



**Interreg
North Sea**



**Co-funded by
the European Union**

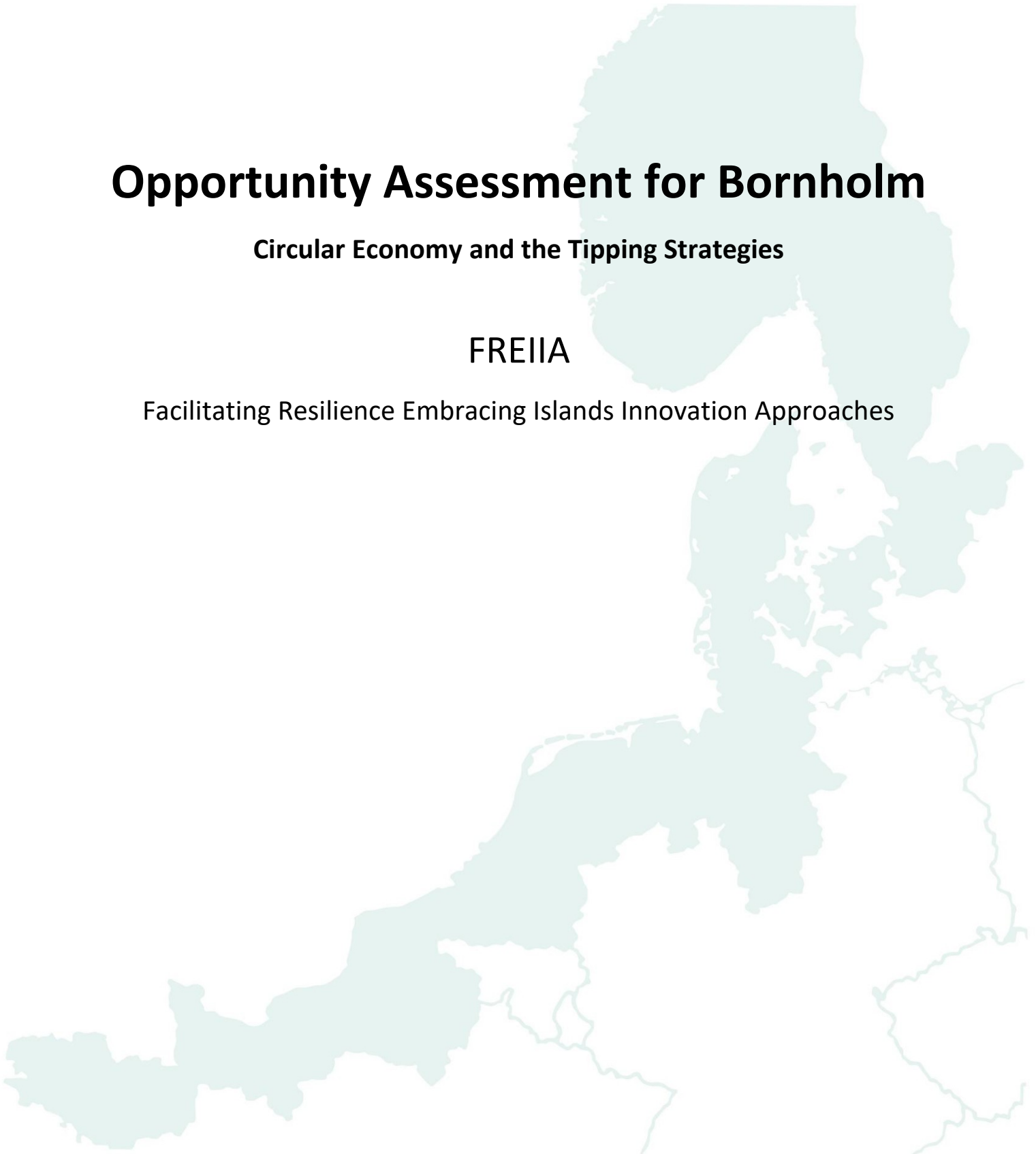
FREIIA

Opportunity Assessment for Bornholm

Circular Economy and the Tipping Strategies

FREIIA

Facilitating Resilience Embracing Islands Innovation Approaches



Content

The background of the Opportunity Assessment	3
Introduction to Bornholm	7
SDGs and resilience at Bornholm	10
Circular economy within the eight Tipping strategies	11
Strategy 1: Creative Sector	11
Strategy 2: SMEs and NGOs	14
Strategy 3: Young Entrepreneurs	16
Strategy 4: Import and Export of Knowledge	17
Strategy 5: Community Involvement	19
Strategy 6: Crowd Co-design	21
Strategy 7: Special Institutional Arrangements	23
Strategy 8: Innovation Policy Fitness	25
Conclusion	27
Top 10 Cases	28
Reference list	31

The background of the Opportunity Assessment

The opportunity assessments explore and assess the potential and opportunities for circular innovation on the islands. The reports have been created in an iterative fashion, with AAU and island partners collaborating on creating a report based on the Tipping method for idea generation, inspiration for other islands and as evaluation of each island's current and future status of circular innovation on each island. The island's self-evaluate is conducted through a subjective scoring system, which is argued for by each island and AAU. Besides the intention to generate ideas and provide a preliminary circular innovation evaluation, these reports are also intended to be used by each island's transition teams in the Rudder design-thinking approach. These reports, and these overviews, which the reports may give an initial idea of, can be expanded through continuous work and updates to provide an ever-evolving and adapting map of opportunities for circular innovation.

Innovation is a core theme of the FREIIA project. It is the focus of this report, as are the three subjects: Circular economy, Resilience, and the Sustainable Development Goals. Within these three subjects, circular economy has been chosen as the main subject of this Opportunity Assessment. Circular economy is recognised in the FREIIA project as a fundamental innovation driver on an island. There are multiple perspectives on circular economy, defined by the 9R Framework in this report. The picture below shows the 9Rs definition of Circular Economy.



The 9Rs describe a hierarchy of circular strategies, with the highest-placed strategies indicating a higher degree of circularity than the lowest. Circularity here is understood as avoiding the extraction of new resources and instead utilising resources already within the system and using as little energy as possible to create new products or services. This definition does not address issues such as hazardous waste and instead focuses on solid waste in circular economy. The definition does not highlight the variations in technological and biological areas within circular economy either. The following are examples of how an island community can use the 9Rs.

Refuse: The community starts by refusing single-use plastics, such as plastic bags and straws, to reduce the amount of plastic waste generated in the first place.

Rethink: The community starts to rethink how to avoid single-use plastics, e.g. using other materials for single-use plastic products such as paper bags.

Reduce: The community works to reduce their overall waste production by educating residents on responsible consumption practices and encouraging them to buy products with minimal packaging.

Reuse: The community sets up a system for reusing items like hard plastic cups and containers, either through local bottle return programs or by teaching the community how the products can be reused.

Repair: Instead of throwing away broken items, the community encourages residents to repair them whenever possible to extend their lifespan.

Refurbish: The community sets up a workshop where residents can learn how to refurbish and restore items like furniture, preventing them from ending up in landfills.

Remanufacture: Businesses on the island are encouraged to use materials from their discarded products to produce new products with the same function.

Repurpose: Materials from discarded products are used by businesses to create new products with different functions.

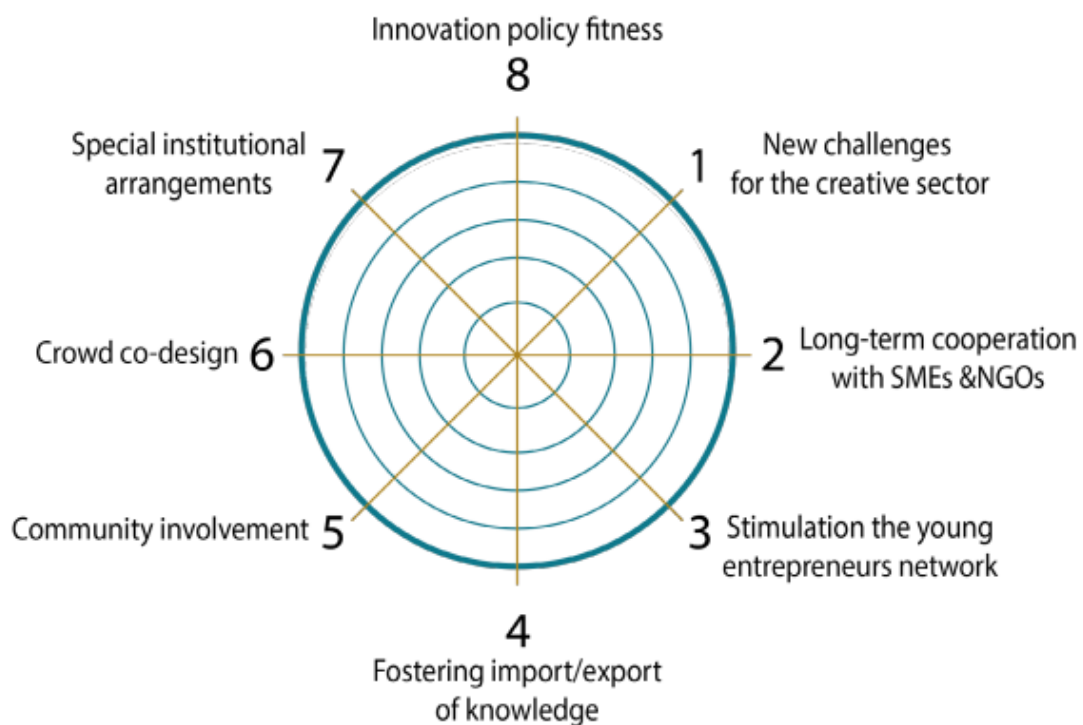
Recycle: The community establishes a comprehensive recycling program, collecting and sorting materials like plastics, paper, and glass to be processed and turned into new products.

