Cradle to Cradle Islands

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Interreg projects boosts of knowledge developments

Interreg projects boosts of knowledge developments. Over the past few years the province of Fryslân has participated in around 25 Interreg projects. Projects that stand for creative, innovative partnership projects involving countries or regions in the European Union. Through the Interreg programme the European Union wants to find innovative ways to make the most of territorial assets and tackle shared problems of Member States, regions and other authorities. In many cases the projects have acted as boosters of knowledge and new developments both in Fryslân and in the participating partner countries. In one of these projects, the Interreg IV B project ‘Cradle to Cradle Islands‘ we were able to cooperate with 22 regional partners from 6 European countries around the North Sea and also partners from New York and the Baltic Sea. This was a successful cooperation resulting in a good mix between the new member states and the more developed regions. We were inspired by the support the Interreg Program provided. Together we worked on specific - and quite often common - subjects to learn and exchange knowledge and experiences. All project partners worked hard on their activities and we achieved good results. Cradle to Cradle Islands was nominated with four other projects for the European Regio Star Award 2013.

I am very proud to say that the Province of Fryslân was Lead Partner in this project.

Vice governor of the Province of Fryslân
Mr. Hans Konst
Biological nutrients should be available for re-use either in the natural environment or for human use. But also closing water cycles and making use of solar, wind energy and others fits into this approach with the qualification that the material side still has to be developed.

In the Cradle to Cradle Island (C2CI) project all the activities are executed within parameters of the Cradle to Cradle® approach. Were possible the principles are used, and if not possible they function as a guide for the most sustainable present solutions.

Framework and central aim

The international project Cradle to Cradle Islands took place within the framework of the Interreg IVB North Sea Region program. This European program promotes economic growth and sustainability in the North Sea Region and focuses on economic as well as social integration of the European member states around the North Sea. These aims should be worked on by territorial cooperation within the program’s priorities. One of the priorities of the Interreg IVB program was promoting environmentally-responsible energy production practices.

The islands in the North Sea Region are facing many common problems: geographical isolation, a lack of local resources in the field of energy, materials and water supply, high tourism pressure on resources and the environment by tourists and declining populations.

The main goal of the Interreg IVB project Cradle to Cradle Islands was to develop innovative solutions in the field of energy, water and materials for a sustainable future, using Cradle to Cradle® principles as a guide. The project was aiming to speed up the development of new energy related technologies and strategies, increase their uptake and through partnership ensure their safe, efficient and sustainable adoption, thus promoting economic growth and sustainability of the North Sea Region.

This general objective was pursued through the application of the Cradle to Cradle® approach by 22 partners from six countries around the North Sea. Ten islands located in the peripheral regions of the North Sea area, all lacking resources, cooperated in three development clusters; the three main issues Mobility, Water and Materials, each linked to the Energy issue. The islands all were excellent demonstration sites. Within this project the islands functioned as catalysts for new developments and testing grounds for sustainable innovations. The partners cooperated from January 2009 until the end of 2012 on creating local decentralised solutions. Total budget of the project was € 4.0 million (50% European funding, 50% co financing by partners).

The islands served as innovation centers, where research institutes and companies experimented with new technologies, thus accelerating innovation. A network was created for the exchange of knowledge and collaboration between all institutions involved, companies and stakeholders.

About Cradle to Cradle®

The Cradle to Cradle® (C2C) approach was developed by Michael Braungart and William McDonough as a new way of thinking: we should stop making ‘less bad’ products and start designing intelligent products and materials, that can be used over and over again in biological or technical cycles. In this vision the concept of waste doesn’t exist anymore: ‘waste is food’.

The Cradle to Cradle® design process, making use of technical “nutrients”, focuses on improving quality, which makes products more commercially successful, healthy for users and beneficial for the environment as well as for future generations.
The islands, situated in the most peripheral regions of the North Sea area, do their best to make use of their own regional qualities. All of them are lacking resources like water, energy and materials. This situation makes them good catalysts for new developments and testing grounds for sustainable innovations. During the execution of the project they functioned as demonstration sites providing a basis for (world wide) implementation. As the lead partner of the project the Province of Fryslân offered them a good platform.

Cradle to Cradle Islands resulted in a number of attractive and innovative results regarding the project’s three main themes Mobility, Water and Materials. Each of the themes was related to the Energy issue. Some of the most appealing project results are described below.

