering high-quality services – would help steer the economy in the right direction.

Transforming the production and consumption systems from today's linear "take, make, waste" model to a circular model, where products are designed for reuse, recycling, maintenance, repair, upgrading and remanufacturing is not a futuristic concept. It was an essential part of the the pre-industrial lifestyle and remains the only thinkable strategy in the poorest parts of the world. This concept is now gaining ground all over Europe as policy-makers and business leaders realise that the linear system of resource use exposes societies and businesses to serious risks.

With a growing population, a much-needed increase of per-capita-income (affluence) in low income countries, technology innovation, in combination with behavioural change - and underpinned by policy reforms - are the only options we have to bring down the environmental impacts. Luckily, there are many types of decoupling that could and should be achieved by improved technology, often complemented by behavioral change. Unfortunately, policies to promote such actions are rare.

Whilst the promotion of labour productivity has been a priority for economic policy-making in the past, resource productivity has been more or less neglected. To steer the economy in the direction of a circular economy, with the potential to deliver considerable social benefits, would require deliberate policy measures as well as targeted investments over a period of time; the main objective being to reduce the energy and material throughput in society. Central to this shift will be the capacity to view a circular economy not as an environmental issue alone, but as an integral part of jobs and competitiveness strategies.

However, a perfectly circular economy is probably not possible. We can hardly fully recirculate all material we use, many of which have been so complex that we have difficulties to break them down again. The fact is that if we seriously want human conditions on the planet to be conducive to decent living conditions, we have to rapidly take large steps towards the circular economy. During that process we will learn how to develop our concepts, our tools, our consumption patterns and behavior as well as our technologies.

The main purpose of this report is to share some examples, primarily from the Baltic Sea Region on how governments, regions, municipalities, research communities and companies have started to make the circular economy a reality. Many of the examples focus on waste management and residue materials. That may be natural as a first step in the process. But for the circular economy to really make a difference priority must be given to upstream issues such as design and material sourcing. It is only when careful consideration is given to how products are designed - and how the ingoing materials are sourced - that a serious transformation to a circular economy will be possible.

Tove Ahlström
CEO, Global Utmaning

Staffan Laestadius
Professor emeritus, Royal Institute of Technology in Stockholm (KTH) and Chair, Climate & Resources programme, Global Utmaning

Anders Wijkman
Chair, Circular Sweden and Member of the Board, Global Utmaning

Municipality of Aalborg, Denmark
https://www.aalborg.dk/english

Best Practice 1.

CIRCULAR PUBLIC PROCUREMENT

Background

The municipality of Aalborg has high aspirations when it comes to sustainability and has during the past two decades worked committedly to improving the sustainability of the city. It is the fourth largest city in Denmark and is home to more than 200 000 citizens. As a result of a Danish school reform that recognised the importance of differentiated learning environments for facilitating inclusion, well-being and improved learning, schools in Denmark are looking for new classroom designs, which are flexible and dynamic and that can be tailored to classes' learning needs. Aalborg decided to use this opportunity to transform their approach of classroom design far away from just focusing tables and chairs, and instead create an inspiring learning environment, that supports students' needs whilst also strengthening the circular economy of the school. Thus, Aalborg designed a public procurement tender that asked providers not just to supply, but also inspire and challenge ideas, and provide a comprehensive proposal for a new classroom environment based on circularity and the re-use and refurbishing of existing furniture.

Good Example

The use of public procurement to support the acceleration of circular economy and sustainability in public services is a good example that is also advocated as a useful method by the EU. In the case of Aalborg, the tender for new classroom designs was designed to include provider merits of:

- Integrating the principles of circular economy with interior design solutions
- Analysing interior design through dialogue with schools
- Guaranteeing the possibility of recycling existing furniture
- Preparing interior design proposals
- Restoring and refurbishing existing furniture
- Delivering and installing new furniture
- Responsibly disposing of excess furniture which is not considered suitable for reuse or recycling.

This way, Aalborg ensured that the provider would be responsible for the long-term maintenance the produces and use sustainable materials and reparable furniture with a long life-cycles. Furthermore, technical specifications of the tender specified that the use of packaging should be made from recycled materials, at least 70 percent of wood used should come from sustainable sources. The producer also had to provide service and during the total warranty period had to inform the schools of the relevant maintenance services available and advised for each product.[5]

Challenge

The environmental impact of furniture and other classroom equipment are linked to the materials that are used in the production. Schools are just one of many examples where furniture and other equipment have a short lifespan due to its heavy use. Not only is purchasing new furniture expensive, it is also not environmentally sustainable. But, as the actual use of furniture results in virtually no environmental impact, extending the lifespan has a direct environmental benefit. As such, a circular approach to procurement, which rewards reuse and refurbishment over purchases of new furniture, can be considered a more holistic and sustainable approach to meeting organisations furniture needs.[6]

Outcomes & Opportunities

Sustainable and circular procurement looks beyond short-term needs and considers the whole lifecycle of a product or service. As a result, schools can reuse and repair classroom furniture rather than purchasing new, thereby saving costs, as well as reducing the environmental impact of producing new furniture.

However, for the procurement process to work as expected it is important to design the tender carefully with cross-sectoral input on how to define the services and products asked for. It is also important to include a requirement for continued monitoring and evaluation of the services provided throughout the whole contract period in order to ensure that the procurement and the services provided meet the objectives.

City of Gothenburg, Sweden
https://smartakartan.se/en

Best Practice 2.

THE SMART MAP

Background

In 2016, the City of Gothenburg, Sweden, took initiative to develop an interactive map for its citizens to gather a multitude of happenings, events, initiatives and projects aimed at supporting a more sustainable lifestyle. The initiative is a partnership between the public and private sector and the people and is therefore reliant on local organisations to provide services and citizens to report their activities to the map. The map aims to make it easier for citizens of Gothenburg, as well as visitors, to live more sustainably. The map encourages more inclusion, facilitates new ways of linking up, and promotes access to shared services with the purpose to provide sustainable and resource efficient alternatives to mainstream services and products. For example, people are encouraged to find alternatives to consumptions, such as sharing and lending. The maps is open source and is continuously evolving, any citizen or organisation can propose new initiatives.[7]

Good Example

The Smart Map highlights current and upcoming activities and networks throughout the city. The map works as a community where people can interact and promote their services and solutions to a greater audience. For example, the map shows different “swap services”, lending services for toys, clothes and machinery, bike repair shops, carpools, work and event spaces. By connecting people with different needs and solutions, the map facilities more sustainable ways of living for the citizens of Gothenburg. The maps has categories such as; food, knowledge, meetings, mobility, spaces, things and transaction types.

The map is design in a way that the makes the search functionality very flexible, allowing users to search for initiatives by name, sector or activity. As a user, one can also browse the ongoing activities in your area or be inspired by projects in another part of the city.[8]

Challenge

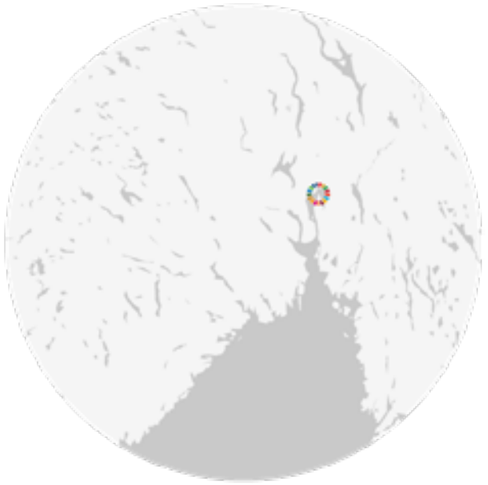
It should be easy to live sustainable lives but for citizens looking for alternative services or more sustainably produced products, it can be a challenge. In the City of Gothenburg, as in all cities, there are a lot of different organizations, citizens and companies that strive for more sustainable choices. They are each working in their respective fields to realise that vision, whether it be as a private citizen with great knowledge on bike repairs, a grocery store that is looking for ways to limit food waste, or an organisation repurposing old clothes for people in need. In order to make their activities fruitful and realise their vision at large, they need to be connected. Hence, the map serves as a good tool to link these users together and create a community that co-creates the information offered on the platform.

Outcomes & Opportunities

To publish information on the map, the initiative must fulfil a number of criteria (number 1-5 are compulsory):

1. Open to everyone or limited to a particular block or group of residents
2. Items and services are provided free of charge (or at cost price)
3. Be a local community actor
4. Facilitate urban commons and accesses, rather than ownership
5. Promote renting, sharing, exchanging, borrowing and giving, rather than purchasing and selling
6. Promote exchange between private individuals
7. International companies are not allowed if they are not a cooperative

What is presented on the map is also decided through joint consultation between the association Collaborative Economy Gothenburg and the City of Gothenburg Consumer and Citizen Services Administration and are founded on their collective values and common remit. Anyone can submit a proposal by completing a ‘Add an activity’ form. Activities are then selected through a discussion between the project owners.[9]



City of Oslo, Norway
https://www.oslo.kommune.no/

Best Practice 3.

MUNICIPAL WASTE MANAGEMENT

Background

In Oslo, the collaboration between the municipality and the population has resulted in an efficient use of resources. The city has set an overall target to reduce its CO2 emissions by 95 percent by 2030 compared to 1990 and to become carbon neutral by 2050. One of the measures needed to achieve this target is an integrated waste management system, which Oslo launched in 2006 with its Waste Management Strategy (WMS), aiming to establish a “recycle and reuse” society[10]. The citizens sort their waste at home using a system of color-coded trash bags that are collected by the municipal Agency for Waste Management and brought to the waste facilities. Once there, the Waste-to-Energy Agency sorts the household waste and produces district heating, biogas and biofertilizer. This resource-focused way of thinking is the main force behind a circular economy approach that is needed to reach the target of carbon neutrality.

Good Example

Using a system of color-coded trash bags, the waste that is produced by the city is sorted through an optical separation system at waste management sites Haraldrud and Klemetsrud, where green bags containing food waste and blue bags with plastic packaging are separated automatically from the residual waste. The food waste, together with other biological materials, becomes biogas and biofertilizer, while the plastic waste is handled by Grønt Punkt Norway (Green Dot Norway) and ends up as new plastic products. The residual waste is incinerated and becomes district heating for Oslo's population[11]. The system makes it easier for the citizens to correctly dispose a vast majority of their produced waste, at the same deposit sites only using differently coloured bags. This also makes the transportation of waste more efficient as all waste pickups can be centralized to fewer locations. Today, only two colours are used for identification, green and blue. However, there is no limit to the number of colours that could be used for sorting and therefore has the potential for upscaling.

Challenge

Cities consume about 75 percent of global energy and emit between 50 and 60 percent of the world's total greenhouse gases[12]. The global waste problem is also increasingly linked to urbanisation as the growing number of cities are becoming mass producers of waste[13]. Efficient waste management systems are key to meet the targets of carbon neutrality and greater energy and resource efficiency in any city.

Outcomes & Opportunities

A key to the success of the Oslo waste management system is that it required no logistical changes to the existing waste management system and could be implemented rapidly – contrary to the alternative of adding more waste containers and routes for the collection vehicles. As of now, 21 percent of the plastic, 64 percent of glass and metal, and 76 percent of paper and cardboard are recycled. In addition, it seems that by making food waste visible, the system has had an educational effect, making the citizens more aware about the volume of food that is wasted, as the total volume of food waste has reduced by 5 percent since the system started.[14]

Päijät-Häme region, Finland
http://www.kohtikiertotaloutta.fi/english/

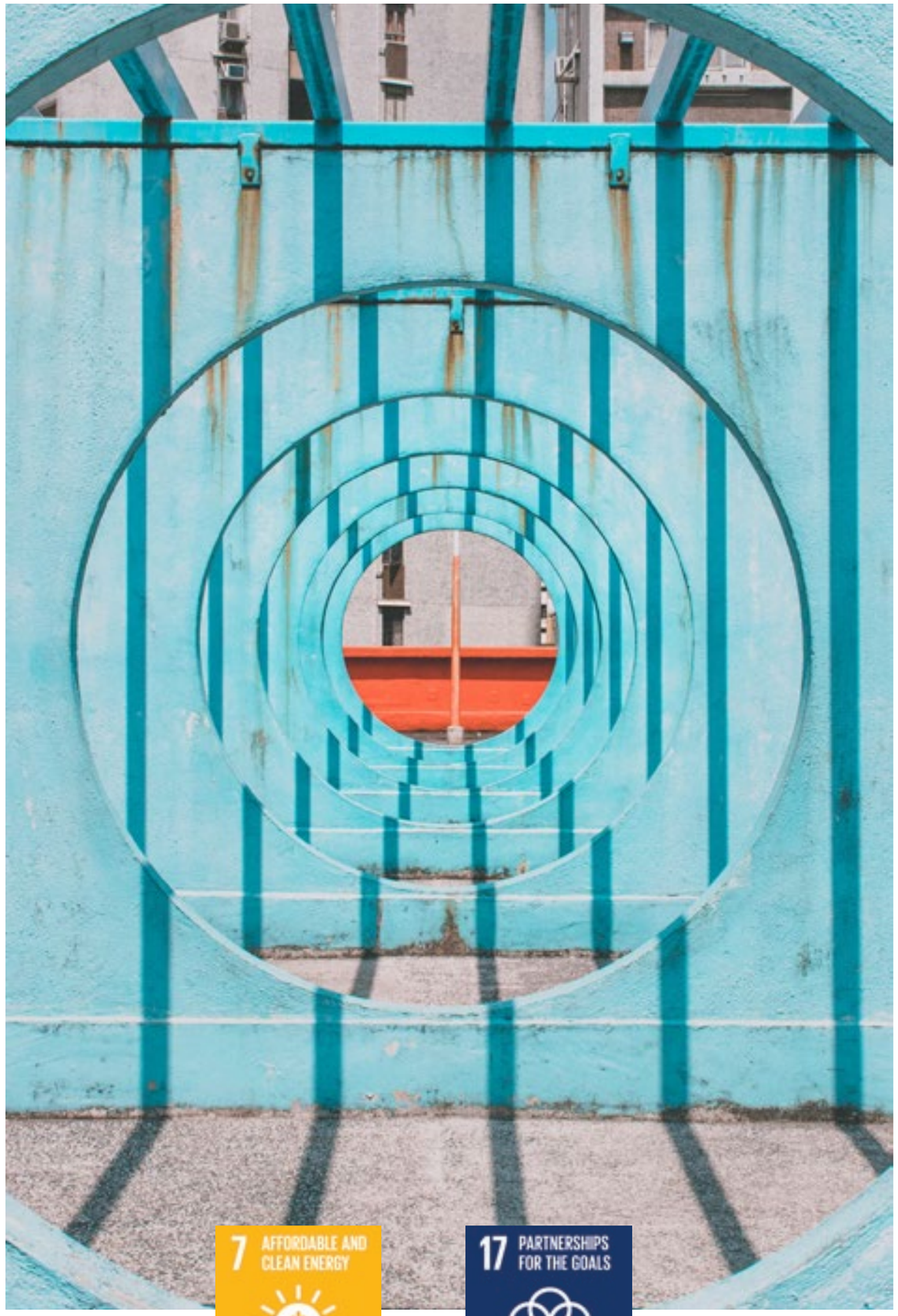
Best Practice 4.