Recover: The community explores options for recovering energy from waste, such as using biomass or waste-to-energy technologies to generate electricity.

By implementing the 9Rs, the island community can significantly reduce its waste output, protect its natural environment, and create a more sustainable future for generations to come. The 9Rs are all about finding innovative solutions to use fewer materials and processes and thereby keep the materials and products in circulation. As it is a hierarchy, the highest Rs are the most circular way to handle materials and products, yet society can not use only high R strategies. Therefore, the hierarchy functions as a guideline and inspiration to create more circularity, but the actors need to think of how to keep the value of their product or service.

To assess opportunities for circular innovation, multiple other aspects may influence what may locally be a valid opportunity not included in the 9R framework. Economic and social conditions may heavily influence what constitutes a strategy as much as possible. The 9R strategies may involve different actor constellations, which the 9R framework leaves open for interpretation. The strategies and the involved actors influence are not only conditioned by local conditions but also by regional, national and international conditions like legislation. The 9R framework does not address these aspects directly and therefore highlights the need for a governance mechanism which may.

The report is structured through the eight Tipping strategies for improving innovation governance and policy, shown in the figure below. Each strategy involves a group of actors mapped for each island. The report explores how these actors enhance circular economy.



A questionnaire made by Aalborg University was distributed to the Bornholm partner (BOFA), and their answers were used as empirical background for this report. The questionnaire's questions concerned the island's general characteristics, how the island works with the SDGs and resilience, and more comprehensive questions related to the eight strategies. For each of the eight strategies, questions regarding the presence and involvement of each strategy's relevant actor group and how these groups work with circular economy were included. The picture below shows a clipping from the questionnaire.

Strategy 2: SMEs & NGOs

Areas of interest	Describe the current practice
<p>Actor present - Which actors within the SMEs and NGOs exist on your island - Which actors on mainland have relevance to SMEs and NGOs for your island?</p> <p>E.g., small companies with new ideas, companies locally producing goods and services, NGOs supporting developing new products and services, companies and NGOs finding solutions for local problems etc.</p>	<p>Working with Circular economy - Does any of the abovementioned actors within the creative sector include any of the circular economy principles? - If any, which and how? - Which principles of circular economy could be relevant to work further on within the creative sector and why? - How does the local government support CE in the creative sector?</p> <div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 5px; margin-top: 5px;"> <p>• Insert bullets</p> </div>
<p>Involvement of the actor - How are the abovementioned actors involved in the strategy of SMEs and NGOs?</p>	<div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 5px; margin-top: 5px;"> <p>Where do you envision you are now with the creative sector and circular economy (score from 1 to 10)?</p> </div> <div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 5px; margin-top: 5px;"> <p>Where do you envision you are in 5 years from now with the creative sector and circular economy (score from 1 to 10)?</p> </div>

BOFA also gives scores in the questionnaire. These are based on how the actors in the strategy are working with the circular economy and what the potential is for the actors to include more circular economy. The scores stem from the 9Rs and the potential of the actors in the strategy to include more of the 9Rs and climb higher in the 9Rs ladder. As such, the scores are an individual assessment from the partner answering the questionnaire. The report is written by AAU using the answers and scores from the questionnaire and follow-up research on the actors and how they relate to the 9Rs. At the end of the Opportunity Assessment report, a figure visualises the scores for how far Bornholm is with each strategy and circular economy. After the conclusion of the report, a list of 10 cases is shown. These are the cases that have been assessed by AAU to have the most potential to further develop current or possible circular strategies in relation to the island-specific context. The 10 projects/actors are chosen from the earlier assessment and scores by BOFA. The report shows the degree of opportunities for innovation, especially in regard to the circular economy and the actor groups from the tipping strategies.

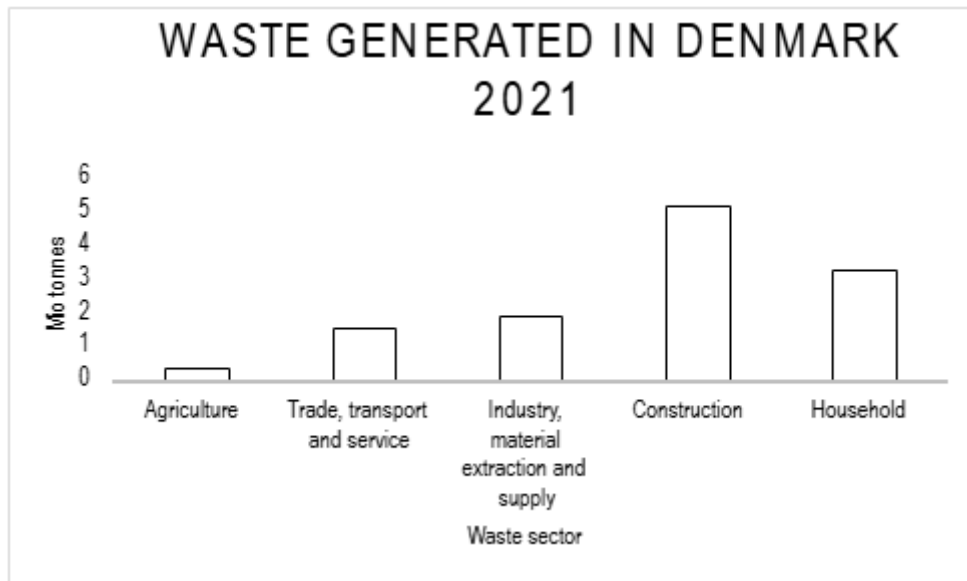
It is the foundation for the tipping workshops facilitated on Bornholm in November 2024. These workshops will only include the actors related to Bornholm.

Introduction to Bornholm

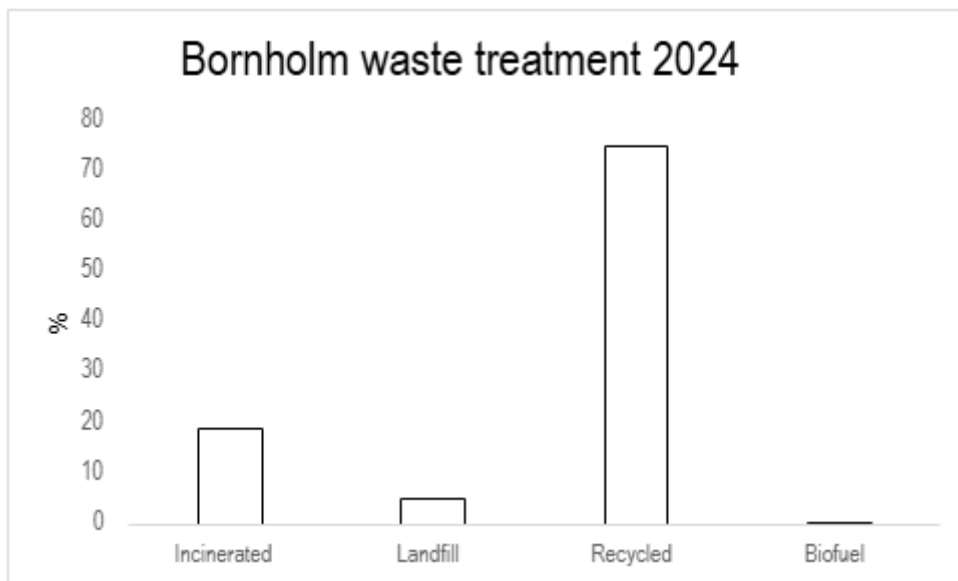
A brief description of the island is given in this introduction to understand the current status of Bornholm's circular initiatives and future ambitions. Here, aspects of demography, geography, transport, business sector, local government, and waste management are mentioned to illustrate part of the context in which Bornholm's circular initiatives are situated.

Bornholm is a Danish island in the Baltic Sea. It measures approximately 588 km² and has a population of around 39.000 people. Bornholm is a part of Denmark, and more specifically, it is a part of Denmark's administrative capital region. Yet the island has a local government, which specifically is the Regional Municipality of Bornholm. This government has both municipal and some regional responsibilities. To visit Bornholm, it is possible to fly from Copenhagen Airport, take the night ferry from Køge, or travel through Sweden by bus, train, or car and take the ferry from Ystad. For boat owners, several small harbours are also available for reaching Bornholm. Different educational options exist at Bornholm, with multiple schools and one gymnasium (general upper secondary education). At the gymnasium it is possible to take 4 different kinds of educations: regular gymnasium (STX), technical gymnasium (HTX), trading and economy gymnasium (HHX) and higher preparation gymnasium (HF). There are also opportunities for youth education for young people with physical or cognitive disabilities (STU). Bornholm also provides higher education, such as a bachelor's degree in teaching, nursing, and pedagogy, glass and ceramics education, Academy Professions (AP) such as financial management and service management, and an innovation and entrepreneurship top-up to the APs. If students choose diverging educational offerings from those on the island, such as a university education, they need to move to the mainland.

Denmark's majority of generated waste originates in the construction sector.



Besides that, household waste generates the second largest amount and is distributed into different categories for sorting. In 2021, Bornholm generated 635 kg per capita household waste, and in 2024, Bornholm recycled 75,27% of its total waste.



Bornholm has the same problem as many other islands: There is a need for the population to increase, and the local government has set a specific target of reaching 42.000 inhabitants. While it has stopped the population decrease, most inhabitants are over 70 years old. Bornholm has a flourishing tourism industry that brings the island to life in the summer. Yet in the winter, Bornholm is reversed, with the majority of restaurants and shops being closed because of the limited number of visitors. This affects the number of residents, especially in the most touristic communities. About 700.000 tourists visit Bornholm every year. The most prominent tourist attractions on Bornholm are the old castle of

"Hammershus", the smokehouses, the amusement park of "Brændesgårdshaven", the nature area "Almindingen" and the democracy festival "Folkemødet". At Bornholm, there is a need to create more life and jobs. Even though Bornholm has a stable employment number with around 17.000 people employed on Bornholm, the rest of Denmark's employment has increased by 8%. Tourism is a sector that creates a lot of jobs on Bornholm and is thereby essential for its economy. Food production and arts and crafts are similarly important sectors. These two sectors are related to tourism and the locals. Besides tourism, agriculture is also significant for Bornholm. The majority of Bornholm's land use is occupied by agriculture and is important both for the island's economy and job market.

The Regional Municipality of Bornholm prioritises entrepreneurship with plans for stimulating the rise of entrepreneurship further. Bornholm had 364 new businesses emerging in the period from 2009 to the end of 2017. These businesses focus especially on the island's regional characteristics, such as nature experiences, food, regional sustainable raw materials and arts, crafts, and multiple include sustainability in their communication. In this report, circular strategies and Tipping strategies will be applied to understand how circular innovation can generate even more opportunities and increase the attraction for new inhabitants and tourists on the island.

SDGs and resilience at Bornholm

All SDGs can be considered relevant for the island, and for now, Bornholm works with the following:



Bornholm's main SDG actors are the civil society, public institutions, and tourists. One example of how Bornholm works with the SDGs is BOFA. They deal with SDG 12 regarding implementation and regulation to handle waste, SDG 3 and 5 as they recruit vulnerable people and empower women, SDG 4 as they collaborate with DTU to get students to the island, and SDG 7 and 13 focusing on energy islands and EU projects. BOFAs work with the SDGs are also entrenched in their Environmental Management System, where selected SDG targets are incorporated. In the future, Bornholm intends to increase its network-oriented initiatives with the SDGs.

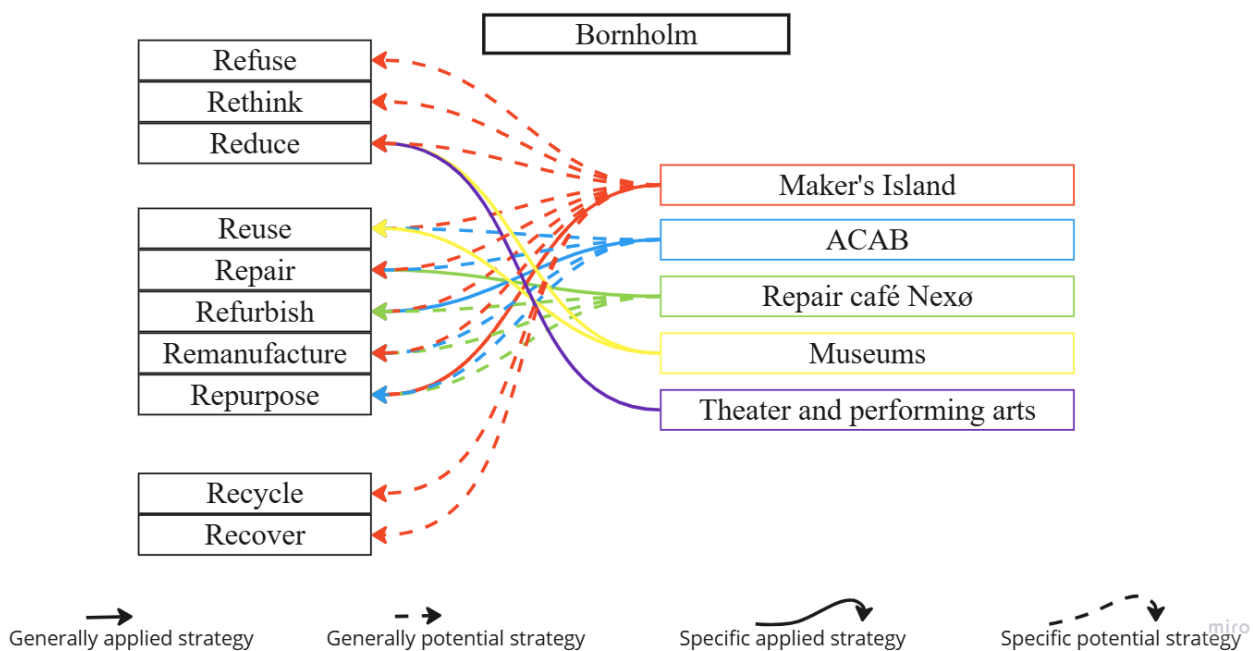
Bornholm also works with resilience (adaptation to the changing environments primarily related to climate change), and multiple departments within the Regional Municipality of Bornholm work with resilience. Plan, Byg og Miljø works with physical and spatial planning, Beredskab og Veje prepares emergency services, and Udvikling refers to a department, which, amongst others, develops island resilience. The local government also focuses on vegetation and agriculture, incidents of drought, and attempts to innovate how waste reduction can be approached. In the future, they would like to work with resilience through stakeholder engagement and specific infrastructures.

Circular economy within the eight Tipping strategies

The following section presents the different groups of actors and their current work with circular economy concerning each tipping strategy. The actors included in the report are either working with circular economy or have the potential to do so. The sections are structured with a visualisation, a description and a summary of the scores of the actors' current or potential work with the circular economy.

Strategy 1: Creative Sector

Bornholm's creative sector is characterised by a unique mix of cultural institutions, museums, festivals, educational facilities and business development initiatives. Through a strong cultural infrastructure and ongoing support, Bornholm has positioned itself as a cultural hub both nationally and internationally, where art, history, nature, and innovation converge. The actors in this chapter represent a sample of the rich and numerous creative sector within Bornholm.



These actors are related to the Creative Sector and circular economy in different ways.

There are actors related to the arts and crafts. The umbrella organisation Maker's Island is associated with BOFA to create a "future of craft green living lab" in relation to the EU project Hephæstus, which seeks to preserve and develop traditional crafts introducing new technologies and new business models combined with research on how these can add to a green transition in the field. The ceramicists at Maker's Island are exploring the possibilities of repurposing glaze that would otherwise have been sent to recycling or incineration. ACAB is an association supporting innovation by creating a

network, workspace, knowledge, etc., on innovation and creativity. An example of how they work with the circular economy is that, e.g. ceramicists in the organisation reduce their waste by using raw materials from Bornholm ground and sharing materials. Textile designers work with dead-stock fabric or leftovers from the large-scale fashion industry and therefore repurpose material. At Bornholm, there is also a volunteer-run repair café in Nexø, and part of the non-profit organisation Repair Café Denmark. Bornholm is famous for its arts and crafts; all these actors are examples of those involved in this subject. These actors enhance innovation on Bornholm through innovative projects and experiments. Mainland actors are also associated with the Creative Sector at Bornholm. An example is the KADK (Danish Royal Academy), which also has a campus in Nexø on Bornholm.

Bornholm also boasts numerous museums, such as Bornholm Art Museum and Gaarden, which is Bornholm's Food Culture House. First mentioned has previously collaborated with, amongst others, KADK, during the recurring Triennale European Ceramic Context 2024. The theme for 2024 was sustainable practices in ceramics and had workshops on the reuse of ceramics. Gaarden held in 2022 events about how food production services may reduce packaging.

Bornholm has several more festivals and events than already mentioned, which can be categorised within the creative sector, and are addressed in the chapter Crowd Co-design. These festivals also have a strong connection to the tourism sector, and in general the tourism is important for the creative sector.

Theatre and performing arts are also present in Bornholm, with theatres and a venue for concerts, theatre and so on. An example is Rønne Theatre, which is Denmark's oldest still functioning theatre and serves as the centre for performing arts on the island. Rønne Theatre has previously worked with sustainability and in their 2024 renovation prioritised energy optimisation to reduce energy use. The Creative Sector in Bornholm has a variety of different types of creative actors on many different organisational levels, which work with circular strategies. A significant actor here is Makers Island Bornholm, which promotes and develops Bornholm's craft and design through networks, projects and visibility for artists and designers. Yet, there is still room to include more circular strategies. An example to further investigate is how a value chain could be created with the many different networks, projects and actors. All of the 9R strategies could be relevant to investigate in such a supply chain. There are also other, more specific examples of circular innovation in Bornholm. In the case of the Repair café in Nexø, a circular development would entail financing new tools for repair, as well as more knowledgeable volunteers, or exploring other ways to increase its workforce. However, funding and municipal support have been cut to the entrepreneur house Møbelfabrikken, which houses the repair café. Therefore, another possible locality for a repair café is also necessary. These initiatives

could make the repair cafés include more circular strategies such as repurposing, remanufacturing, refurbishing, and repairing. Repurposing glaze is a new and innovative way to create circularity in the ceramics sector and is utilised by ceramicist Christina Schou Christensen and the KADK in Nexø. Yet more circularity could be included by the Maker's Island, exploring why ceramics are discarded and whether some can be reused or refurbished. All the actors in the Creative Sector can enhance circularity in different ways and should try to include as many of the R-strategies as possible.

The local government can stimulate growth in the Creative Sector with funding. Though the local government has been enforcing budget cutbacks in recent years, options for seeking local funding for businesses and civil projects are still available. Fitting funding options for financing tools, workspace and helping grow the repair workforce for the repair café may be available. The local government can establish a general strategy that supports and promotes circular experiments, stimulating an on-island market for circular products and services. A strategy may include a repair service where the local government is a client or where the local government buys locally produced circular ceramics for daily use. Bornholm Regional Municipality has a purchasing policy which, amongst others, includes an interest in further reuse and recycling. However, the local Government aren't allowed to favour local produce, which can be a barrier for local circular public purchasing. The Creative Sector can also continue to develop ways to cater to the tourism sector by refurbishing, remanufacturing, and putting local circular art on display in museums. By producing artwork for museums, the purpose of creating art can focus on service instead of creating souvenirs, thereby rethinking a product into a service.