CIRCULAR ECONOMY ROAD MAP

Background

In 2016, the Finnish government and launched a national roadmap to a circular economy - Leading the cycle: Finnish road map to a circular economy 2016-2025 under the leadership of SITRA, The Finnish Innovation Fund. This made Finland the first country in to world to present such a roadmap. It describes detailed actions that can accelerate the transformation of Finland into a competitive circular economy. The roadmap highlights best practices and pilot examples that can easily be replicated and provides added value on a national scale.[15]

The roadmap provides an outline for the transition, whilst the Päijät-Häme Circular Economy roadmap, a joint regional Circular Economy strategy covering nine municipalities, illustrates aims and actions at the regional level. The regional roadmap was launched in October 2017 as part of Päijät-Häme's regional economic strategy for 2018–2021. The drafting process was coordinated by Lahti University of Applied Sciences, in close cooperation with the regional council and local stakeholders, such as regional and municipal authorities, academia, a regional development corporation, as well as public and private companies.[16]



Good Example

The roadmap is a good example of how regions can take local action for sustainability and develop context-specific needs and opportunity assessments, and integrate them into their general development strategy. Additionally,the co-creation process of developing the roadmap is also a good example of how to build recognition and acceptance for the actions outlined in the roadmap. The process allows regional stakeholders to define a common vision, regional aims and detailed action plans. This was made possible through workshops, discussions, and requesting comments from additional stakeholders through a survey and direct emails. Since input was gathered from across the region and provided by stakeholders from many different sectors, it created a foundation for successful implementation. The roadmap is also a living document; annually updated to involve new actors and opportunities. In currently includes five main themes, each with regional goals and actions. The overarching themes are:

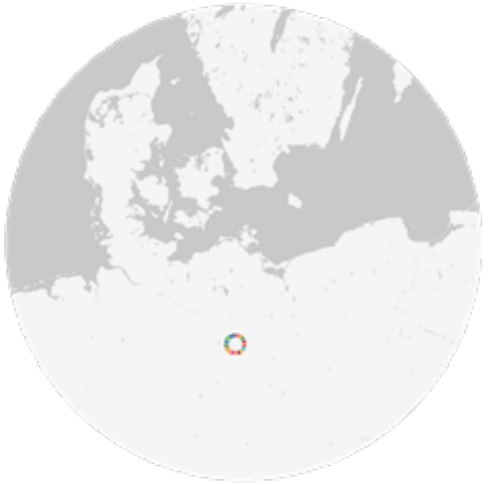
- Closed loops of technical streams to create added value
- Sustainable business from bio-circular economy
- Towards energy self-sufficiency by sustainable transport and energy solutions
- Shared economy generates new consumption models and business opportunities
- Piloting and demonstrating innovative circular economy solutions

Challenge

The roadmap is an attempt to solve the challenge of getting both public and private stakeholders from different sectors to develop a joint and holistic vision for the long-term regional development that is both sustainable and mutually beneficial.

Outcomes & Opportunities

The active involvement of local authorities and regional stakeholders have been key to the successful strategy process in Päijät-Häme. the circular economy roadmap has become part of the Päijät-Häme strategic regional plan and regional development programme 2018–2021, which is a measure of success.[17]



City of Berlin, Germany
https://www.grover.com

Best Practice 5.

SUBSCRIBING ON TECHNOLOGY

Background

Mainstreaming circular approaches and business models into the German society at large, supported by national legislation, have made evident the financial and environmental benefits and opportunities offered by circularity. A rise of green and circular start-ups has named Berlin ‘the circular economy innovation hub of Europe’[18]. Grover is one of the more well-known start-ups in Berlin that offer “pay-as-you-go” subscriptions to the latest consumer tech as an alternative to owning products. Through their service, consumers are able to subscribe products, such as laptops or phones. The service offers consumers “good as new” products for a monthly fee, and if a product is damaged or if the consumer needs to change it to a different one, Grover replaces it. This way, the need for consuming new products is reduced. By offering a subscription-based service to consumers, Grover is developing the rental-based economy in Germany offering their customers tech-products by monthly, quarterly or yearly subscription.

Germany is, according to Politico´s Circular Economy Index, outperforming other European countries in terms of circular economy practices, holding an estimated 1260 patents that have to do with sustainable products, processes and services[19].

This is a lot more than any other country in the top five list of European countries. The Circular Economy Index takes into account seven key metrics: annual municipal waste per person; municipal recycling rate; trade of recyclable raw materials; material reuse rate; investments in circular economy sectors; circular economy patents; and annual food waste per person.[20]

Challenge

The EU generates almost three billion tonnes of waste annually, of which 90 million tonnes are hazardous waste. A societal shift from ownership of goods to shared access of goods is necessary in order to move away from a traditional take-make-waste economy and instead towards a system that balances our resources and the environment. Producers are driven by economic incentives and getting consumers to purchase the latest products is argued necessary for continued economic growth. This model ultimately ensures that products are developed not to last. A rental economy where products are designed to be rented, rather than sold, would rather provide producers with incentives to develop repairable products with a longer lifespan that could be used by multiple users. A rental-based economy would therefore reduce the need to buy single-use products, thus reducing the demand and production.

Good Example

Working in cooperation with Europe's largest electronics retailers, Grover has grown to be a leading player in the consumer electronics market by redefining the ways in which consumers relate to products which maximises usage and minimises waste. Grover's subscribers gain access to consumer electronics on a monthly basis and return items when they are no longer needed. Examples include smartphones, laptops, cameras, wearables and smart home appliances.[21]

Outcomes & Opportunities

Through their platform, Grover is able to increase asset utilization and enable products to be cascaded through multiple user cycles. Products are rented in good conditions and returned products are serviced, cleaned and repaired, before a new customer request it. This way, each product has a longer life-cycle than it would if purchased as new.[22]

National initiative Poland, Lithuania, Denmark, Germany and Sweden
https://ubis.nu/

Best Practice 6.

PARTNERSHIPS FOR URBAN INDUSTRIAL SYMBIOSIS

Background

Urban Baltic Industrial Symbiosis (UBIS) is a regional cooperation project financed by the European Regional Investment Fund, Interreg South Baltic. The project focuses on developing pilot cases of industrial symbiosis, learning about the industrial symbiosis concept and spreading knowledge in order to inspire new symbiosis sites in the South Baltic region.

Industrial symbiosis is the mutually beneficial exchange of waste and by-products between different parties. Based on ecological mutualism and nutrient flows within an ecosystem, industrial symbiosis requires collaboration between different stakeholders within a relatively small geographic proximity[23]. Developing capacity and finding opportunities to develop cross-sectoral and public-private industrial symbiosis is an opportunity for both private and public companies to increase their profitability and competitiveness by reducing the cost of resources, while at the same time being substantially more environment-friendly by reducing the use of material and production of waste[24]. As such, industrial symbiosis is a business model and method based on circular material flows and circular economy.

Skåne Energy Agency, a regional energy agency in the south of Sweden, and a department within the non-profit organisation Skåne Association of Local Authorities, is the lead partner of the UBIS project. Together with ten partners in five countries (Poland, Lithuania, Denmark, Germany and Sweden) the project developd tools and recommendations by learning from existing industrial symbiosis plants, project members that already have knowledge and experiences of industrial symbiosis, and from five pilot investments that are carried out as part of the project.

Good Example

The project is a good example of how to combine the experiences of already established industrial symbiosis sites and production systems, and how to use those to develop guidelines, recommendations and methods in order to support a greater expansion of circular economy through industrial symbiosis practices . It is also a good example of building cross-sectoral and regional partnerships to support the practical expansion and utilization of circular economy.

The UBIS project works directly with five pilot investments that serve as the testing ground for the project. These are:

- The City of Malmö, Sweden: The objective for the city of Malmö in the UBIS project is to develop a soft pilot planning tool. The aim is to map the industrial symbiosis streams, such as heat and cold, various materials in Malmö harbour for example, and digitalise into a GIS-layer. This will be a helpful tool in identifying opportunities and marketing the possibilities with industrial symbiosis.
- Kalundborg Utility, Denmark: Kalundborg Utility will complement the services already available to the industrial symbiosis in Kalundborg. This expansion includes the possibility to supply cost-effective surface water for production with an all-year-round constant temperature. More information can be found in Best Practice 16.
- Gdańsk University of Technology, Poland: The major task of the Gdańsk University of Technology will be to identify groups of enterprises suited for collaboration within an industrial symbiosis system in the Pomeranian region in Poland. A particulate task will be waste energy sharing among companies. For this purpose, a Spinning Fluids Reactor-based mobile system is proposed for low temperature heat recovery from various types of power generators.

- The municipality of Bjuv, Sweden: “Urban Health” by industrial symbiosis involves identification and analysis, city planning and implementation. By using the residual heat from local industries, the municipality can create new, healthy, and social environments for people in urban areas.
- The municipality of Silute, Lithuania: Silute will develop municipal waste storage by installing new infrastructure for collection of waste so that it can be recycled and get a second life as new raw material.

Challenge

Trust, knowledge and procedures of cooperation are some challenges that have to be overcome when developing business models for industrial symbiosis that are both a profitable and resource efficient means of creating more circular economic flows. Trust concerns the fear of being too dependent on the resources of other actors in the symbiosis. There is a lack of knowledge on many levels, about the industrial symbiosis itself, the opportunities it presents and about legal implications. Procedures of cooperation refer to the need for building long-term relations, transparency and information sharing between the actors involved in the symbiosis, something that is often missing.[25]

Outcomes & Opportunities

Where the project stands at the moment, it has developed a series of publications with methods and recommendations on how to overcome some of the challenges involved in expanding and developing new sites for industrial symbiosis in the BSR. The project has developed:

- An Evaluation Tool to evaluate the potential for industrial symbiosis in a specific site.[26]
- A Decision Tool to help stakeholder find opportunities and make sustainable decisions.[27]
- A Business Model to help stakeholder find profitability and sustainability through industrial symbiosis solutions.[28]

City of Kaunas, Lithuania
https://ec.europa.eu/futurium/en/node/1961

Best Practice 7.

CIRCULAR ECONOMY PARTNERSHIP

Background

The transition towards a more circular economy brings great opportunities for Europe and its citizens. It is an important part of our efforts to modernise and transform the European economy, moving in a more sustainable direction. There is a strong business case behind it which enables companies to make substantial economic gain and become more competitive. It delivers important energy savings and environmental benefits. It creates local jobs and opportunities for social integration. Cities will play an essential part in the transmission of the economy.

Good Example

Kaunas city is an active partner in the Urban Agenda for the EU Circular Economy Partnership. Cities play an essential role in the development of a circular economy; they act as enablers of potential measures by which they can influence both consumers and businesses. In order to develop the concept of a circular economy within cities there are other themes that can not be overlooked, such as; overall governance, enabling businesses, public procurement, consumption and resource management.

The Partnership on Circular Economy has looked into the whole circle, beginning with the extraction of raw materials to design, production, transportation, consumption and, finally, the recycling of waste with residues for final disposal. By choosing the themes mentioned above, the Partnership on Circular Economy covers most of the relevant circular economy aspects from a city perspective. The Partnership on Circular Economy has not elaborated an overall plan for introducing the circular economy at a city-level, but has rather focused on specific actions and recommendations that would fit into already existing plans for most cities.

Challenges

The Partnership on Circular Economy has identified several barriers and bottlenecks regarding the use of secondary raw materials (recycling) or products (re-use) originating from waste streams. In the Partnership, this has been presented from a public procurement perspective, a consumer perspective, a waste management perspective, as well as a business enabler perspective. Besides a lack of awareness for existing sources of funding and financing for circular economy investments and the conditions for accessing and/or blending them, cities and funding institutions often lack knowledge on how to assess, design and set up funding programmes and/or schemes for circular economy projects.

Outcomes & Opportunities

By establishing a practical roadmap, cities are enabled to develop an urban resource management plan. In this roadmap, the three main elements of resource management will be incorporated; a) mapping of resources and resource flows, b) brokerage facilities to bridge the gap between supply and demand; and c) the monitoring of results. Supporting businesses and local authorities to identify their waste or by-products, diverting them away from the waste streams and using them as secondary resources for new products, will contribute to a more efficient resource management that is economically sound in terms of value creation. This may help speed up a city's transition to a circular economy in terms of resource efficiency, lowering environmental impact, and creating new economic activity and jobs. The Partnership has identified that an urban resource management plan could be an important tool to achieve this.

Information Provided By Dr. Visvaldas Varzinskas, Member of Kaunas City Council, Chairman of the Committee of Sustainable Development and Investments

National initiative, Lithuania
http://grazintiverta.lt/en

Best Practice 8.

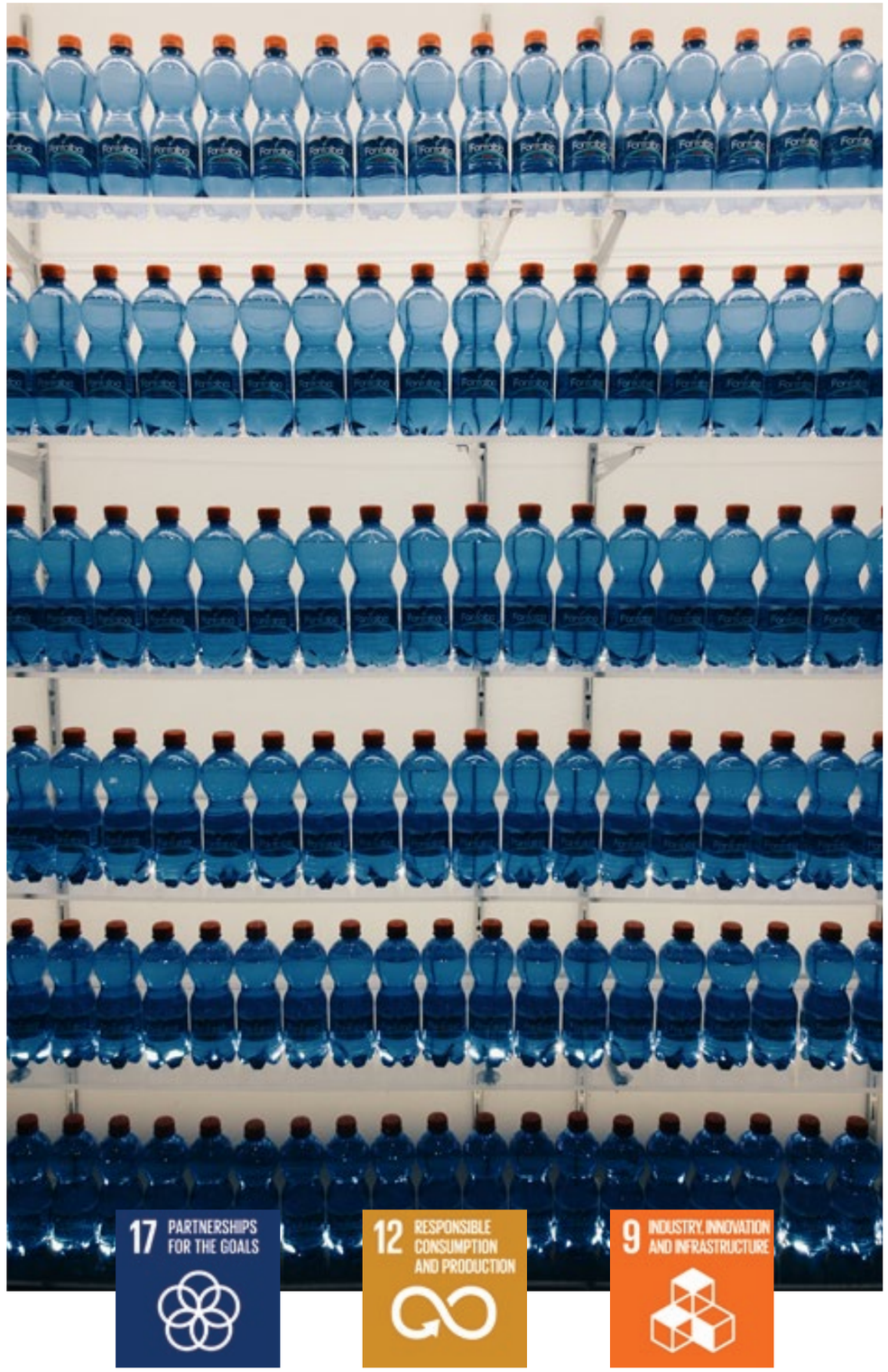
DEPOSIT RETURN SYSTEM

Background

In 2016, the government of Lithuania implemented a “deposit return system” for disposable beverage packaging as an attempt to combat litter and increase the collection- and recycling rates of used drinking bottles. Consumers would pay a deposit amount of €0.10 when purchasing eligible drink containers, to be refunded when the empty container is returned for recycling. This system is not unique to Lithuania, similar deposit-return systems are present in most European countries. However, the system implemented in Lithuania has proven the most successful of the EU member states with 74 percent of plastic packaging recycled, according to a Eurostat study. The number can be compared to the second best country, Cyprus, where 64 percent and to the average within the EU of 42,4 percent of plastic packaging are recycled.[29]

Good Example

One of the key reasons behind the recycling success in Lithuania has been the nationwide roll out of a national Deposit Refund Scheme (DRS), with easy-to-use reverse vending machines where consumers can deposit used plastic bottles and receive a cash-back of €0.10 per bottle.



Producers and importers that supply alcoholic and alcohol-free beverages in disposable glass, plastic or metal containers with a capacity of more than 100 ml, but below three l, are obligated to participate in the deposit system for disposable beverage packaging. Individuals who buy beverages in metal, glass and plastic containers marked with the deposit symbol pay the deposit at the point of sale and can collect a refund after delivering the packaging to a DRS machine. There are now over 1,000 DRS machines at large retail chains across the country and more than 1,800 small shops are also accepting the plastic containers. The performance of this system, i.e. the container return rate, reached about 70 percent in the first year of operation and more than 90 percent in the second year of operation.

The public institution Užstato Sistemos Administratorius manages the entire deposit system, starting with the collection of the packaging waste and ending with it being recycled. The process can also be tracked in real-time, at the time of writing this report, 1,649,489,610 packages have been recycled through the system.[30]

Challenges

The national DRS has successfully tasked both producers and consumers to take responsibility for the recycling of their products. It is estimated that through the DRS, 21.000 tons of packaging per year is recycled instead of ending up in dumpsites or the environment.[31]

Outcomes & Opportunities

By the end of 2016, 99.8 percent of the Lithuanian public were aware of the deposit system, with 89 percent having used it at least once. 58 percent of consumers reported recycling more and 78 percent believed the deposit system to be good and necessary. Prior to the scheme, only one-third of all beverage containers in Lithuania were returned. The goal of a 55 percent return rate in 2016 was exceeded to 74.3 percent of all beverage containers returned for recycling. The return rate reached a huge 91.9 percent by the end of 2017.[32]

Information Provided By Mantė Černiūtė-Amšiejienė, Head of Urban Planning unit at Klaipeda City Municipality, Republic of Lithuania.

National initiative, Latvia
http://www.varam.gov.lv/

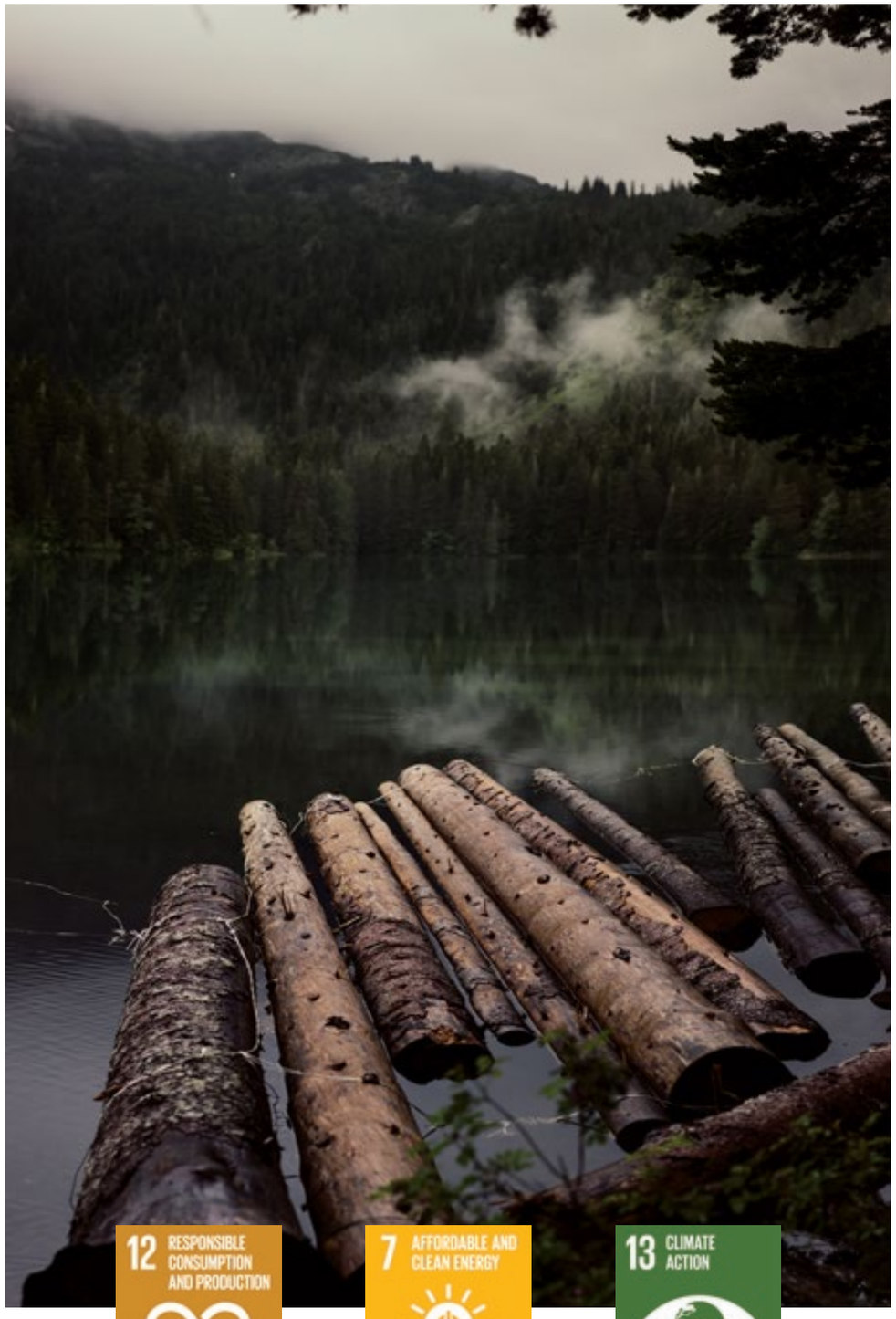
Best Practice 9.

GREEN PUBLIC PROCUREMENT AND TAXATION FOR CIRCULARITY

Background

For any country looking to develop efficient instruments to accelerate the transformation towards a more resource efficient, circular and sustainable community, environmentally informed taxation on resource heavy- and polluting industries, as well as green public procurement, are two core instruments.

Green Public Procurement (GPP) or green purchasing is a voluntary instrument in the EU toolbox but plays a key role in the EU's efforts to become a more resource-efficient economy. The European Commission states: "Europe's public authorities are major consumers. By using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production - what we call Green Public Procurement (GPP) or green purchasing".[33]



Latvia has implemented a Natural Resource Tax and guidelines and criteria for GPP. The country is by no means alone in using these instruments to enhance the country´s resource efficiency and promote circularity in procurement processes, but the country is a good example of how such policy regulations could look and be developed.

Good Example

Latvia has further strengthened one of the core economic instruments serving for environmental purposes – the Natural Resource Tax – by regularly reviewing both the tax rates and tax base in order to target the polluting activities and enhance resource efficiency. The review aims to provide financial incentives to improve waste management, reduce landfilling, enhance efficient use of resources and transition from natural resources to secondary materials[34]. The review of the tax also includes increased tax rates for waste disposals, with the aim of reducing waste volumes in landfills while stimulating waste management companies to switch to other more favourable waste treatment options, such as recycling or reuse. Together, these measures will help Latvia to transition towards a circular economy, where waste becomes a resource and returns back to the economy.

Latvia has also established the legal basis for Green Public Procurement with specific environmental criteria for public procurement of specific product groups including office paper, office IT equipment, office furniture, food and catering services, cleaning products and services, indoor lighting, traffic signals and several other voluntary product groups. To help develop guidelines for GPP, Latvia is also developing a “calculator” of life-cycle costs for energy consuming products groups.

Challenges

A major challenge to the development of legal guidelines for GPP is a perception among authorities that GPP is more expensive and complicated and introduction of “green” requirements and criteria will restrict the competition and could result in an appeal of the tender results. Also, the concept of “greening” of the procurement has to be made as early as possible in the procurement process, preferably at the project planning phase. This requires comprehensive cooperation between project developers and procurement specialists, which also has proven a challenge.

Outcomes & Opportunities

The Natural Resource Tax and GPP facilitates and accelerates the transition to circular economy. These practices contribute to “doing more with less”, by increasing net welfare gains from economic activities while reducing resource use and the degradation of ecosystems. Expected co-benefits include reduced pressure on environment, a more efficient use of resources and changing consumer behaviour, which is paramount when achieving the transition to circular economy.

Information Provided By Anna Popkova, Senior Expert, Ministry of Environmental Protection and Regional Development of the Republic of Latvia

National Initative Estonia
https://e-estonia.com/

Best Practice 10.

CIRCULAR START-UPS

Background

Named the most advanced digital society in the world, Estonia has developed a comprehensive digital ecosystem comprising many aspects of everyday life. Taxation, voting, health, residency are some of the social services managed through e-solutions in e-Estonia, a movement by the government of Estonia to facilitate citizen interactions with the state through the use of electronic solutions.[35]

Having been a global leader in the digital transformation for the last two decades, Estonia is today experiencing a boom in the start-up scene of innovative companies making use and developing on the foundation of the already fully digitalised Estonian society. Ranking third in Europe regarding the highest number of start-ups per capita[36], Estonia is also ranked 24 on the Global Innovation Index[37].

Good Example

Favourable conditions for setting up start-ups in Estonia has created a scene of Greentech start-ups working with circular business models, trying to find market opportunities for innovative products, services and solutions for greater resource efficiency and sustainability. Inspirational start-ups to highlight as an example of best practices include:

- 3cular: Eco-innovative 3D printing that gives wood waste a new value. 3cular is reinventing 3D printing in a sustainable way, enabling manufacturers to produce any kind of wooden objects out of leftover wood material, increasing resource productivity and reducing the use of plastics as the most popular 3D printing material.[38]

- Pillirookõrs: Reusable, biodegradable drinking straw made exclusively from reed that grows naturally on the shores of Saaremaa, in the Baltic Sea. Reed is processed into the straws without the use of any additives. Each one is handmade and can be reused and washed in the dishwasher. After the Pillirookõrs has served its purpose, it will decay completely; completing the circle.[39]

- Rohepakend: Alternative to disposable plastic utensils and food containers made from recycled cloth. Individuals and companies donate fabric and Rohepakend gives it a new life as a sustainable and biodegradable food container.[40]

Challenge

With only 11 years left to implement the 2030 Agenda for sustainable development, it is crucial that the private sector continues to develop services and products if we are to fulfil our global goals. It is evident that states and public service providers are not able to meet the challenges of sustainable development alone. However, for innovative companies and start-ups to commit to a circular business model with resource efficiency and sustainable growth as core values, they need the government to support technology development and small businesses as well as investors who cherish sustainability and realize the long-term profitability of such values.

Outcomes & Opportunities

According to e-Estonia the following reasons explain why Estonia is able to foster a culture fuelling the innovative start-ups scene:

- e-Services and the ease of doing business. Being able to conduct most tasks of setting up a business online through the e-Estonia platform and through other digitised service providers. Also, business-friendly taxation with a corporate tax rate at 21 percent with no double taxation on dividend income.

- People and community. The Estonian start-up community has good relations with the government and their voices are actively being heard as the government does its best to be responsive to entrepreneurs and start-ups.

- Developed and affordable living environment. The quality of life in Estonia is high but at the same time it's very affordable: Tallinn is one of the more affordable capitals of the EU while also among the most connected cities in the world, offering almost universal free public WiFi and free public transportation for residents.

- Ease of hiring talent. Estonia has also made it easy for local start-ups to acquire foreign talent, as in January 2017, the country launched its Start-up Visa. [41]

Information Provided By Krista Kupits, Environmental Adviser, Association of Estonian Cities and Municipalities

Satakunta, North and South Karelia, Southwest and Central region, Finland
http://www.materiaalitkiertoon.fi/en-US

Best Practice 11.