At Bornholm, scores for the Creative Sector and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

- The envisioned score for the current status is **5 out of 10**
- The envisioned score for the status five years from now is **9 out of 10**

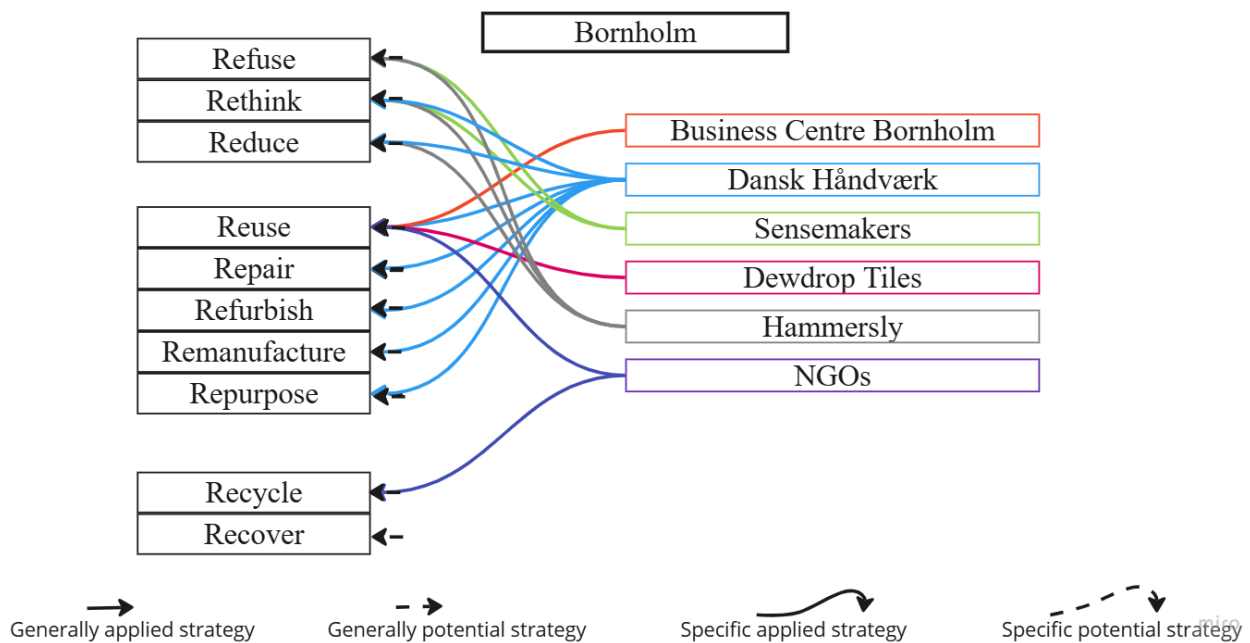
Future opportunities for circular economy integration within the Creative Sector include:

- The repair café could include **repurposing, remanufacturing, refurbishing**, and more **repairing**
- Maker's Island can investigate opportunities for creating a creative value chain that, in principle, could utilise all of the **9Rs**
- ACAB could look into how to **repair, reuse, repurpose** and **remanufacture**
- The local government could promote and fund circular experiments and become a customer for circular products

- The Creative Sector can continue to develop ways to cater to the tourism sector, e.g. having local circular art displayed in museums

Strategy 2: SMEs and NGOs

At Bornholm, several actors are related to SMEs, NGOs, and the circular economy. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



The local SMEs incorporate different circular services to give products and materials new life. Examples are Dewdrop tiles, who reuses tiles from old, demolished constructions. Sensemakers monitor water quality and ecosystems at sea and work with the higher Rs, refuse, and rethink by finding the sources of pollution. Hammersly produces organic, local vegetables and fruits consumed on Bornholm. Therefore, Hammersly refuses and reduces the use of harmful substances and rethinks having an all-local production and consumption, thereby minimising food waste. Dansk Håndværk supports SMEs on Bornholm, an example being Lærtingenes Hus. Lærtingenes Hus is a house that has gone through a total restoration done by apprentices from different craft educations. At Lærtingenes Hus, they try to incorporate as many circular strategies as possible by reusing tiles and beams, repurposing, remanufacturing, repairing, and most importantly, reducing and rethinking how construction work is usually done. NGOs such as the Salvation Army have thrift stores on the island, which reuse materials. The previously mentioned NGO repair café is also present on the island. The

NGO, DN (Danish Society for Nature Conservation), also has a section in Bornholm. Though this NGO does not directly address circular economy, DN has previously been a part of a project with BOFA and Nestle to investigate opportunities for reusing and recycling all plastic packaging in Bornholm.

To promote circular services, a collective strategy can be made to bind the different SMEs and NGOs together. Bornholm has previously had multi-actor initiatives, meant to support SME development and business sustainability on Bornholm. Business Center Bornholm is and has been a project leader or partner in multiple projects, such as prior “Bæredygtig Bundlinje Bornholm” and “588 – affyringsrample for iværksættere”. A "pressure cooker" workshop can be utilised in this strategy, where local stakeholders attempt to solve local issues quickly. As a part of the strategy, the local government can support high-potential SMEs, product development, and local markets. A focus could be to utilise available resources and make the best of what is available on the island. SMEs utilise this principle and should be highly valued for their innovation. The Business Centre Bornholm can be beneficial as a co-creator of the strategy, due to its knowledge of the opportunities and barriers for local SMEs and prior experience as a project leader and partner. Business Centre Bornholm also has knowledge of available funding. Besides Business Centre Bornholm, BOFA, with its Zero Waste Bornholm innovation platform, may also be beneficial in such a strategy. The platform allows partners to join BOFA in creating circular projects, and currently, Dewdrop Tiles and Nestle are partnering with BOFA through this platform. More platform partners and projects can be a part of the purpose with above mentioned workshop and may promote continued implementation. With a strategy like this, more actors on the island will include circularity in their business models, while the SMEs already including it can diversify their methods.

At Bornholm, scores for the strategy of SMEs and NGOs and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

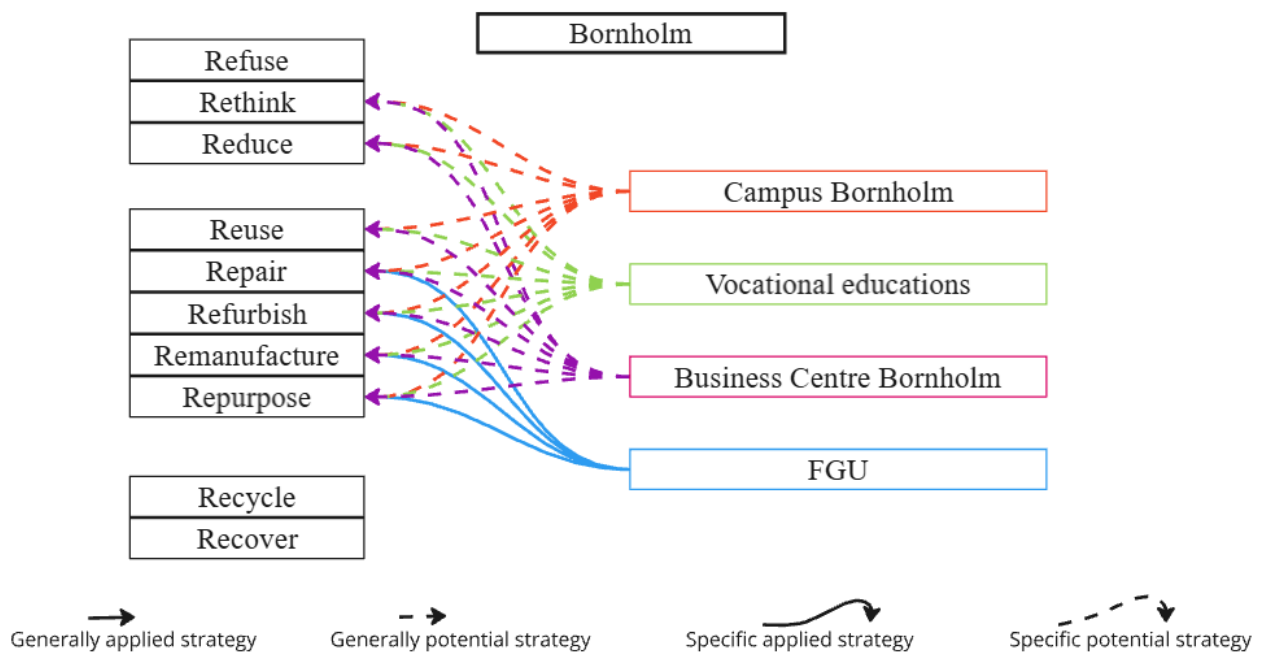
- The envisioned score for the current status is **3 out of 10**
- The envisioned score for the status five years from now is **6 out of 10**

Future opportunities for circular economy integration within SMEs and NGOs include:

- The NGOs and SMEs could collaborate in including more circular strategies by for example utilising BOFAs Zero Waste Bornholm Innovation Platform
- The government could support high-potential SMEs with the aid of Business Centre Bornholm
- Business Centre Bornholm could keep supporting the SMEs and teach them about the use of all 9Rs

Strategy 3: Young Entrepreneurs

On Bornholm, some organisations promote young entrepreneurship. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



The organisations promote young entrepreneurship mainly in connection with education, but intertwined with market-based aspects. FGU is an educational program for preparatory basic education, where the students learn to create products from used materials and products. At FGU, the students repair and refurbish white goods and other things in the "reuse lab" project. Besides, they repurpose and remanufacture textiles, crafts, jewellery, and other products in different workspaces. Campus Bornholm, the vocational education, and Business Centre Bornholm do not directly include circular strategies, yet they have opportunities to do so. Campus Bornholm, the vocational education and Business Centre Bornholm, could include more training and teaching about how to reuse, rethink, reduce, repair, refurbish, remanufacture, and repurpose.