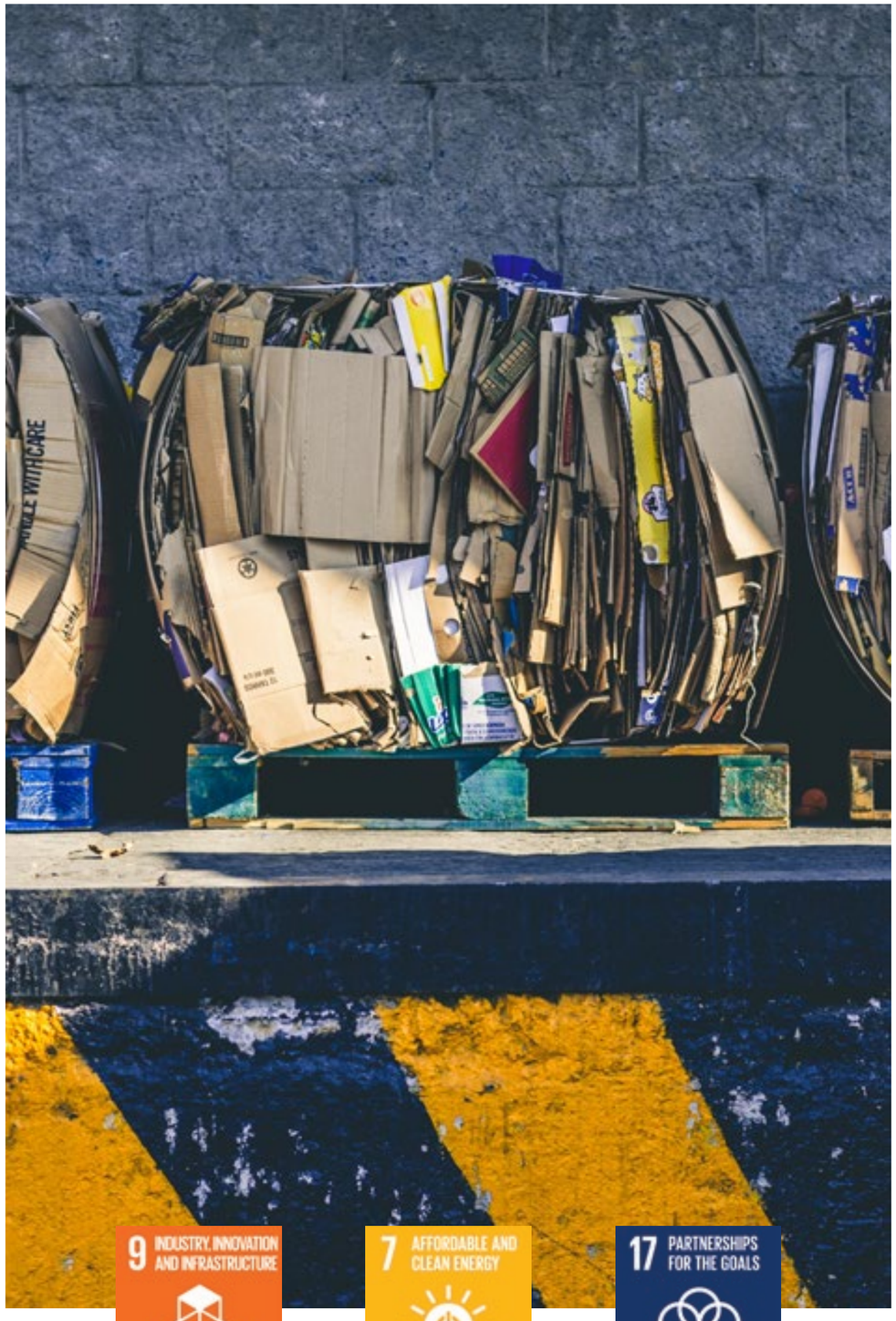
CIRCWASTE

Background

Circwaste is a cooperation and capacity-building project funded in large parts by the EU LIFE programme and is coordinated by the Finnish Environment Institute. Geographically focused on the Southwest Finland, Satakunta, Central Finland, North Karelia region and South Karelia region, the project gathers a selection of 20 cross-sectorial stakeholders and 10 funders to jointly promote and develop efficient use of material flows, waste prevention and new waste and resource management concepts. All actions of the project contribute to implementing the national waste management plan and directing Finland towards a circular economy. The project stands out as an example of a regional catalyst and support platform for local projects focused on improving resource efficiency through circular economy solutions.

Good Example

Acting as a circular economy platform for knowledge-exchange and capacity-building, the Circwaste project has proven a successful catalyst supporting the regional implementation of the Finnish national waste management plan. Key to the success of the project has been its regional focus.In each region, the relevant regional stakeholders have formed cooperation groups that work to implement the national



plan at a regional level. The groups create roadmaps that set goals and activities necessary to decrease the amounts of waste, improve material efficiency, utilize industrial by-products, etc.[42] In addition, Circwaste is also carrying out concrete pilot projects in key areas to develop the waste management system and to promote circular economy, as well as establishing an expert network on circular economy to provide expert services and spread information on successful solutions to relevant stakeholders outside of the project. A number of projects and initiatives, linked to Circwaste, has already been successfully implemented and some are highlighted as best practices in this report. These include:

- Production of biogas and fertilizer from biowaste streams and wastewater sludge at the LABIO Ltd biogas and composting plant (Best Practice 14)
- Waste sorting system enabling more effective material recycling at the Päijät-Häme Waste Management company.

Challenge

The Circwaste project responds to the challenge of regionalising national sustainability strategies by building multi-stakeholder partnerships with the capacity to implement national regulations on a regional and local level. In addition, the underlying challenge that the Circwaste project focuses on is developing solutions, best practices and recommendations on how partnerships of regional stakeholders can develop more resource efficient systems, not only to meet the targets of the national waste management plan, but also to support sustainable development, locally, regionally and nationally.

Outcomes & Opportunities

The Circwaste project emphasizes the need to develop regional roadmaps that set out the needs, opportunities and ways forward for the implementation of the national waste management plan. Creating regionalised and context-specific roadmaps is an important step to identify relevant stakeholders, build essential partnerships and find innovative solutions supporting the development of more circular and resource efficiency systems. With this method of work, the Circwaste project estimates that they will have: 1) decreased the amounts of municipal solid waste; 2) increased the recycling of construction and demolition waste; 3) improved material efficiency and waste prevention in production, industry and trade; 4) increased the use of mineral waste and industrial by-products.[4]

Municipality of Eskilstuna, Sweden
https://www.retuna.se/

Best Practice 12.

RETUNA RECYCLING MALL

Background

ReTuna Återbruksgalleria (ReTuna Recycling mall) is the world's first recycling mall, revolutionizing shopping in a climate-smart way. Old items are given new life through repair and upcycling. Everything sold is recycled or reused or has been organically or sustainably produced.

Good Example

The mall opened its doors in August 2015 and is located next to the Retuna Återvinningscentral, recycling center at Folkestaleden in Eskilstuna. It is easy for visitors to sort the materials they are discarding into the containers and then drop off reusable toys, furniture, clothes, decorative items, and electronic devices in the mall's depot, called "Returen". In the depot, staff from AMA (Eskilstuna Municipality's resource unit for activity, motivation and work) perform an initial culling of what is usable and what is not. The items are then distributed to the recycling shops in the mall. The shop staff then perform a second culling, where they choose what they want to repair, fix up, convert, refine – and ultimately sell. In this way, the materials are given new life.

ReTuna Återbruksgalleria and Retuna Återvinningscentral are run by the municipality-owned company Eskilstuna Energi och Miljö.

Challenge

Eskilstuna Municipality strives to be a green role model. In its environment-related development work, the idea came about to open a mall that had “regular” shops, but with a reused and upcycled range of products. The concept would attract a broad target group, and spread knowledge about sustainability and circular economy.

Outcomes & Opportunities

The business concept is working: In 2018, ReTuna Återbruksgalleria had 2 million € in sales for recycled products. But, ReTuna is more than just a marketplace. It also aims to be a public educator. ReTuna organizes events, workshops, lectures, themedays, and more – all with a focus on sustainability. The folk high school Eskilstuna Folkhögskola conducts its one-year education program “Recycle Design – Återbruk” on the premises. There are also conference rooms, where guests can hold climate-smart meetings. Organic lunch and baked treats are on offer at Café Returama.

In addition to offering sustainable shopping and serving as a public educator in relation to environmental issues, ReTuna Återbruksgalleria has generated over 50 new jobs. The mall has become international news – documentary filmmakers, journalists and curious tourists from around the world have visited ReTuna Återbruksgalleria. The concept is now spreading.

City of Lahti, Finland
http://www.labio.fi/en/

Best Practice 13.

BIOGAS AND FERTILIZERS FROM BIO-WASTE

Background

Located in Lahti, LABIO is the largest biogas production and refining plant in Finland and it produces biogas, a domestic and renewable product, from waste. It provides a treatment service for bio-waste and water treatment plant slurry for industry, waste management companies and for the general public.

Good Example

By using municipal bio-waste, bio-waste from food industries, forestry, fisheries, sludge from wastewater treatment plans and biodegradable materials from farming, LABIO is able to produce biogas and fertilizers. It is the largest biogas production and refining plant in Finland, and part of the industrial symbiosis in Kujala Waste Treatment Centre in Lahti.[44] The system developed by LABIO is pioneering, by combining composting and gas production where the compost produced by the biogas production is turned into raw soil materials and fertilisers, it allows the nutrients stored in bio-waste and sludge to be put back into circulation.[45]

In practice, the biogas generated is transported to the nearby operator for upgrading and distribution in the gas grid. The digestate is processed into compost and other growing solutions used in agriculture, cultivation and gardening. Heat energy from the composting process is used to heat the biogas facility.[46]

Challenge

Previously, bio-waste was largely used as landfill causing difficulties with methane gas production, odours and contributed to a valuable resource and energy loss. The amount of bio-waste is growing globally. With the right treatment, infrastructure and waste management systems, it could be used as a valuable resource for organic soil improvers and fertilisers or extracted, modified or transformed into a range of different bio-based products all replacing fossil-based products such as mineral fertilisers, peat and fossil fuels.[47]

Outcomes & Opportunities

The operation of the plant offers an environmentally friendly, reliable, secure and odourless production of biogas and compost. Composting and the recovery of biogas are ideal ways of reducing carbon dioxide emissions and the carbon footprint. It is also a renewable and domestic energy source. The process is dependent on the development of a successful industrial symbiosis whereby waste products are delivered to the plan where it is upscaled and then released back. This, in turn, requires the cooperation of local neighbouring companies and municipalities.

City of St. Petersburg, Russia
http://www.vodokanal.spb.ru

Best Practice 14.

WASTEWATER SLUDGE UTILIZATION

Background

Vodokanal is a municipal water and wastewater service based in St. Petersburg that provides drinking water to 5,3 million citizens of the city and tens of thousands of companies and enterprises. Vodokanal also collects and treats wastewater to support the implementation of the Helsinki Commission's recommendations for preservation of the Baltic Sea. St. Petersburg has, through the work of Vodokanal, become the first megalopolis in the world to solve the problem of wastewater sludge utilization, finding alternative utsages of the sledge that otherwise would be hazardious waste.

Good Example

Three sludge incineration plants operate in the city at the Central wastewater treatment plant, Northern wastewater treatment plant and South-West wastewater treatment plant. Sludge is incinerated in the fluidized-bed furnaces at the temperature of 870°C. The heat produced by sludge incineration is used for process needs, space heating and power generation for Vodokanal to save energy resources. Flue gases are treated in three stages.

Mechanical treatment is designed for wastewater clarification. This block comprises an inlet chamber, mechanized screens, grit channels and primary clarifiers. The biological treatment includes aeration tanks and secondary sedimentation tanks. The biological treatment process occurs due to vital functions of activated sludge in aeration tanks in continuous contact with atmospheric oxygen injected into the aeration tank. Activated sludge is a biocenosis inhabited by different bacteria, protozoa and multicellular microorganisms which transform contaminants in wastewater and treat them.

Challenge

The combination of only these two treatment stages did not ensure the quality of treated effluents stipulated in HELCOM (Convention on the Protection of the Marine Environment of the Baltic Sea) recommendations concerning nutrients total nitrogen and total phosphorus (when entering the Baltic Sea water they create a nutrient medium for bluegreen algae, that take in oxygen from water and cause the death of the water bodies living organisms).

Therefore, today, chemical and biological wastewater treatment is introduced at the Vodokanal wastewater treatment plants, which combines enhanced biological nutrients removal with the accompanying chemical phosphorus precipitation. Today, a chemical method for phosphorus removal has been introduced at all the city wastewater treatment plants, using aluminium sulphate, which is the most effective and economical chemical.

Outcomes & Opportunities

Vodokanal amis to provide accessible water and sanitation services to ensure high quality of life for the customers and sustainable city development, to build the culture of water use and to preserve the Baltic Sea basin. The company operates according to values of sustainability and responsibility: Responsibility before future generations; Responsibility before the customers; Responsibility before the staff; Openness to the public and responsibility before the society. It also operates with an innovative approach focused on learning from international best practices in the field.

Some examples of ongoing programmes of Vodokan to enhance its capabilities includes:

- The Neva Untreated Wastewater Discharge Closure Program: This program envisages, among other things, the completion of the extension of the Northern Tunnel Collector, and the modernization of the Northern and Central Wastewater Treatment Plants to comply with new requirements of HELCOM (The Baltic Marine Environment Protection Commission) regarding enhanced removal of nitrogen and phosphorus from wastewater.

- Improvement of sewage sludge treatment and disposal technology: Today, all the sludge produced by wastewater treatment is burnt at three sludge in-cineration plants. However, in the previous years (before the incinerators were constructed) sludge was disposed to special landfills. For instance, the area of Severny landfill in Novoselki is about 83 ha. To eliminate a negative impact of sewage sludge landfills on the environment, a landfill reclamation project was designed on the basis of Geotube technology.

National initiative Poland
https://grupa-eneris.pl/en/o-nas/sustainable-developme-nt/5-fraction-coalition/

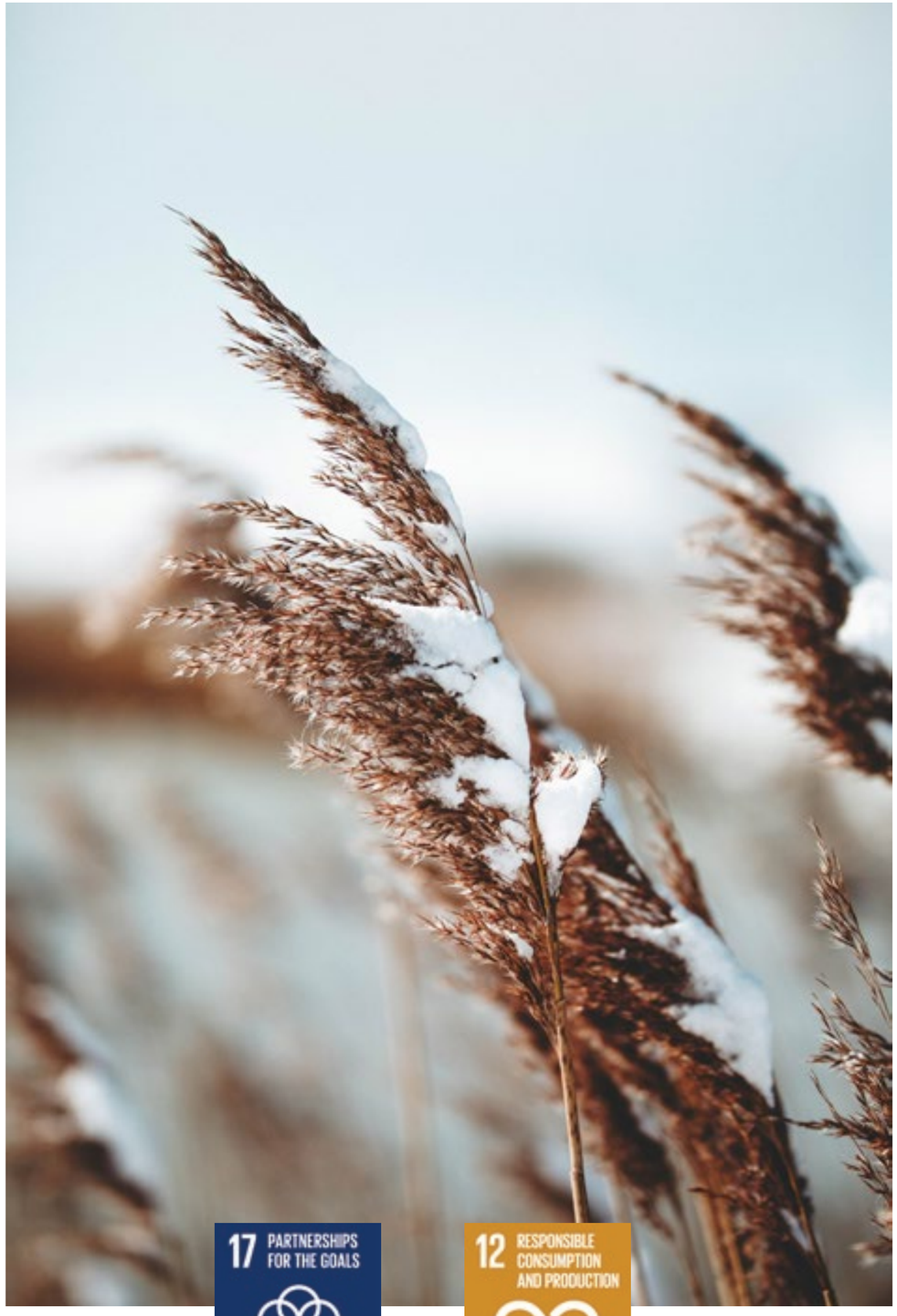
Best Practice 15.

5-FRACTIONS COALITION

Background

Poland is developing a roadmap for the transition to a circular economy, the CLE Map. The document identifies, in particular, measures to increase the efficiency of resource use and reduce waste generation. The roadmap is an instruction manual for the subsequent stages of introducing a circular economy in Poland. It is also a strategic document to guide a responsible and sustainable development. The purpose of the roadmap is to interlink all stages of the waste life cycle. It is an attempt to approach the topic of the circular economy very broadly, as to focus on all elements of the product life cycle including the acquisition of raw materials, processing, eco-design, sustainable consumption, and waste management.

One interesting example of a project that has been developed out of the CLE map is the 5-fractions coalition, an initiative by stakeholders in Partnership for the realization of SDGs, coordinated by the Ministry of Entrepreneurship and Technology. The first system solution for increasing the percentage of separate waste collection in Poland.



Good example

The 5-factions coalition is an intersectoral initiative based on several companies and institutions that together have acknowledged a huge gap in the field of education and tools needed to achieve the environmental goals in Poland. Their goal is to disseminate knowledge and practice in the field of waste sorting, recovery, and recycling among consumers. In order to do so, the coalition has developed an infographic system to ease the task of sorting waste. They rely on a coherent and uniform system of pictograms that entrepreneurs and local governments can use to mark their products by waste type, thus simplifying the task of sorting the waste by consumers and waste managers.

Challenge

The growing amount of municipal waste in Poland largely comes from different kinds of packaging, a lack of clear labels and symbols for consumers on how to sort packaging waste makes it difficult to recycle correctly.

Outcomes & Opportunities

The 5-factions coalition has prepared pictograms for packaging manufacturers to place on packaging products for local governments and companies to place on their waste containers. All actors involved in recycling, packaging recovery or environmental education can join the joint educational projects of the 5-factions coalition, promoting the labeling and proper waste separation.

Information Provided By Marta Ostrowska-Chałupa, Ministry of Entrepreneurship and Technology, Poland

Municipality of Samsø, Danmark
https://energiakademiet.dk/en/

Best Practice 16.

CIRCULAR ISLAND

Background

In 1997, Samsø set the goal to be 100 percent energy self-sufficient within 10 years and in 2004 the island reached the goal, ahead of time. The transformation of Samsø from a carbon-dependent importer of oil and coal-fuelled electricity to a pioneer of renewables started when the island won a competition sponsored by the Danish ministry of environment and energy. The agency was looking for a showcase community that could prove, the then freshly announced Kyoto target to cut greenhouse gas emissions by 21 percent was, in fact, achievable. Since 2004, Samsø has continued to act as a pioneer in the wider field of sustainability with a clear target set on becoming fossil free by 2030 and circular by 2050.[48]

Samsø Energy Academy, an organization and a meeting place on the island, has played a key role in this journey – binding together the local people, NGO's, farmers, businesses and local politicians in a strong network.

Good Example

Samsø's green transition has, since 1997 when the journey began, been divided into three phases with different thematic focal points and scopes.

The first phase, Island 1.0 Utopia is possible (1997-2017), focused on sustainable energy systems, which today are partially owned by the residents of the island. With an investment of 468 million kr. (US$73 million), the island is now 100 percent self-sufficient with renewable energy, and have a negative CO2 footprint of minus 3.5 tons per resident.

The second phase, Island 2.0 This IS difficult (2007-2030) is focused on phasing out all fossil fuels by 2030. This involves careful planning, arranging themed meetings, upgrading existing wind turbines, replacing oil furnaces with heat pumps, and advising residents and businesses to reduce their use of electricity and heat.

The third phase, Island 3.0 Common Sense (2011-2050) is focused on the recycling of resources and circular economy. The entire island community needs more knowledge to make informed decisions about technologies and economic investments, decisions that are based in a circular mindset and that accelerate the transformation towards a circular island economy. [49]

Challenge

Meeting the goals of carbon neutrality and sustainable use of resources, requires a holistic societal approach uniting citizens, producers, agencies and organisations in a shared vision for a green transition. A holistic approach is necessary but it is also a challenge since it requires acceptance and knowledge. Therefore, it is crucial to increasing the general knowledge of local residents and make all sectors active participants in the decision-making process, to realise the master transition plan.

Outcomes & Opportunities

Experiences from Samsø's green transition has shown that working with sustainable development is a special type of developmental work that requires venturing into new territory, heading into uncharted waters. It takes community and collaboration models developed by practitioners. It requires a certain kind of leadership and a leader who know the local communities. The empowered community that has been established in Samsø is a proven source of success for the green transition on the island. One example of Samsø's green transition success is the islands CO2 emission. Danish CO2 emissions as a whole were 7.4 ton per inhabitant, while Samsø islanders emitted minus 1.4 ton – 8.8 ton less than the average Dane.[50]

City of Kalundborg, Danmark
http://www.symbiosis.dk/en/

Best Practice 17.

THE KALUNDBORG SYMBIOSIS

Background

Kalundborg Symbiosis is a partnership between nine public and private companies in the city of Kalundborg, Denmark. Since 1972, these partners have developed the world's first industrial symbiosis with a circular approach to production. The industrial ecosystem that has been created in Kalundborg is a closed cycle where the by-product and residual product of one company is used as a resource by other companies in the symbiosis.[51] It's a leading example of local collaboration where public and private enterprises buy and sell residual products, resulting in mutual economic and environmental benefits.

The symbiosis network is located at the Kalundborg Eco-industrial Park and involves a number of actors, including a power station, two big energy firms, a plasterboard company, and a soil remediation company. Other actors include farmers, recycling facilities, and fish factories that use some of the material flows. Kalundborg Municipality also plays an active role.

The Kalundborg Symbiosis is a pioneer in its field and provides expertise and experience to other symbiosis sites across the world and is therefore also one of the partners in the UBIS project (Best Practice 14).

Good Example

Applying the principles of industrial symbiosis to business practices enables companies to cooperate in order to utilise material streams, energy, water and other assets more efficiently, yielding greater overall productivity, resource efficiency and profitability.

The symbiosis established in Kalundborg is about finding mutually benefitting relationships whereby undervalued materials, by-products or waste, rather than being destroyed or sent away, are repurposed for use by another company, typically from a different sector. Having evolved organically over the past six decades, the Kalundborg Symbiosis is today a pioneer and has proven that industrial symbiosis is a model for success, both from a sustainability and profitability standpoint. The model is not only profitable for the partners, who as a result of the symbiosis enjoyed annual bottom-line savings of about 24 million €[52], but also for society as a whole. The following are some examples of resources saved through the Kalundborg Industrial symbiosis initiative:

- Groundwater: 2.0 mill. m3/year
- Surface water: 1.0 mill. m3/year
- Natural gypsum: 200.000 tonnes/year
- Oil: 20.000 tonnes/year
- Reduction of CO2 emissions: 275.000 tons

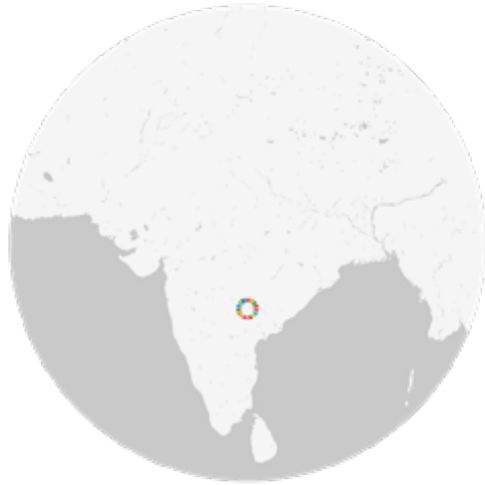
Challenge

The Kalundborg Symbiosis was developed naturally from the mutual interest of the companies working in close proximity as a means to maximize resource efficiency and profitability. The development was hence not driven, primarily, by environmental or ideological concerns nor by the vision of local authorities. Therefore, it is essential for the symbiosis to continue, that the partners keep finding mutually benefiting relationships.

There are two challenges in regard to this when it comes to pricing. Firstly, the prices of the materials delivered by a symbiosis partner have to make economic sense and match the regular market price for such a product. Secondly, companies express concern about ensuring a secure and steady supply of energy and raw materials, as a participant in the symbiosis, one needs to consider the consequences, if a key-partner in the project closes or pulls out of the symbiosis.[53]

Outcomes & Opportunities

For a symbiosis to work, there needs to be a variety of actors involved in relatively close proximity to each other. The stakeholders need to be diverse with different needs and forms of production to make use of each other's waste or by-products. The case of Kalundborg also illustrates the strength in self-organizing, the symbiosis arose from the companies themselves without any external interventions. The model of cooperation that followed was simply a practical matter for those involved. Therefore, opportunities for exchange and cooperation needs to be identified in settings where companies already are active and engaged with each other.[54]



City of Hyderabad, India
http://banyannation.com/

Best Practice 18.

BETTER PLASTICS

Background

Banyan Nation, an Indian plastic recycling company based in Hyderabad, has received much international attention for its use of data intelligence to collect plastic waste and repurpose it by removing inks, coatings, and other contaminants using environment-friendly detergents and solvents. The plastic cleaning technology used by Banyan converts collected post-consumer and post-industrial plastic waste into high quality recycled granules comparable in quality and performance to virgin plastic.

Good Example

The idea behind Banyan Nation is to limit the downcycling of plastic waste; when the plastic waste is contaminated with low-value plastics, product remnants like oils, shampoos and moisture and in certain cases heavy metals such as lead, phosphorus, mercury and the like that can be harmful to humans. The process of cleaning the plastic, as developed by Banyan, is able to produce a near virgin state of plastic making it possible for an upcycling, rather than downcycling, of waste. This technology has, for example, enabled car manufacturer to recycle a bumper into a brand new one at competitive cost, thereby enabling more effective use of resources.[55]

Challenges

Around 20 million tons of plastic per year is consumed in India for products and packaging. India is world leading when it comes to the recycling of plastic bottles, some estimates that as much as 70-80 percent of bottles are recycled.[56] That equals about 10 million tons of discarded plastic that makes it into recycling streams annually, but over 80 percent of this is downcycled into potentially contaminated low-value products. It is a large amount of downcycled plastic disabling the possibility to meet the uprising demand of virgin plastics. The challenge that Banyan Nation address is how to recycle plastic in such a way that it can be reused for the same original product, therefore closing the circle.[57]

Outcomes & Opportunities

To date, Banyan Nation has recycled over 500 tons of plastic, reduced over 750 tons of carbon dioxide, and diverted over 1,000 tons of plastic from landfills. Banyan is also the only Indian company yet to be recognized by 'The Circulars', the circular economy award program, at the World Economic Forum in Davos for its pioneering work in developing closed-loop models in plastics recycling in emerging markets.[58]

City of Budapest, Hungary
https://mindspace.hu/en

Best Practice 19.

CO-CREATING COMMUNITY ENGAGEMENT

Background

Mindspace is a non-profit organization founded in 2011 that focuses on urban revitalization in areas such as social innovation, smart city concepts and knowledge management. Currently, the main project is Rákóczi Square Market Hall's (Rákóczi téri Vásárcsarnok) revival in the eighth district of Budapest.

Good Example

The bottom-up practices that have guided the work of Mindspace have been targeted at local community engagement and building their involvement and trust. All the activities offered are free and open to everyone. Many locals and newcomers get the opportunity to socialize, educate them self and relax at the many creative workshops, acoustic concerts, community breakfast etc. The project is a dynamic and experimental experience that aims to create interpersonal connections. One motivational factor is the revitalization and reintegration of the neighbourhood which sparks a great enthusiasm in the local community resulting in a lot of volunteer help and input from local businesses as well as citizens. Mindspace has become a bridge between the public

and the market operator, creating a platform for co-operation. Business establishments and buildings surrounding the marketplace that was previously empty, are now occupied thanks to the successful initiative. The local community has become more open to the idea of change and now turns to Mindspace for tips. Some of the activities of the revitalization process include community eating and get together in the market hall, a festival that brings together locals, friends, urban experts and artist, a pop-up co-working space and concerts in vacant shops.

Challenges

Budapest's eight district has a history of prostitution and crime, which nowadays is less of an issue but still affects the areas bad reputation. However, the eighth district is still struggling with poverty, negative gentrification consequences and challenges due to disintegrated and ethnically diverse community. The Rákóczi Square Market Hall has encountered many problems among which are vacant business premises, uncompetitive prices and products, and, consequently, a decreasing number of customers; but it's still the heart of the district and a great place for starting the neighbourhood's (and the market's) revitalization.

Outcomes & Opportunities

One lesson learnt is that the community wants a slow, continuous, persistent effort that is spread out over time. Also, for a sustainable revitalization that covers the needs of the local community, it is important to consider the local, social, cultural and historical characteristics – it is of utmost importance to get to know the local people, and from there help them change by providing a fun experience.

Information Provided By Sindija Balode and the Mindspace Team

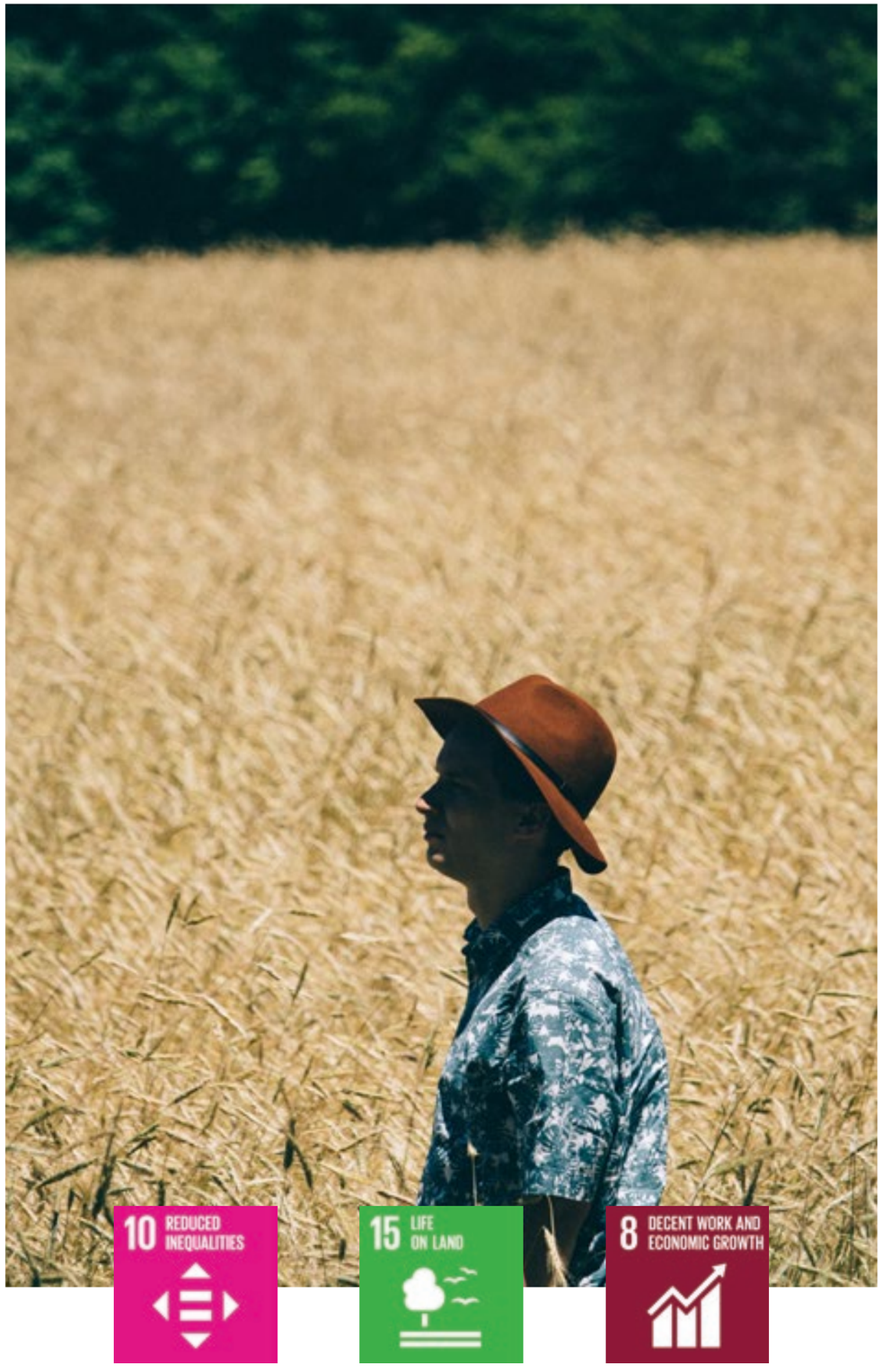
National initiative Romania
http://asatromania.ro/

Best Practice 20.