Besides that, internships and apprenticeships at Bornholm's local SMEs are offered. The use of internships for students and the NGOs' promotion of practical work is part of the island's strategy for educating young entrepreneurs. The local government is focusing on the youth through, e.g. education

in innovation and entrepreneurship. A relevant opportunity is to create a link between the young entrepreneurs, as the SMEs show interest in, e.g. FGU's practical work.

At Bornholm, scores for the strategy of Young Entrepreneurs and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

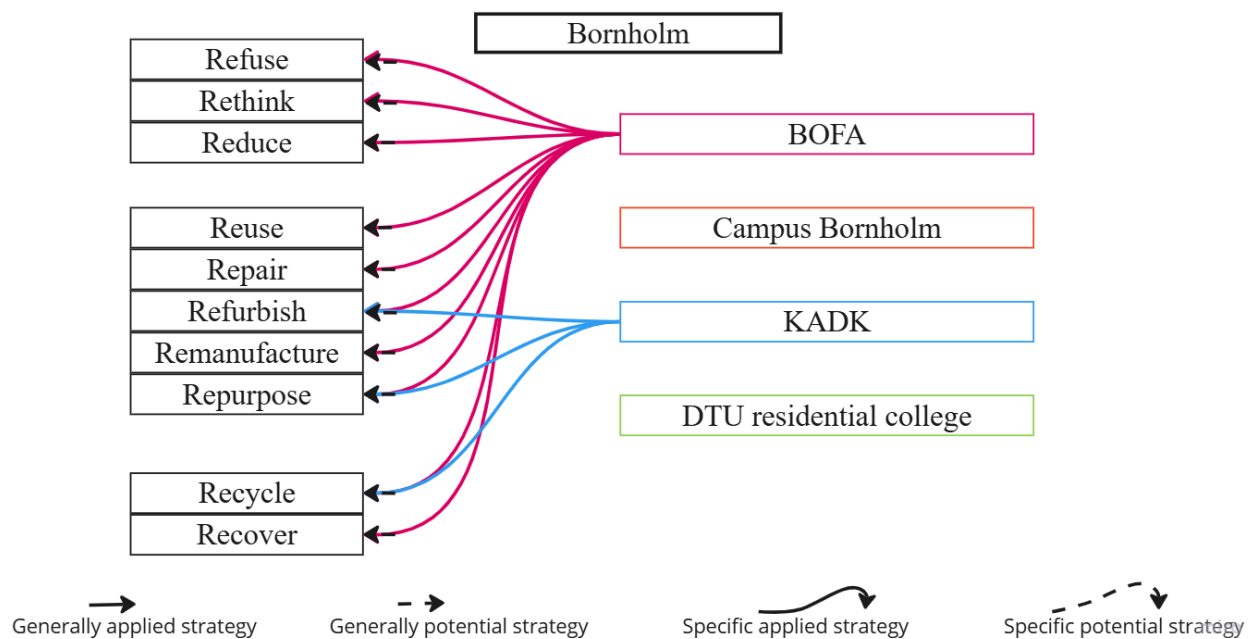
- The envisioned score for the current status is **2 out of 10**
- The envisioned score for the status five years from now is **4 out of 10**

Future opportunities for circular economy integration within Young Entrepreneurs include:

- Campus Bornholm, the vocational education and Business Centre Bornholm, could train and teach potential young entrepreneurs to **reuse, rethink, reduce, repair, refurbish, remanufacture, and repurpose**
- The local government and education can enhance internship opportunities in SMEs
- There could be stronger links created among young entrepreneurs

Strategy 4: Import and Export of Knowledge

On Bornholm, there are some excellent examples of actors importing and exporting knowledge regarding circular economy. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



The knowledge actors within Bornholm are mainly related to education, except BOFA. Through multiple projects, BOFA imports knowledge and exports knowledge to and from partners. As BOFA has multiple circular projects, it can be assumed that they work with multiple of the 9R within this strategy. E.g. in Hephæstus, BOFA collaborates with universities such as Copenhagen Business School and Gøteborg University to create a living lab meant to test circular principles and to develop the future of crafts. As previously mentioned, this project includes circular strategies of reduce and repurpose, but also reuse is a part of the principles. These actors use experimentation, research, surveys, etc., to investigate how circular services can be used. KADK has a glass and ceramic education on Bornholm. KADK includes circular strategies by experimenting with recycling, repurposing, and refurbishing in art series made by the academy's students. DTU's residential college provides scientists and students with living areas while researching green energy on the island. Campus Bornholm hosts a gymnasium, vocational education, and adult education. Neither DTU's residential college nor Campus Bornholm directly include circular strategies in their work. Yet, there is potential for the existing Import and Export of Knowledge actors on the island to import and export more knowledge about circularity. Campus Bornholm could focus on how to reuse, repair, refurbish, remanufacture, and repurpose in, e.g. the construction industry, to address one of the major waste streams.

Universities on the mainland are essential regarding the Import and Export of Knowledge. Some universities collaborate with local companies and larger institutions such as BOFA. An example is Aalborg University collaborating on projects related to circularity, such as Reuse Lab, which refurbishes and repairs white goods and other larger discarded products.

A way to further the Import and Export of Knowledge on Bornholm is by creating a flagship of circular innovation on the island. The idea of Bornholm being a test island is currently a part of Regional Municipality Bornholm's policy targets and may already be reflected in current projects, e.g. Hephaestus. The experience gained from the already proven strategy may be useful in future test island projects, which could utilise all of the 9R strategies

At Bornholm, scores for the strategy of Import and Export of Knowledge and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

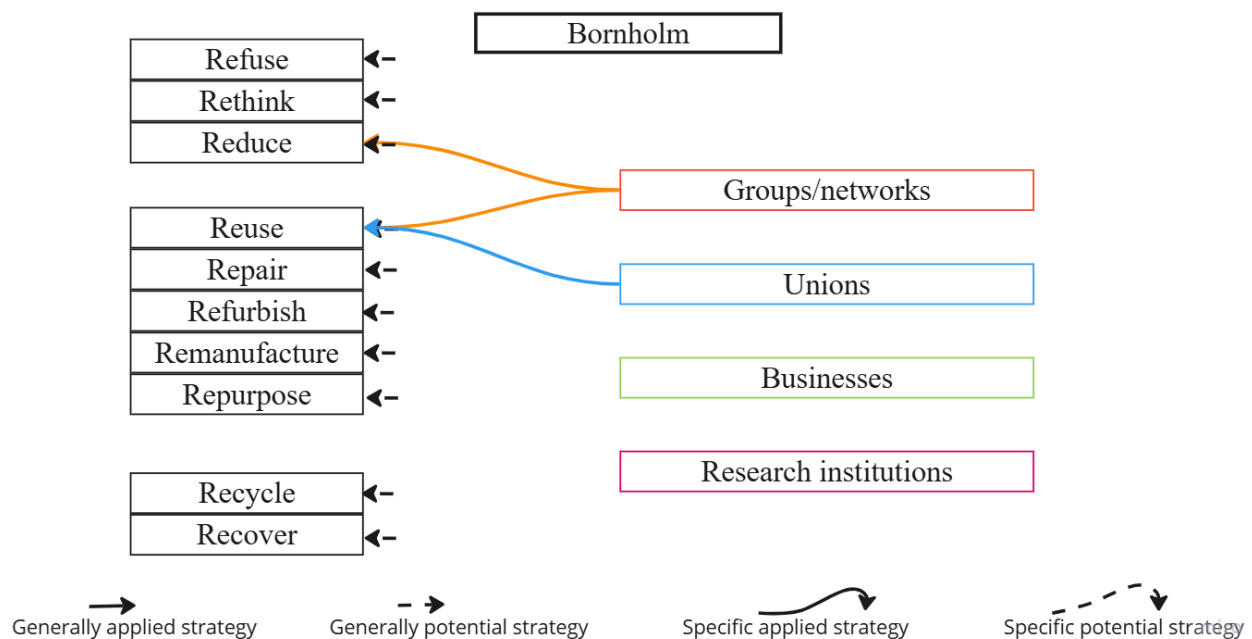
- The envisioned score for the current status is **4 out of 10**
- The envisioned score for the status five years from now is **7 out of 10**

Future opportunities for circular economy integration within the Import and Export of Knowledge include:

- Campus Bornholm could include more importing and exporting of knowledge on how to reuse, repair, refurbish, remanufacture and repurpose in the construction industry
- More collaborations with universities
- Flagship of circular innovation on the island, which could make all of the 9R possible strategies

Strategy 5: Community Involvement

On Bornholm, a lot of community involvement is happening. The most relevant actors are the bigger actor groups of groups/networks, unions, businesses, and research institutions. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



Bornholm has a rich community involvement with groups and networks for the community and unions. The groups and networks are established within different sectors, foster new ideas and relations, and promote knowledge sharing. There are also examples of Eco-societies in Bornholm, such as Friskoven, which includes circular strategies such as the reuse of building materials and reducing energy use. The unions are popular, represent various interests, and are open to everyone. For example, Christian organisations are present in Bornholm and some of these organisations also have thrift stores which sell reused goods as mentioned in Strategy 2. Bornholms Borgerforeninger Samvirke, an organisation of the citizen associations on Bornholm, are another example of community engagement. The organisation champion the cause of local democracy and local communities being heard in governmental processes.

Some relevant businesses and institutions on both Bornholm and the mainland also enhance community involvement at Bornholm. The actors involve the community through knowledge sharing, EU projects, and personal relations. These actors can promote knowledge sharing and other methods for promoting community engagement, and they can include circular strategies in this work. Yet, there is not a lot of community involvement related to circular economy on Bornholm.

One way to create or influence a circular-oriented group is by using a shared and ambitious vision co-created by the community and the local or regional government. Another approach consists of organising community competitions to promote interest and innovation in circular products and

services. All 9Rs could be included in both approaches, but the community needs knowledge about the circular strategies to use them.

At Bornholm, scores for the strategy of Community Involvement and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

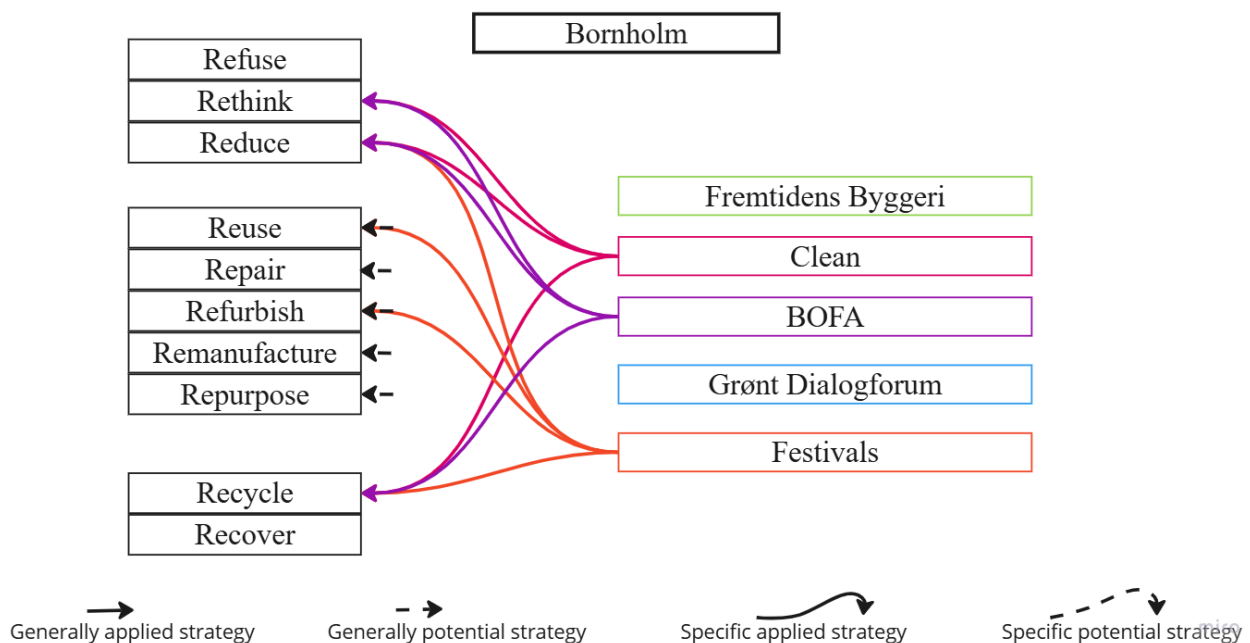
- The envisioned score for the current status is **1 out of 10**
- The envisioned score for the status five years from now is **6 out of 10**

Future opportunities for circular economy integration within Community Involvement include:

- Promote knowledge sharing and methods of community involvement within the 9Rs
- Create shared and ambitious visions on the 9Rs, co-created with the community
- Organise community competitions within products and services, including the 9Rs

Strategy 6: Crowd Co-design

At Bornholm, different actors are involved in Crowd Co-design. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



Folkemødet is Denmark's largest political festival, bringing together politicians, organisations, and citizens for debates, workshops, and cultural events. Folkemødet Bornholm also collaborates with BOFA and Clean, the Danish Environment and Water Cluster, on the project Strive (Sustainable

Tourism through Resilient and Innovative Festival). The project develops guidelines for circular principles in festivals, such as rethinking, reducing and recycling festival products. Other festivals, with a focus on arts and crafts, are also present at Bornholm, such as Bornholm Craft Weeks. This festival is an annual celebration of craft and design, with workshops, exhibitions, and talks that showcase Bornholm's artisan craft. It also has workshops on how to recycle glaze for ceramics and showcases of ceramics with locally sourced materials, thereby reducing the need for other materials. Another festival, Østpaas, has circularity as a core concept, by refurbishing an old farm for festivals and cultural purposes. As previously mentioned, Triennale European Ceramic Context also utilises the reuse strategy. The events organised by Grønt Dialogforum aim to address environmental-related topics on Bornholm. The crowd co-design happens by engaging and contacting the locals and conducting interviews

Besides the festivals, other types of crowd co-design are also present in Bornholm. The self-organised construction network, Fremtidens Byggeri, works with circular principles through network creation and workshops. Since 2020, the Regional Municipality of Bornholm has carried out various participation initiatives through public hearings and dialogue events, especially in relation to significant projects like the Bornholm Energy Island and urban development plans.

One notable example is the public consultations and workshops held for the Bornholm Energy Island project, where local citizens were invited to provide feedback on the municipality plan supplements and local planning processes. These sessions, which took place in 2022 and 2023, allowed the local community to engage in shaping the design and environmental impact assessments of large infrastructure projects. Workshops tested ideas and gathered input from stakeholders to ensure that the development aligned with community preferences while integrating renewable energy solutions into Bornholm's future.

One way to promote circular innovation within this strategy is to utilise the popularity of Folkemødet Festival to further Bornholm's circular ambitions and its current circular services. New circular strategies for the festival could be investigated, such as repair and reuse through the use of festival goer involvement. Moreover, using a specifically circular innovation event can support and stimulate the sharing of ideas and generate networks on the island and beyond. An example could be a workshop with Fremtidens Byggeri about circular principles in construction and demolition. Repurposing, remanufacturing, refurbishing, repairing, and reusing could be relevant for Grønt Dialogforum and Folkemødet to promote. The Regional Municipality of Bornholm's prior experience with crowd co-design in the energy sector suggests that the local government may be willing to use

this tipping strategy and that they also have relevant experience on the topic. This may be useful in future circular economy crowd co-design.

At Bornholm, scores for the strategy of Crowd Co-design and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

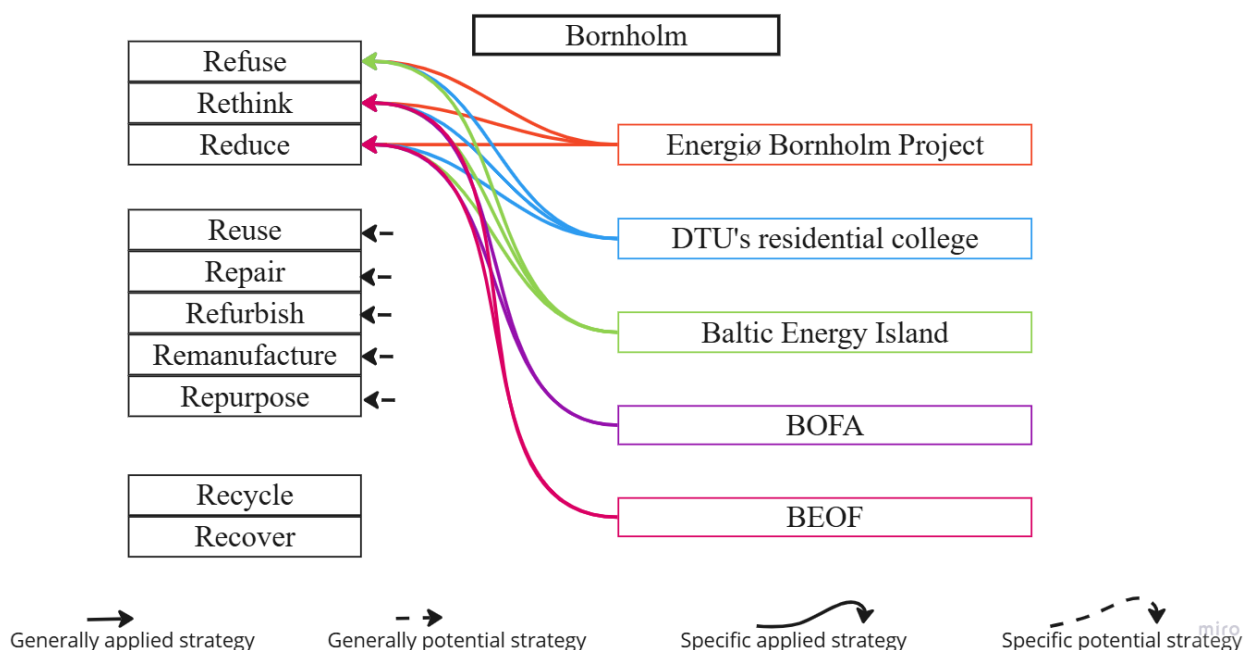
- The envisioned score for the current status is **1 out of 10**
- The envisioned score for the status five years from now is **6 out of 10**

Future opportunities for circular economy integration within Crowd Co-design include:

- Use the popularity of Folkemødet to promote Bornholm's circular ambitions and circular services, such as repair and reuse, through festival goer involvement
- Create events to share ideas and networks on circular services and products
- Especially, **Repurpose, remanufacture, refurbish, repair** and **reuse** can be promoted at workshops at events

Strategy 7: Special Institutional Arrangements

Bornholm has several special arrangements, from university collaborations to major energy investments. The figure below shows the actors working with circular economy or having the potential to work with it, and which circular strategy they relate to.