INNOVATIVE SMALL-SCALE FARMING

Background

Asociația pentru Susținerea Agriculturii Țărănești, ASAT (Association for the Support of Rural Agriculture) is a Romanian non-governmental organisation established in 2014 as a country-wide network of partnerships between traditional organic small-scale farmers and nearby consumers and cities. Following a cooperation model of creating partnerships between organic and local agricultural producers and local consumers and businesses, the project supports sustainable rural development and traditional agriculture while at the same time offering small-scale producers a step into the larger market. The organisation has been very successful in establishing an alternative model for the development of traditional small-scale farms, a model through which farmers receive a fair price for their work and which protects them from the instabilities of the food market dominated by large agri-businesses.



Good Example

ASAT helps small-scale farmers to capitalize on the benefits provided by traditional agriculture in Romania. With a cooperation model based on solidarity and with a vertical governance, the organization has established a nation-wide network connecting local food producers with consumers and businesses. This model ensures the sustainability of small-scale farming, their possibility of collective bargaining ensures that producers receive a fair price for their products. Not only does this model support the financial sustainability of locally produced agri-products, it also helps to preserve local biodiversity.

Challenge

Even though large-scale and modern techniques of farming are efficient in producing a vast quantity of agricultural product, such techniques are dependent on using pesticides, relying on monocultures and other practices that are harmful and hazardous for the biodiversity of the area. On top of this, local and small-scale producers who are farming organic and sustainable agricultural products have been forced out of business in favour of the expansion of large agribusiness.

Outcomes & Opportunities

The ASAT project is guided by three pillars: 1) Ecology and sustainability: small scale farmers supported by ASAT deliver healthy organic products to their consumers. ASAT farmers also work hard at preserving Romania's traditional seed diversity; 2) Social inclusion and solidarity: most farmers supported ASAT were marginalized people at risk of poverty before entering the partnership. Now they manage to make a decent living and slowly grow their farm through new investments supported by the partnerships (e.g. investments in greenhouses, irrigation systems, technologies, etc.); 3) Direct sales of farm-made products: ASAT farmers sell their product directly to their consumer circumventing all intermediaries. Furthermore, the co-operative solidarity foundation and governing model of ASAT has been identified as a key factor for success, confirming the importance of accounting for the needs and demands of the local community in the decision-making process.[59]

City of Brescia, Italy
http://www.cauto.it/servizio/dispensa-alimentare/

Best Practice 21.

REDISTRIBUTION OF FOOD FOR SOCIAL PURPOSES

Background

The CAUTO Network is an organisation that brings together a consortium of 5 different social cooperatives from the city of Brescia, Italy. Founded in the early 1990s, the network cooperates together with local businesses and implements a numbewr of projects focused on empowering socially marginalized and vulnerable groups. The food pantry, a large-scale food redistribution scheme from retailers to charities, is one of the most successful activities of the CAUTO network.

Good Example

In 1993, CAUTO started to procure food for social purposes from wholesale fruit and vegetable markets in the city of Brescia. Since then the activities have increased exponentially and the CAUTO network is today partnering with a local network of food companies, canteens, hypermarkets and supermarkets who donate unsold goods, no longer tradable but still edible and safe. The selected food is donated to a network of about 200 local charities.

The beneficiaries are thousands of people in need. The food unsuitable for people is donated to local farmers and used for animal nutrition. For retailers, the redistribution scheme is a great way of reducing disposal costs for mixed and organic waste.

Challenge

In the EU, around 88 million tonnes of food waste are generated annually with associated costs estimated to 143 billion euros. Wasting food is not only an ethical and economic issue but it also depletes the environment of its limited natural resources. By reducing food loss and waste we do not only come one step closer to achieve the SDGs, but it also contributes to the fight against climate change since food waste alone generates about 8 percent of Global Greenhouse Gas Emissions. On top of that, it also saves nutritious food for redistribution to those in need, helps eradicate hunger and malnutrition; in the EU alone, 43 million people cannot afford a quality meal every second day. The economic benefits of reducing waste are evident as it saves money for farmers, companies and households.[61] Challenges of the CAUTO project include difficulties in establishing a constant flow of food donations since the amount of waste differs. Moreover, collaborating with retailers has been a challenge as their priorities vary. At the moment, only 5 percent of discarded food is recovered.[61]

OUTCOMES & OPPORTUNITIES

CAUTO successfully extend the life cycle of food by reducing waste, repurposing it and making it into food donations or animal fodder. It is economically beneficial for the supermarkets who enjoy a decrease in disposal costs and for the charities who depend on food donations. Annually CAUTO redistributes 3 000 tons of food waste.

Brussels-Capital Region, Belgium
http://www.circulareconomy.brussels/

Best Practice 22.

BE CIRCULAR - BE BRUSSELS

Background

On 10 March 2016, the Government of the Brussels-Capital Region adopted the Brussels Regional Program for a Circular Economy 2016-2020. The program aims to transform environmental objectives into economic opportunities; relocate the economy to the Brussels area in order to produce locally whenever possible, reduce travel, optimise land use and create added value for Brussels inhabitants and create opportunities for employment. In order to trigger the transition to a circular economy in the region, the program recognise the need to involve start-ups and small businesses. To increase the interest for circular economy among start-ups, self-employed citizens, small business and non-profit organisations, Brussels launched the initiative Be Circular - Be Brussels.[62]

Good Example

Be Circular - Be Brussels is a joint initiative by the city agencies Brussels Economy and Employment, Brussels Environment and Impulse.brussels. The initiative was designed as a one-stop-shop for entrepreneurs seeking information, support or funding for circular economy projects.

Be Circular - Be Brussels has three goals: 1) to support innovative business ideas; 2) to identify projects that would have a lever effect on the development of the circular economy; 3) to advance public support for different models of this new economic exchange and production-system, such as the reuse of waste and the collaborative economy.[63] As such, the Be Circular - Be Brussels is a regional funding platform supporting the circular transformation in the Brussels-Capital Region.

Challenge

Be Circular - Be Brussels was set up to accelerate the Brussels Regional Program for a Circular Economy 2016 – 2020, focusing on circular economy as a means for business development for start-ups and small scale business. Focusing exclusively on small business, the initiative addresses the challenge of how small-scale producers, start-ups and self-employed can find time and resources to develop the capacity for a circular economy. Larger companies, it was argued, tend to already have access to the resources and knowledge to instigate their own move towards more sustainable ways of working, whereas smaller firms need financial and business support.

Outcomes & Opportunities

As a governmentally owned funding platform for circular economy, Be Circular - Be Brussels is able to combine both top-down and bottom-up approaches harnessing insights from the business community understanding their needs and opportunities while also having governmental assistance and financial support. This to support the circular transformation of the Belgian business community. The first call for funding was launched in 2016, 41 proposals were submitted - far more than expected. Out of these entries, 8 were chosen related to a diverse range of industries including food, construction, IT, design and retail. Those submitting proposals could also ask for free methodological support ahead of submission to make their proposed activity more circular.

State of California, USA
https://www.yerdlerecommerce.com/

Best Practice 23.

RECOMMERCE OF CLOTHING

Background

Yerdle Recommerce provides the technology, service and logistics to facilitate the process of creating a “white label” service with the goal of making it easy for apparel retailers to buy back and resell used items. The term “White label” refers, in the case of Yerdle, to the process of upcycling used clothing to such a state that the original producer is able to resell the item as refurbished. Being a platform between consumers and producers, Yerdle is able to facilitate a closed circle of production - consumption - production.[64]

Good Example

Yerdle provides the service of cleaning, repairing, refurbishing, photographing and posting on online stores clothes made available by customers in exchange of credits that can be used to buy refurbished items. After the clothes have been refurbished by Yerdle, the original producers are able to resell the items under their own brands, complete with warranties, customer service and return policies. Thus, reclaiming the secondary market and reducing the need for new production.

Challenges

Sustainable production and consumption is key to a sustainable transformation of our societies. Consumptions based emissions of greenhouse gasses are one major contributor to global warming. Buying used clothes instead of new is one way of reducing the need for new production and extends the life cycle of the products. However, there is still a challenge in how to make used goods attractive and easy to buy for consumers. This is the challenge Yerdle addresses by offering a refurbishing service whereby apparel retailers are able to sell used goods in the same way as new ones, making the new/used divide irrelevant for the consumer.

Outcomes & Opportunities

Yerdle is today partner with three major American apparel producers and retailers providing their services for them. Each item Yerdle receives is inspected, inventoried, cleaned, repaired, photographed and placed on the partner's website. Eventually, it will be picked, packed and shipped to a customer. All of this is done by Yerdle under the partner's brand. The end consumer never sees the Yerdle name.

City of Rio de Janeiro, Brazil
http://redeasta.com.br

Best Practice 24.

WOMEN EMPOWERMENT THROUGH UPCYCLING

Background

ASTA is a Brazilian network of female artisans and a platform for production and retailing of products produced out of waste. ASTA transform artisans into entrepreneurs, and waste into new products. Their objective is to empower women artisans living in vulnerable areas of Rio de Janeiro. It started with helping artisan groups enhance their products and selling them through ASTA's own sales channels. After 12 years of operations and many lessons learned, ASTA is focusing on its two main areas of actions: Impact and Business.

Good Example

ASTA has developed an innovative capacity building program called the Business School for Artisans, based on the knowledge acquired working with artisans and with the market. The school provides relevant contents regarding business and human capital management, production and sales. ASTA is also focusing on the wholesale market selling corporate gifts for companies produced by the trained artisans base, using the companies discarded materials, operating a circular production cycle.[65]

Challenge

Women in Brazil still face major inequalities and exclusion from the labour market. Today, women represent a significant part of the social economy, which comprises more than 33,000 businesses throughout the country. However, small-scale artisans face great challenges to the quality and commercialization of their products, hindering their entrepreneurial efforts.

Outcomes & Opportunities

By providing training to disempowered and marginalized female artist and grant them access to the market by selling their products under the brand of “ASTA” in showrooms and online these women are able to earn an income and develop marked skills. ASTA supports 60 productive groups across 10 states in Brazil, having improved the lives of more than 4.000 women.[66]

City of Shenzhen, China
http://en.gem.com.cn

Best Practice 25.

E-WASTE RECYCLING IN CHINA

Background

A market leader in the area of e-waste material recycling in China, the Shenzhen based company GEM Co is internationally renowned for their pioneering battery recycling. The company was a 2018 finalist in the prestigious Circulars Awards and has taken the leading position in the high-tech recycling market in China.

Good Example

GEM recycle materials from a number of industrial sectors including electronics, automobiles, batteries and wastewater. However, the company is most renowned for its recycling of battery, an important strategic sector for China due to the growth of electric and plug-in hybrid vehicles. Recycling more than 10 percent of the total number of discarded batteries, or about 300,000 tonnes of battery waste per year, GEM has the highest capacity of recycling used batteries in China. Their technology enables the recycling of scrapped lithium batteries from electric vehicles, extracting the nickel, cobalt and other important resources, transforming them into materials that can be reused to produce new batteries.

Challenge

China is still by far the world's largest consumer of raw materials. In 2015 its factories and industries accounted for about 50 percent of global steel, copper, nickel and aluminium demand. The demand for batteries in China is also growing exponentially. The Chinese government has set the target to increase the number of electric vehicles by five million by 2020, a target that looks likely to reach. This development puts a lot of pressure on the use of materials as well as an increasing need to shift to a more circular approach where battery components are reused in order to protect against supply and cost fluctuations. GEM Co Ltd has adopted a circular approach for almost two decades.[68]

Outcomes & Opportunities

GEM has combined the recycling industry with green technology. It has invested almost 300 USD million to build eight treatment centres around China, with an annual capacity to recycle 15 percent of China's total used household appliances and 20 percent of China's total used circuit boards. It has applied for 1,200 core patents in the field of waste recycling and material recovery and promoted international co-operation in the field of circular economy, for example co-operating with the University of Oxford.

City of Seoul, South Korea
http://english.seoul.go.kr

Best Practice 26.

SHARING CITY SEOUL

Background

Seoul proclaimed its Sharing City Seoul Project on September 20th, 2012, along with a plan to conduct sharing projects closely related to the lives of citizens, and to create and diffuse the base for the sharing. Seoul sees the Sharing City Seoul project as social innovation measures that have been designed to create new economic opportunities, to restore reliable relationships, and to reduce the wasting of resources with a view to resolving urban economic, social, and environmental problems all-together. Seoul's policy for becoming a sharing city aims to encourage the private sector to lead the way in exploring different areas of a sharing economy, while the local government is endeavouring to create infrastructures for the Sharing City Seoul Project and to promote and support sharing activities that are undertaken by the private-sector.[69]

Good Example

The Sharing City Seoul Project has four main objectives and targets:
1) Sharing allows the city to gain more benefits with fewer or less resources since it enhances the usefulness of resources.

For example, the construction of a new building for community residents' gathering will require a huge budget to secure sufficient space. If citizens are able to share the meeting rooms and auditoriums of the city hall, offices, and citizen centres that are vacant at nights and during weekends, however, they can use such spaces for gathering within a short distance without spending too much money. 2) When the sharing economy becomes reinvigorated, it can create new jobs and added values. Furthermore, citizens of the city may earn additional income by lending their idle resources to others at adequate prices. For example, they could earn additional monthly income by leasing their empty rooms to foreign tourists. 3) Sharing can contribute to the recovery of the disappearing sense of community, increasing interpersonal exchanges and restore broken relations since sharing promotes a trust-based, reciprocal economy. 4) Sharing contributes to resolving environmental problems created by excessive consumption. Sharing allows one resource to be used by a number of people, thereby effectively boosting the utilization. Furthermore, sharing connects resources to people who need them, which also reduces waste.[70]

Challenge

Encouraging and facilitating citizens to adopt the new lifestyle of sharing goods and services to a higher extent, is a key challenge. Programs of educational events to raise awareness must be continuous - to ensure that interest, participation and efforts from all levels are ongoing and not just a passing fad.

Outcomes & Opportunities

The initiative has certified 50 sharing projects that provide people with an alternative to owning things they rarely use, and given grants to a number of these projects. Certified projects range from local car-sharing company SoCar, and websites like Billiji that help people share things with their neighbours, to schemes that match students struggling to find affordable housing with older residents who have a spare room. One great results of the project are the increasing participation of citizens. Moreover, Seoul has opened up almost 800 public buildings for public meetings and events when they aren't in use and Sharehub has organized a large public engagement and education campaign with conferences, seminars, reports and a book.[71]

City of Cape Town, South Africa
http://greencape.co.za/wisp/

Best Practice 27.

WESTERN CAPE INDUSTRIAL SYMBIOSIS PROGRAMME

Background

The Western Cape Industrial Symbiosis Programme (WISP) is a free facilitation service which uses industrial symbiosis to enhance business profitability and sustainability. The programme is carried out by GreenCape, a Sector Development Agency established by the Western Cape Provincial Government and The City of Cape Town, and provides a service connecting companies so that they can identify and realise the business opportunities enabled by using underutilised or residual resources (materials, expertise, logistics, capacity, energy and water). The program was the first industrial symbiosis program established in Africa and stretches across the Western Cape that covers six districts, including the City of Cape Town. It is one of a number of Green Economy initiatives of the Western Cape Government, supporting the province's intention to become the Green economic hub of South Africa and Africa.[72]

Good Example

WISP provides a free service that connects companies from different sectors with each other so that they can identify and realise the business opportunities enabled by utilising unused or residual resources, enhancing business profitability and sustainability.[73]

In practice, facilitators from WISP support its member companies to implement synergies by organising samples, meetings and ensuring that each synergy is legally sound. The facilitators fill the gaps that its members, especially small and medium-sized enterprises, could experience due to lack of time or dedicated expertise needed to identify and implement resource-, waste- and energy management. In exchange for this free of charge service, the organisation asks for feedback on the financial, social and environmental benefits gained from the match to further improve future matches.[74]

Challenge

South Africa faces challenges in regard to resource use, including its reliance on fossil fuels for energy, water scarcity, and high landfill rates. Industrial symbiosis aims to address this by promoting reuse and recycling of industrial waste. However, for industrial symbiosis to work it requires a high level of trust and co-operation between the parties involved in the symbiosis. WISP tries to overcome this challenge by facilitating mutually benefitting partnerships showcasing the social, environmental and economic possibilities of resources reutilization.

Outcomes & Opportunities

By sharing resources, the members of WISP cut costs, increase profits, improve their business processes, create new revenue streams and operates more sustainably. The industrial symbiosis network now consists of over 300 companies and 3,000 resources have been identified within member companies. The cumulative impact over the last six years has been the following: 36 600 tonnes of waste diverted from landfill; 147 700 fossil GHG emissions saved (equivalent to the electrical usage of 39 800 households in South Africa); R67.9 million generated in financial benefits (additional revenue, cost savings and private investments); and 143 jobs created in the economy (25 directly in member companies).[75]

New York City, USA
https://www1.nyc.gov/assets/donate/

Best Practice 28.

DONATE NYC PARTNERSHIP

Background

The City of New York aims to be zero waste by 2030 and thereby minimise the environmental impact of the city's waste. Overall, New York aims to reduce its CO2 emissions by 80 percent by 2050. The DonateNYC Partnership contributes to this aim. Overseen by the New York City's Department of Sanitation, the DonateNYC Partnership is a network of non-profit organizations in New York City that accept and distribute second-hand and surplus goods. The aim of the partnership is to expand and promote New York City's local reuse community through strategic collaborations and projects. By accepting unwanted yet usable goods, DonateNYC Partners divert close to 100 million pounds of material from landfills every year and serve over 1 million New Yorkers annually through reuse-funded social service programs such as family support, housing, healthcare, professional development, and feeding initiative.[76]

Good Example

The DonateNYC Partnership provides an online platform and mobile app where members of the partnership are able to list and exchange their available waste resources, items and materials with other members. To participate in the partnership, one has to register as a donor or recipient.

For example, a clothing store could register as a donor of used clothes to the partnership, while a non-governmental organization register as needing used clothes to distribute to people in need. Through the platform, these two are connected, the clothing is reused by the NGO and the circle is closed. A newly developed section of the platform is developed to target food waste in New York City. In a similar manner, groups with available food post a donation listing, specifying the type and amount of food, its packaging and delivery requirements, as well as a pickup/delivery time. An algorithm then matches the donations to possible recipients, first by their required criteria (food type, quantity, storage requirements) and then by distance, starting with the closest organization first. Recipients are notified when a donation matches their criteria, and they have a limited amount of time to accept before the algorithm matches a second possible recipient.[77]

Challenge

Logistics of transportation and storage is a major issue in any large urban centre, so also in New York City. To reach the goal of a zero waste New York CIty by 2030 it is necessary to accelerate the recycling and repurposing of waste by making it easy and finding incentives for companies and organisations to consider waste a valuable resource.

Outcomes & Opportunities

One of the main goals of the DonateNYC Partnership program is to quantify reuse in New York City to understand the environmental impacts that reuse has on the local community. In order to accomplish this task, DonateNYC collaborates with the NYC Centre for Materials Reuse on Partner data collection and analysis. Organizations engaged in materials reuse may have limited time, staff, or means to track and analyse data about their reuse activities. This data, if collected accurately, can be used internally to understand and improve operations, and externally to demonstrate and promote the economic-, environmental-, and social benefits of reuse organizations. To accurately analyse and generate reports on Partner reuse data, DonateNYC has developed the Reuse Impact Calculator (RIC), a first-of-its-kind system that uses qualitative and quantitative data to analytically describe the environmental impact of the reuse sector in New York City.[78]

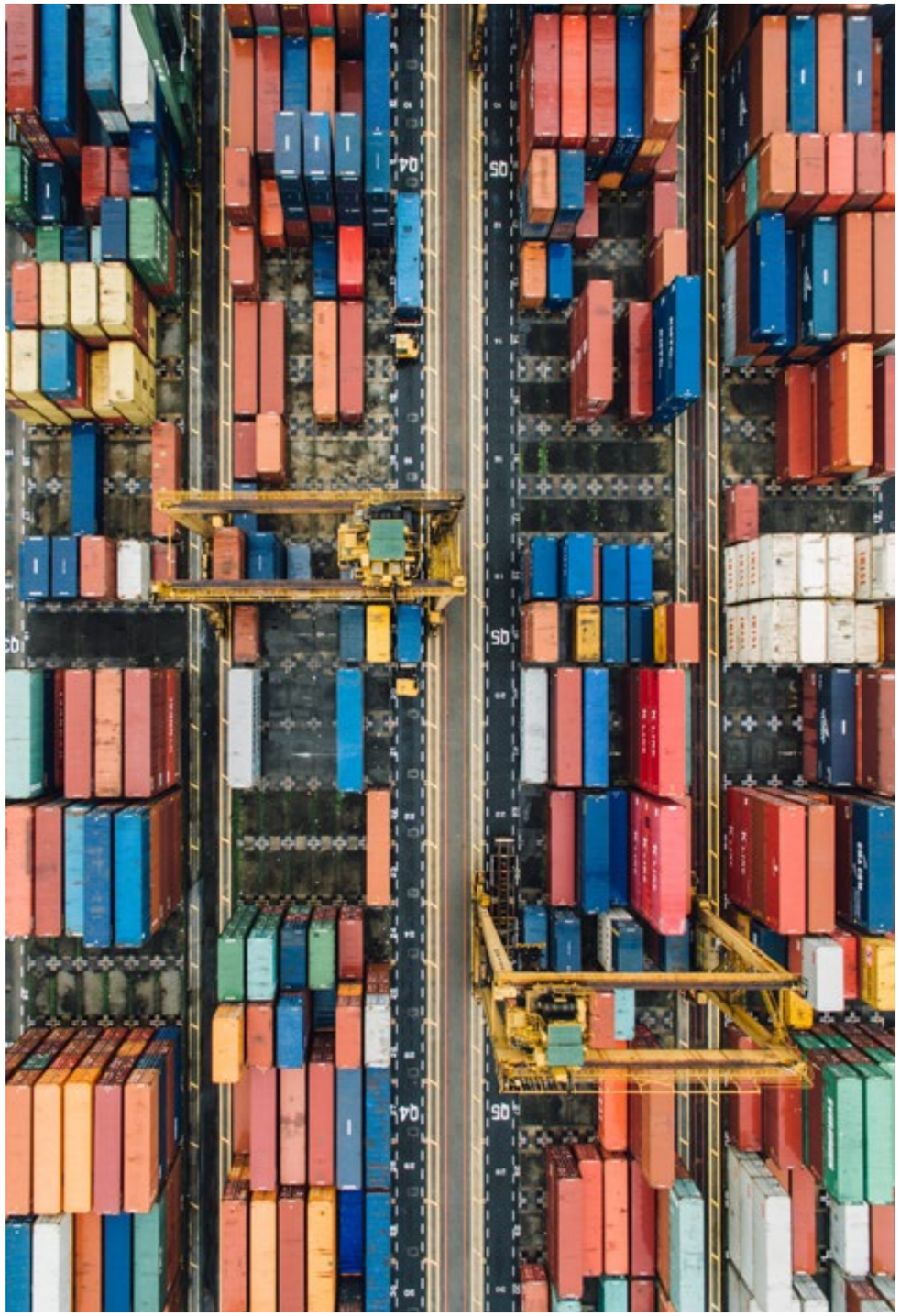
CONCLUSION

This report is a catalogue of best practices on circular economy with cases from both the BSR and globally. It attempts to answer to challenges our municipalities, regions, central government, private sector or organisations encounter in relation to a transition towards a circular economy. For example, in Sweden, the per capita greenhouse gas emissions for consumption are approximately twice as high as the emissions from the domestic territory.

For consumers as well as for producers, a transformation away from a linear 'take, make, dispose' paradigm to a more circular 'cradle-to-cradle' approach is therefore essential if we are to reduce emissions and succeed in building sustainable and resilient communities. The need for circular solutions is urgent as today, only a few percentages of the original product value is recovered after use. A transformation from a linear to a circular economy does not only enhance resource efficiency, but also promote other social benefits at large – e.g. gains in employment.

The BSR includes a number of countries considered to be amongst the best positioned to deliver on the 2030 Agenda and to reach the SDGs, including the global Paris Agreement on climate change and the New Urban Agenda. The BSR also has a lot to offer in terms of good examples and best practices supporting a circular transformation. The case of Kalundborg Symbiosis in Denmark (best practice 16), the Smart map in Gothenburg (best practice 2) and Circular startups in Estonia (best practice 10) are some examples of innovative circular practices that transform management of waste and resources and reshape attitudes of consumers and citizens. These examples, and others included in this report, stand out as internationally renowned examples of how the circular transformation already is advancing on different levels across several sectors in the BSR.

The need for more knowledge and inspiration is still necessary in order for a circular approach to be integrated across sectors, at different levels, and as the core of sustainable development in the BSR.



A global outlook of best practices from around the world is suggested as a further recommendation. For example, how can the “Sharing City Seoul” initiative (best practice25) provide the BSR with insight on how to scale up the sharing economy on a city or region-wide basis. By leading the way at home, the BSR can be a global source of inspiration, showcase good examples and provide tools to support a circular transformation globally.

This report also illustrates the limits of today’s circular practices. Waste management, recycling practices , and the reutilisation and recommerce of waste materials, constitute the most common understanding of what circular economy is and practices relating to these themes inform the majority of cases presented in this report. These are reactive approaches focusing on finding the use of, and reducing the negative impact of, materials and products already produced. These are necessary, but more proactive approaches to circular economy are needed where materials and products are produced with the intention to be reused, repaired and recycled. The circular evolution needs to go upstream and transform how every little component of a product is produced.

There is a need for sustainable and circular designs and material-use from the first step of planning products or services. There is still a level of confusion regarding the actual meaning of ‘circular economy’ as a concept, and how its meaning relates to, or differs from, other concepts such as ‘sharing economy’ and ‘bio economy’.

This report has taken the stance that circular economic theory is the theory of how to analyse - and create - a sustainable economic circulation or metabolism which is fully integrated with nature. In the extreme case, this means that all material taken from stored deposits in the earth should be fully circulated, that all other material inputs in the metabolism should be based on, or can be produced by, the planetary system with the help of solar energy, and that all energy used in the economic system should be based on direct or indirect transformation of solar power. In a circular economy there is no scrap.

This report takes is anchored in the Localizing Global Agendas notion building on the recognition that the world is predominantly and increasingly urban. Cities across the world are growing in both size and numbers, so is also their environmental and social impact. Today, more than half of the world’s population lives in urban areas, in one generation that number is expected to reach 80 percent. As a result, cities are the source of about 70 percent of global emissions, 70 percent of the energy consumption and 70 percent of the global GDP.

Exploring possibilities of the intersection between SDG 11: Sustainable cities and communities and SDG 12: Sustainable consumption and production is therefore key to the sustainable transformation of our societies. Furthermore, as argued in the Intergovernmental Panel on Climate Change (IPCC) report on the impacts of global warming of 1,5 degrees, successful implementation of the 2030 Agenda largely depends on our ability to adopt more sustainable lifestyles. At the end of the day, it comes down to our behavioural choices and ability to change our consumption patterns.

AUTHORS

This report has been authored and edited by Joel Ahlgren, director of the Climate & Resources programme and responsible of the Baltic 2030 project at the Swedish independent think tank Global Utmaning. In the development of the report, advisors include Tove Ahlström (CEO at Global Utmaning), Elin Andersdotter Fabre (Programme Director the Sustainable Cities programme and the Localizing Global Agendas project at Global Utmaning), Staffan Laestadius (Professor emeritus at the Royal Institute of Technology in Stockholm, and Chair of the Climate & Resources council at Global Utmaning) and Anders Wijkman (Chair at Circular Sweden and Member of the Board Global Utmaning).

The Baltic Sea States Subregional Co-operation (BSSSC) is a political network for decentralised authorities (subregions) in the BSR. The Baltic Sea States Subregional Cooperation was established in 1993 as a response to a call by the CBSS to improve subregional cooperation in the region. It works to facilitate partnerships and strengthen interregional cooperation in support of a more competitive, better accessible and more sustainable BSR – putting local and regional policy makers and the young generation at the heart of its work. Currently, the Eastern Norway County Network (ENCN) holds the Chairmanship for the period of BSSC 2017 - 2019.

Important policy areas for the BSSSC towards 2020 include: Cohesion policy and programmes post 2020 - especially the future of Interreg; Sustainable development – environment, climate and circular economy; Transport and accessibility – transport corridors and clean transport; Culture and identity; Growth, jobs and innovation - including creative sectors; and Youth, education and employability.

Interreg Baltic Sea Region Programme is a transnational cooperation programme between ten countries in the BSR (Sweden, Estonia, Finland, Latvia, Lithuania, Poland, Denmark, Germany, Norway and Russia). The overall objective of the Programme is to strengthen the integrated territorial development and cooperation for a more innovative, better accessible and sustainable BSR. The Programme promotes transnational cooperation and integration by projects addressing common key challenges and opportunities of the BSR.