BOFA and BEOF (Bornholms energy and water utility company) both work with EU-funded HORIZON projects. BOFA has several projects, such as previously mentioned Hephaestus, but also SYMSITES, which rethinks and reduces, by utilising wastewater for beer production as fertiliser. BEOF is also a partner in SYMSITES, but also works with other EU projects such as RE-EMPOWERED. This project seeks synergies between solar panel parks and the current electricity grid and therefore rethinks and reduces energy utilisation. The Energiø Bornholm Project is a pioneering project of national importance in Denmark. By 2030, Bornholm is supposed to supply 3 GW hours of green electricity from offshore wind turbines. It is part of a national strategy for mitigating climate effects by shifting to wind energy. The Baltic Energy Island operates as a foundation and has system operators and companies aiming to redesign the global energy system. Bornholm, a pioneer in this field, provides a unique opportunity for student projects, with DTU's residential college facilitating research and feedback on these innovations. However, the development of Energiø's power plant and the establishment of new industries and innovations on the island bring both positive and negative impacts. Baltic Energy Islands seek to balance innovation with the island's historical heritage, aiming to preserve local traditions and sustain the tourism sector while fostering collaboration with students.

These special institutional arrangements emphasise circular practices, refusing, rethinking, and reducing, by maximising the use of renewable energy and minimising reliance on fossil fuels. Despite these efforts, there are further opportunities to enhance circularity, particularly in the lifecycle of energy production machinery, such as wind turbines. These components can be reused, repaired, refurbished, remanufactured, and repurposed, extending their usability and reducing waste. Strengthening the strategy of Special Institutional Arrangements could involve regional or larger mainland projects to promote these circular practices. Strategies utilised by BOFA and BEOF, by utilising EU funds to work on EU projects and together collaborate on, e.g. SYMSITES. EU projects and internal collaboration may be a suitable strategy for further special institutional arrangements. Prior mentioned Zero Waste Bornholm platform and Bright Green Island might act as a local framing for collaboration and future projects.

At Bornholm, scores for the strategy of Special Institutional Arrangements and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

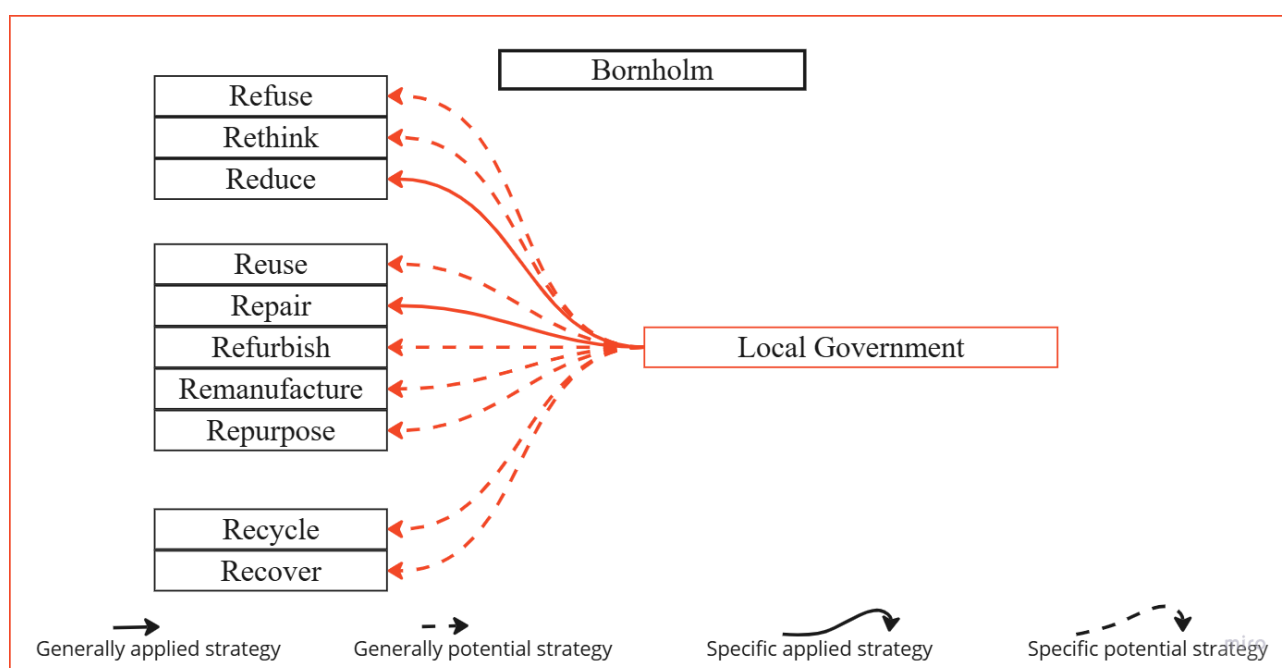
- The envisioned score for the current status is **3 out of 10**
- The envisioned score for the status five years from now is **7 out of 10**

Future opportunities for circular economy integration within Special Institutional Arrangements include:

- Energiø Bornholm and Baltic Energy Island can include **Repurpose, remanufacture, refurbish, repair, and reuse**, especially regarding their machinery
- Collaborate in a regional or larger project that can promote these cases

Strategy 8: Innovation Policy Fitness

The local government is the central actor within Innovation Policy Fitness. The figure below shows how the local government is working with circular economy or has the potential to work with it, and which circular strategy they relate to.



Bornholm Regional Municipality and many more actors are responsible for the creation and implementation of policy measures, as many different parts of the local government are included in policy creation. A policy example is the Bright Green Island Vision, which aims for CO2 neutrality by 2025. One key initiative is the use of electric buses to reduce reliance on fossil fuels. Another example is the vision for waste and resource management on Bornholm, which revolves from the Bright Green Island. The vision, amongst others, envisions island-wide sharing services, thereby reducing products and socioeconomic repair businesses. The local government are showing examples of how to work with innovation policy fitness. Another approach may be by promoting circular initiatives through a bottom-up approach that empowers individuals to pursue these initiatives independently. In the development of Bright Green Island, the local community where invited to participate in co-creating the vision, showing the local government's willingness for this approach. As Bornholm also has experience with multi-actor initiatives and with BOFA's Zero Waste Bornholm platform, another

option may be to create innovative networks and make new partners. To achieve CO2 neutrality by 2025, Bornholm must incorporate the 9Rs framework, particularly focusing on Refuse, Rethink, and Reduce, which should be integrated into the island's policies.

At Bornholm, scores for the strategy of Innovation Policy Fitness and their work with circular economy have been assessed in relation to the roles and actions of the aforementioned actors.

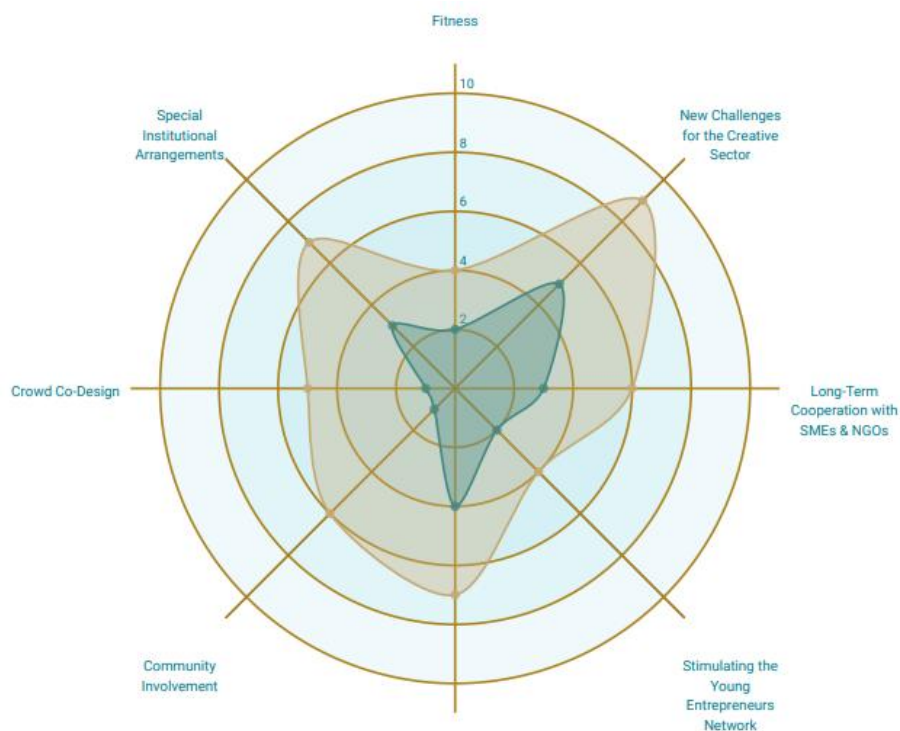
- The envisioned score for the current status is **2 out of 10**
- The envisioned score for the status five years from now is **4 out of 10**

Future opportunities for circular economy integration within Innovation Policy Fitness include:

- A bottom-up approach allowing individuals the freedom to initiate and drive circular economy projects
- Create networks or make partners for circular innovation
- The top of the 9Rs, Refuse, rethink, and reduce, could be embedded into Bornholm's policies

Conclusion

The strategies' scores are presented in the tipping wheel with additional reflections on the opportunities for further developing the eight tipping strategies and circular economy on Bornholm.



The figure illustrates that Bornholm already has existing circular initiatives that foster innovation, with active participation from both island and mainland actors. However, some strategies, such as Young Entrepreneurs and Innovation Policy Fitness, lack or minimally utilise circular services. Bornholm has significant potential to expand its circular practices, given the engagement, creativity, and innovation of its associated actors. The island has actors in all actor groups involved in tipping strategies, and through collaboration and a systematic approach, these actors can further advance the circular economy and innovation on Bornholm.

However, establishing pathways for collaboration remains challenging. There is, however, great potential for further utilising circular strategies, as there are both actors and actors who use circular strategies within each tipping strategy. Especially the creative sector, special institutional arrangements, and the import and export of knowledge. However, SMEs and NGOs also have promising aspects, such as the innovation platform and community involvement by tapping into the multiple unions, groups and networks.