Global Utmaning (Global Challenge) is an independent think tank based in Stockholm that promotes long-term solutions to challenges in the ecological, economic and social systems through collaboration between research, business, politics and civil society. The think tank is a node within international networks, working with strategic analysis, policy solutions and advocacy through policy dialogues, seminars and reports. The think tank is a non-profit association funded through grants from institutions, authorities, organisations and companies. Global Utmaning holds expertise in four intersecting thematic programmes: Climate & Resources - Climate transformation and sustainable resource utilization; Economy & Governance - New institutions and models for economy and governance; Health & Welfare - New paths towards health, wellbeing and livelihoods; and Sustainable Cities - New approaches to sustainable urban development.

REFERENCES

IMAGES

Frontcover: Inspiration feed on Unsplash
Introduction: chuttersnap on Unsplash / Ivan Bandura on Unsplash / Joel Filipe Unsplash
A Circular Economy:Tobias Cornille on Unsplash
Best Practice 1: Katya Austin on Unsplash
Best Practice 2: Jonas Jacobsson on Unsplash
Best Practice 3: Markus Spiske on Unsplash
Best Practice 4: Joel Fulgencio on Unsplash
Best Practice 5: Ilya Ilford on Unsplash
Best Practice 6: Marten Bjork on Unsplash
Best Practice 7: Jonas Jacobssonk on Unsplash
Best Practice 8: Giuseppe Famiani on Unsplash
Best Practice 9: Appolinary Kalashnikova on Unsplash
Best Practice 10: Jaanus Jagomagi on Unsplash
Best Practice 11: Alfonso Navarro on Unsplash
Best Practice 12: Inspiration feed on Unsplash
Best Practice 13: Ivan Bandura on Unsplash
Best Practice 14: Justin Kauffman Unsplash
Best Practice 15: IJoshua Fuller on Unsplash
Best Practice 16: Michal Kubicek on Unsplash
Best Practice 17: Victor Garcia on Unsplash
Best Practice 18: Giuseppe Famiani on Unsplash
Best Practice 19: Humphrey Muleba on Unsplash
Best Practice 20: Fineas Anton on Unsplash
Best Practice 21: Aneta Pawlik on Unsplash
Best Practice 22: Bethany Beck on Unsplash
Best Practice 23: Bruno Nascimento on Unsplash
Best Practice 24: Bruno Nascimento on Unsplash
Best Practice 25: David Hofmann on Unsplash
Best Practice 26: Ryoji Iwata on Unsplash
Best Practice 27: Chuttersnap on Unsplash
Best Practice 28: Mike Rasching on Unsplash
Conclusion: Chuttersnap on Unsplash
Sustainable Development Goal and Target logos: www.globalgoals.org

SOURCES

1 European Union (nn) https://circulareconomy.europa.eu/platform/ (collected 2019-05-09)
2 Interreg Europe (nn) https://www.interregeurope.eu/ (collected 2019-05-09)
3 The Circulars (2018) https://thecirculars.org/ (collected 2019-05-09)
4 Ellen MacArthur Foundation (2017) https://www.ellenmacarthurfoundation.org/case-studies (collected 2019-05-09)
5 SPP Regions (2018), Mervyn Jones, Iben Kinch Sohn and Anne-Mette Lysemose Bendsen http://iclei-europe.org/fileadmin/templates/iclei-europe/lib/resources/tools/push_resource_file.php?uid=BDJtTcim (collected 2019-05-09)
6 Aalborg (2018) http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue79_Case_Study_155_Aalborg.pdf (collected 2019-05-09)
7 Gothenburg http://www.eurocities.eu/eurocities/documents/Cities-in-action-Gothenburg-s-Smart-map-WSPO- AVBEMQ
8 Collaborative Economy Gothenburg, Tove Lund (2017) http://nws.eurocities.eu/MediaShell/media/participation_Gothenburg.pdf (collected 2019-05-09)
9 Kollaborativ Ekonomi Göteborg https://smartakartan.se/en/about-us/ (collected 2019-05-09)
10 Oslo (2016) https://www.c40.org/case_studies/c40-good-practice-guides-oslo-waste-management-strategy (collected 2019-05-09)
11 Grønt Punkt Norway (nn), Oslo https://www.oslo.kommune.no/english/politics-and-administration/green-oslo/best-practices/circular-economy-in-practice/ (collected 2019-05-09)
12 UN Habitat (nn) https://unhabitat.org/urban-themes/energy/ (collected 2019-05-09)
13 Let's Do It Foundation (nn) https://www.letsdoitworld.org/2015/09/worlds-cities-produce-up-to-10-billion-tonnes-of-waste-each- year-un-study-estimates/ (collected 2019-05-09)
14 Oslo (2016) https://www.c40.org/case_studies/c40-good-practice-guides-oslo-waste-management-strategy (collected 2019-05-09)
15 Sitra (2016), Helsinki https://www.sitra.fi/en/publications/leading-cycle/ (collected 2019-05-09)
16 Kierratyskeskus (nn), Helsinki https://circulareconomy.europa.eu/platform/en/main-language/finnish (collected 2019-05-09)
17 Päijät-Häme region (nn) Finland https://www.interregeurope.eu/policylear-

ning/good-practices/item/145/regional-road-map-towards- circular-economy/ (collected 2019-05-09)
18 Hightech Accelerator (2018) https://hightechaccelerator.atomleap.com/2018/08/02/berlin-the-capital-of-circular-economy-startups/
19 Ginger Hervey (2018), Politico https://www.politico.eu/article/ranking-how-eu-countries-do-with-the-circular-economy/ (collected 2019-05-09)
20 Kirstin Linnenkoper (2018), Recycling https://recyclinginternational.com/business/circular-economy-index-germany-is-number-one/ (collected 2019-05-09)
21 Circularity Capital (nn) https://circularitycapital.com/news/2018/7/30/specialist-circular-economy-investor-circularity-capital- leads-investment-in-grover-the-netflix-for-consumer-tech (collected 2019-05-09)
22 Jason Efstathiou (nn), Grover, Germany https://help.getgrover.com/help-in-english/are-all-products-new (collected 2019-05-09)
23 The Practitioner Guide (nn) https://www.ceguide.org/Strategies-and-examples/Dispose/Industrial-symbiosis (collected 2019-05-09)
24. Nordregio http://www.nordregio.org/nordregio-magazine/issues/industrial-symbiosis/what-is-industrial- symbiosis/
25 Urban Baltic Industrial Symbiosis (nn) https://ubis.nu/wp-content/uploads/sites/34/2018/03/Business-models.pdf (collected 2019-05-09)
26 Urban Baltic Industrial Symbiosis (nn) https://ubis.nu/wp-content/uploads/sites/34/2018/03/Light-version-evaluation-tool-V2.pdf (collected 2019-05-09)
27 Kai Schmedemann, Urban Baltic Industrial Symbiosis (nn) https://ubis.nu/wp-content/uploads/sites/34/2018/03/Decision-tool-IS.pdf (collected 2019-05-09)
28 Urban Baltic Industrial Symbiosis (nn) https://ubis.nu/wp-content/uploads/sites/34/2018/03/Business-models.pdf
29. Eurostat (2019) https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20181129- 1?inheritRedirect=true&redirect=%2Feurostat%2Fnews%2Fwhats-new (collected 2019-05-09)
30 Užstato Sistemos Administratorius (nn) http://grazintiverta.lt/en/#slide-duk (collected 2019-05-09)
31 Laura Matjusaityte (2018) Green news https://greennews.ie/lithuania-teach-other-countries-how-to-manage-plastic-waste/ (collected 2019-05-09)
32 Lorraine Dundon (2018), Open Access Government https://www.openaccessgovernment.org/recycling-lithuania-deposit-system-exceeds-all- expectations/45003/ (collected 2019-05-09)
33 European Commission (2019) http://ec.europa.eu/environment/gpp/index_en.htm (collected 2019-05-09)
34 Green Growth knowledge (nn) http://www.greengrowthknowledge.org/big-e/latvia-revise-natural-resource-tax-system-promote- better-waste-management (collected 2019-05-09)
35 e-estonia (nn) https://e-estonia.com/ (collected 2019-05-09)
36 e-estonia (2017) https://e-estonia.com/estonia-is-ranked-the-third-in-europe-regarding-the-highest-number-of- startups-per-capita/ (collected 2019-05-09)

37 Soumitra Dutta, Bruno Lanvin, & Sacha Wunsch-Vincent Editors (2018), Global innovation https://www.globalinnovationindex.org/gii-2018-report# (collected 2019-05-09)
38 Cleantech ForEst (nn) https://www.cleantechforest.ee/single-post/2018/07/04/These-10-Estonian-cleantech-startups-are- going-global (collected 2019-05-09)
39. Pillirookõrs (2019) https://xn--pillirookrs-nfb.ee/ (collected 2019-05-09)
40. Rohe pakend https://www.rohepakend.ee/ (collected 2019-05-09)
41. Kristi Vabamäe & Kadi-Ingrid Lilles (2017) e-estonia https://e-estonia.com/why-is-estonia-a-startup-paradise/ (collected 2019-05-09)
42. CIRCWASTE (2017) http://www.materiaalitkiertoon.fi/en-US/Circwaste (collected 2019-05-09)
43 European Commission (2019) https://ec.europa.eu/easme/en/life
44 Interreg Europe (nn) https://www.interregeurope.eu/policylearning/good-practices/item/169/utilisation-of-biowaste- streams-bio-based-industrial-symbiosis/ (collected 2019-05-09)
45 Smart and Clean Lahti (nn), https://www.smartlahti.fi/content/kujala-waste-symbiosis/ (collected 2019-05-09)
46 European Regional Development Fund (nn), https://www.interregeurope.eu/policylearning/good-practices/item/169/utilisation-of-biowaste-streams-bio-based-industrial-symbiosis/ (collected 2019-05-09)
47 European Compost Network (nn), https://www.compostnetwork.info/policy/circular-economy/ (collected 2019-05-09)
48 Visit Samsoe (2017) https://www.visitsamsoe.dk/en/inspiration/waste-becomes-important-part-islands-circuit/ (collected 2019-05-0
49 Energiakademiet (nn), https://energiakademiet.dk/en/island-3-0/ https://energiakademiet.dk/en/samsoe-2/ (collected 2019-05-09)
50 Energiakademiet (nn), http://www.pioneerguide.com/ (collected 2019-05-09)
51 Mcrit (2015) http://projects.mcrit.com/esponfutures/index.php/home/85-kalundborg-symbiosis-in-denmark-the- world-s-first-working-industrial-symbiosis (collected 2019-05-09)
52 European Union (nn), https://circulareconomy.europa.eu/platform/en/good-practices/kalundborg-symbiosis-six-decades- circular-approach-production (collected 2019-05-09)
53 We Economy (nn), http://we-economy.net/case-stories/kalundborg-symbiosis.html (collected 2019-05-09)
54 We Economy (nn), http://we-economy.net/case-stories/kalundborg-symbiosis.html (collected 2019-05-09)
54 Pranbihanga Borpuzari (2018), Economic Times https://economictimes.indiatimes.com/small-biz/startups/features/this-startups-tech-could-be-tipping-point-in-our-fight-against-plastic-pollution-banyan-nation/articleshow/62304541.cms (collected 2019-05-09)

55 Pranbihanga Borpuzari (2018), Economic Times https://economictimes.indiatimes.com/small-biz/startups/features/this-startups-tech-could-be-tipping-point-in-our-fight-against-plastic-pollution-banyan-nation/articleshow/62304541.cms (collected 2019-05-09)
56 Ki Kunststoff Information & Plastics Information Europe (2017) https://www.plasteurope.com/news/PET_RECYCLING_t236441/ (collected 2019-05-09)
57 Pranbihanga Borpuzari (2018), Economic Times https://economictimes.indiatimes.com/small-biz/startups/features/this-startups-tech-could-be-tipping-point-in-our-fight-against-plastic-pollution-banyan-nation/articleshow/62304541.cms (collected 2019-05-09)
58 Peter Lacy, Wesley Spindler & Cathy McAndrew (2019), World Economic Forum https://www.weforum.org/agenda/2019/01/plastic-might-just-be-the-solution-to-its-own-problem/ (collected 2019-05-09)
59 European Regional Development Fund (nn), https://www.interregeurope.eu/policylearning/good-practices/item/249/innovative-model-to-support- for-small-scale-farming/ (collected 2019-05-09)
60 European Commission (nn), https://ec.europa.eu/food/safety/food_waste_en (collected 2019-05-09)
61 European Regional Development Fund (nn), https://www.interregeurope.eu/policylearning/good-practices/item/1340/dispensa-sociale-social-larder/ (collected 2019-05-09)
62 Region de Bruxelles-Capitale (nn), http://www.circulareconomy.brussels/a-propos/le-prec/?lang=en (collected 2019-05-09)
63 Eurocities (2017), http://nws.eurocities.eu/MediaShell/media/innovation_Brussels.pdf (collected 2019-05-09)
64 https://www.yerdlerecommerce.com/index.html
65 http://www.if-internationalfoundation.org/en/our-projects/16
66 Ashoka Changemakers (nn), https://www.changemakers.com/economicopportunity/entries/rede-asta-asta-network (collected 2019-05-09)
67 Nick Jeffries (2018), https://medium.com/circulatenews/circular-economy-in-china-six-examples-2709982763f2 (collected 2019-05-09)
68 Ellen Macarthur Foundation (nn), https://www.ellenmacarthurfoundation.org/case-studies/avoiding-3-million-tonnes-of-waste (collected 2019-05-09)
69 Seoul Metropolitan Government (nn), http://english.seoul.go.kr/policy-information/key-policies/city-initiatives/1-sharing-city/ (collected 2019-05-09)
70 Seoul Metropolitan Government (nn), http://english.seoul.go.kr/policy-information/key-policies/city-initiatives/1-sharing-city/ (collected 2019-05-09)
71 Urban Sustainability Exchange, USE (nn), https://use.metropolis.org/case-studies/the-sharing-city-seoul-project#casestudydetail (collected 2019-05-09)
72 Greencape (nn), http://greencape.co.za/wisp/about-us/about-us/ (collected 2019-05-09)
73 Greencape (2018) https://www.greencape.co.za/assets/Uploads/GC3-20181005-WISPCaseStudy-BannerstoBags-Web.pdf (collected 2019-05-09)

74 Greencape (nn), http://greencape.co.za/wisp/what-we-do/
75 Greencape (nn), https://www.greencape.co.za/content/sector/wisp (collected 2019-05-09)
76 Donate NYC (nn), https://www1.nyc.gov/assets/donate/site/Partnership/About (collected 2019-05-09)
77 Waste 360 (2019) https://www.waste360.com/food-waste/donatenyc-web-tool-matches-businesses-food-nonprofits-need (collected 2019-05-09)
78 Donate NYC (nn), https://www1.nyc.gov/assets/donate/site/Partnership/Programs

GLOBAL
UTMANING

Global Utmaning (Global Challenge) is an independent think tank based in Stockholm that promotes long-term solutions to ecological, economic and social challenges through collaboration between research, business, politics and civil society. The think tank is a node within international networks, working with strategic analysis, policy solutions and advocacy by producing policy dialogues, seminars and publications. The think tank is a non-profit association funded through grants from institutions, authorities, organisations and companies.

www.globalutmaning.se | facebook.com/globalutmaning
twitter.com/globalut | instagram.com/global_utmaning
Birger Jarlsgatan 57 C 113 56 Stockholm
info@globalutmaning.se | 08-787 21 50