Top 10 Cases

In this section, ten possible project ideas will be proposed. These ideas have emerged from research into the aforementioned strategies for the circular economy on the Bornholm islands. Several considerations influenced the selection of these projects, namely current and potential circular strategies, the island's context of waste and materials and its ambitions concerning the tipping strategies. The ideas will be presented in no particular order.

Maker's Island collaborates with BOFA on the "Future of Craft Green Living Lab" under the EU project Hephæstus. Their focus on preserving endangered crafts involves repurposing materials, particularly glazes, which can contribute to sustainable practices in craftsmanship. In 2017, Bornholm got the title of World Craft Region as the first region in Europe and the first island community in the world. By reusing and refurbishing more ceramics, they could become more circular and reduce household waste. The local government would benefit from promoting these products as they attract tourists.

ACAB Members (Arts & Crafts Association Bornholm) have criteria for selecting members that emphasise awareness in regards to environmental and social impacts of their production processes. This awareness of environmentally friendly, local production could be further promoted by the local government and have an impact on various waste streams. Moreover, ACAB has the potential to become more ambitious when it comes to repairing, reusing, repurposing and remanufacturing.

Campus Bornholm is used by all educational programs on the island and could be an opportunity to import and export knowledge in how to reuse, repair, refurbish, remanufacture and repurpose in e.g. the construction industry. The local government could benefit from supporting the Campus, as it is a catalyst for circular innovations and is powered by geothermal energy, solar panels, and ground-source heat pumps, which contribute to the island's zero-carbon goal.

Repair café is an NGO operating repair initiatives throughout Denmark, run by volunteers. This aids entrepreneurs and emphasises community engagement in repairing and reusing items rather than discarding them. Additionally, they could work more with repurposing, remanufacturing, and refurbishing, consequently reducing household waste on the island. The financing of new tools for the café and initiatives to expand their workforce may allow these additions.

Folkemødet is an annual Danish festival held in Allinge, which focuses on democracy and dialogue. Over three days, it hosts 2,000+ free events, attracting up to 65,000 participants. It provides a platform for public engagement, involving the local government and could promote Bornholm's circular ambitions and repurposing, refurbishing, repairing and reusing through workshops and events.

STRIVE, CLEAN, and BOFA have already started utilising circular strategies at the festival. This project may also contribute to the import and export of knowledge as the project develops more general festival guidelines.

Zero Waste Bornholm innovation platform has already established public-private partnerships for circular economy. The platform can be a gathering point for SMEs, NGOs, local actors and local government for ambitious innovation policy fitness like Bright Green Island.

Business Center Bornholm is a part of the top 10 cases as it, with its prior multi-actor initiatives and experience as a project leader, has valuable knowledge on how to engage with local SMEs. Besides Business Center Bornholm's potential as a project leader in developing local circular networks, their knowledge of funding options, which may, e.g. help enable the repair cafes' potential circular strategies.

Lærlingenes Hus serves as a practical example of circular strategies in construction, integrating methods such as reusing beams and tiles, thereby reducing material waste. In 2017, Dansk Håndværk acquired and restored the house with 26 apprentices from various vocational programs across Denmark. They collaborated with educational institutions to enhance the quality and image of Danish craftsmanship while addressing modern sustainability needs. Now, it is an inspirational space for craftsmanship education and is available for rent by members of Dansk Håndværk. This project promotes a reduction in construction waste, and the lessons learned from this could be applied to other renovations on the island.

REuseLAB encourages FGU students to repair and refurbish white goods and repurpose textiles and other products, promoting hands-on learning in circular economy principles. Aalborg University and BOFA collaborate with the Reuse Lab, contributing to research in circular economy strategies. Recording the material flows, establishing sales channels and how to scale their activity up are a work in progress. This can help reduce household waste and is an opportunity for the local government to provide support.

The Baltic Energy Island and its Green Qualifications project aim to enhance the educational offerings in the energy sector on Bornholm and foster innovation through strong collaboration between students and companies in green energy. Interested parties can reach out for collaboration with students and researchers from DTU and other educational institutions. Internships are offered that contribute to company competencies while providing insight into the younger generation's work processes and motivations. Business Centre Bornholm is also involved in reaching the goal of attracting investments, creating new jobs, supporting local businesses, and promoting innovations in

the green energy sector. Energiø Bornholm and Baltic Energy Island could include repurposing, remanufacturing, refurbishing, repairing, and reusing, especially regarding their machinery. The local government would profit from supporting these collaborations actively.

Reference list

Core Literature:

Tipping Manual:

[https://vbn.aau.dk/ws/portalfiles/portal/320650657/HanTIPPING Large Print Version.pdf](https://vbn.aau.dk/ws/portalfiles/portal/320650657/HanTIPPING_Large_Print_Version.pdf)

The 9Rs: https://www.researchgate.net/figure/The-9R-Framework-Source-Adapted-from-Potting-et-al-2017-p5_fig1_320074659

Waste and other specific data:

Miljøstyrelsen: <https://www2.mst.dk/Udgiv/publikationer/2023/10/978-87-7038-566-4.pdf>

Danmarks Statistik: <https://www.dst.dk/da/Statistik/emner/miljoe-og-energi/groent-nationalregnskab/materiale-og-affaldsregnskaber>

Center for Regional- og Turismeforskning : <https://crt.dk/wp-content/uploads/SWOT-Bornholm-2022-slut.pdf>

Bornholm inhabitant target: [Mål og visioner Kommunalbestyrelsens visioner \(brk.dk\)](#)

STU: [Ungdomsuddannelser Ungdomsuddannelser \(brk.dk\) BORNHOLM – Tagaskolen](#)

Regional Municipality of Bornholm entrepreneurial plans: [Politikker Erhvervspolitik og -strategi \(brk.dk\)](#)

Bornholm entrepreneurs: [Microsoft Word - Bornholms nye iværksætterånd endelig-kopi.docx \(ogtal.dk\)](#)

Options for funding:

- [Stor pengepulje fordelt: Nu udlodder BEOF igen sekscifrede beløb \(tv2bornholm.dk\)](#)
- [Erhverv Bornholms Erhvervsfremmepulje fremmer erhvervslivet på Bornholm \(brk.dk\)](#)
- [Bornholms Erhvervsfond - Business Center Bornholm](#)

Actors and projects:

ACAB: <http://acab.dk/en>

Baltic Energy Island: <https://balticenergyisland.com/>

Beyond Waste: <https://www.cebeyondwaste.eu/projekter/genbrug/C75-reuselab-bornholm-enskalerbar-socialokonomisk-model-for-lokal-genbrug-og-reparation/>

Bornholm test island: [Bornholms Erhvervspolitik.pdf \(brk.dk\)](#)

Bornholm Regional Municipality public purchasing policy: [Udbuds- og indkøbspolitik for Bornholms Regionskommune 2021-2024](#)

Bornholm Regional Municipality not allowed to favourise local produce: [Kommunen må ikke favorisere lokale leverandører](#)

Bornholmske Borgerforeningers Samvirke: [Bornholmske Borgerforeningers Samvirke](#)

Business Center Bornholm: <https://businesscenterbornholm.dk/>

Bright Green Island: <https://businesscenterbornholm.dk/nyheder/bright-green-island/>

Campus Bornholm: <https://www.campusbornholm.dk/>

Ceramicist Christina Schou: [Christina Schou Christensen Keramik](#)

Dansk Håndværk: <https://dhv.dk/tid-til-haandvaerksmaessig-fordybelse-paa-bornholm/>

Dewdrop Tiles: <https://dewdroptiles.dk/genbrug/>

DN: [Verdens første affaldsfrie samfund på Bornholm? - DI](#)

DTU Residential College on Bornholm: <https://businesscenterbornholm.dk/nyheder/fremtidens-energiloesninger-skal-udvikles-paa-bornholm/>

Energiø Bornholm: <https://www.energiobornholm.dk/>

FGU: <https://fgub.dk/>

Friskoven: [Vision | Friskoven](#)

Folkemødet: <https://folkemoedet.dk/en/participate/why-visit-and-participate/>

Grønt Dialogforum: <https://brk.dk/Indflydelse-Politik/Borgerinddragelse/Sider/Gr%C3%B8nt-dialogforum.aspx>

Hammersly: <https://www.hammersly.dk/om-os>

Hephæstus and BOFA: <https://bofa.dk/hephaestus/>

Hephæstus Consortium: <https://hephaestuscraft.eu/consortium/>

KADK Bornholm: <https://kglakademi.dk/da/kontakt-kglakademi-design-bornholm>

Lærlingenes Hus: <https://www.laerlingeneshus.dk/ideen-bag-projektet/>

Maker's Island: <https://makersisland.bornholm.dk/>

Møbelfabrikken: <https://www.xn--mbelfabrikken-bnb.dk/>

Møbelfabrikken and lack of funding and support: [Fortsætter uden tilskud: 'Bliver på bekostning af min løn' \(tidende.dk\)](#)

Østpaa: [Om | ØSTPAA](#)

RE-EMPOWERED: <https://www.beof.dk/testisland-bornholm/aktuelle-projekter/vedvarende-energi/re-empowered>

Repair Cafe Danmark: <https://repaircafedanmark.dk/>

Rønne Theater: [Nyheder » Rønne Theater styrker bæredygtighed med EWII's støtte » Bornholm.nu](#)

Sensemakers: <https://sensemakers.dk/>

SYMSITES: <https://bofa.dk/symsites/>

Triennale European Ceramic Context 2024: [Oplev fremtidens bæredygtige keramik | Det Kongelige Akademi](#)

Zero Waste Bornholm innovation platform: www.zerowastebornholm.com