European Regio Stars Awards 2013
The ‘Europe 2020’ strategy has set the objective of sustainable growth seeking to promote a more resource efficient, greener and more competitive economy while boosting sustainable growth at regional and local level.
The project Cradle to Cradle Islands was nominated for the Region Star Award 2013 of the Interreg IVB Programme in the category of Sustainable Growth. The Annual Award, running for 6 years now, recognizes best practice in regional development and the best use being made of EU co-investment to boost innovation and create economic growth. The finalists chosen are original, pioneering projects, supported by EU Structural Fund.

The Cradle to Cradle Islands project was presented in Brussels by Hans van Meerendonk as the Lead Partner of the project. Finally the Cradle to Cradle Islands project did not win the price. The project ENWORKS Resource Efficiency Support was the winner. Cradle to Cradle Islands received a certificate from the Luc van Brande, member of the Comité of the Regions and Johannes Hahn, member of the European Commission in charge of Regional Policy at the presentation of the 2013 Regio Stars Awards to Europe’s flagship forward-looking projects.

Interactive Energy SWOT Tool, Sweden
All participating islands were eager to identify solutions leading to sustainable innovations. This Interactive SWOT TOOL was developed at the University of Aalborg by Bernd Möller and Karl Sperling,

The Interactive Energy SWOT Tool serves monitoring questions concerning energy production on the isle of Samsø. Introduced to the Cradle to Cradle Islands project this model was adapted to local conditions on the participating islands, thus serving as a method for identifying demands as well as opportunities at the individual islands and for all the islands as well. The original Samsø model is divided into Energy Sources, Energy Supply and Energy Services. As each change to any of the technologies used in each
Eternal Holiday House, Ameland

An existing holiday house located on the Dutch island of Ameland, was upgraded to become the Eternal Holiday House. The ‘Eternal Holiday House’ is energy- and water positive. More energy and clean water is produced than consumed in the house - without decreasing the level of comfort and health standards. Material choices are made taking into consideration the Cradle to Cradle® philosophy.

This Cradle to Cradle® Holiday House was developed and realized through cooperation by the Municipality of Ameland, Wetsus, Delft University of Technology, Wetterskip Fryslân, VITENS and Duurzaam Ameland (Sustainable Ameland)

The island of Ameland has 3.500 inhabitants and 550.000 visiting tourists a year. Water saving is one of the most important environmental issues. Drinking water company Vitens has to import almost all drinking water from the mainland. A decentralized water concept was demonstrated and tested, based on reduction of water and energy use and on nutrient recovery through separation at source. Domestic waste (water) streams were divided into black water (toilet water: faeces and urine), solid kitchen waste, grey water (originating from showers, bath, laundry etc) and rain water. A vacuum toilet, kitchen grinder and recycle shower were installed in the house. Wireless equipment was installed to measure the real reduction in use of water and energy. A digester was installed to produce biogas (methane) of the black water and organic kitchen waste collected by the grinder. The biogas can be used to light an outdoor gas lamp.

Materials used for the renovation of the holiday house such as bathroom tiles, carpets, other furniture as well as consumables such as shampoo and soaps have been chosen according to C2C criteria wherever possible. In the rebuild bathroom in the house C2C certified tiles (category silver) from Mosa (www.mosa.nl) were used.

This pilot project resulted in a very interesting new DESAH-project (Decentralised Sanitation and Heating) in the city of Sneek, called ‘Waterschoon’ (Water beauty). A new quarter of 250 houses with a decentralized water system was built. The opening ceremony of this appealing water saving project was performed by the King of The Netherlands Willem Alexander van Oranje, chairman of the Independent Advising Group Water and Sanitary supplies of the United Nations and chairman of the Dutch Advising Commission Water.

of the subsystems will have consequences in other parts of the energy system, the connectedness of energy flows and technology choice will become visible. The simple model design chosen reduces the amount of input data to a minimum.

The model of Samsø has been used by the partners of the C2CI project in two ways. Firstly, it is a way to learn how future energy systems with more efficient energy services, improved energy supply and with increased shares of renewable energy work. After some playing with this simple tool everybody should be able to evaluate the workings of energy system transitions. In this way the model is at the same time meant as a pedagogic tool for learning about energy systems as part of a cradle to cradle process. The second way the model was used in the C2CI project was by using it as a template for building individual models for the participating islands. This common interactive model provided good opportunities for analysis across the islands, for development and capacity building through experimental learning based on Cradle to Cradle®-thinking.
Picnic set: a unique experience

The island of Ameland is looking for its own identity regarding recreational activities and tries to position itself compared to the other islands. Tourists mostly pay very short visits to the island and within this short period they seek a unique experience, an experience you can tell stories about back home.

Furthermore a variety of local food and drinks is produced on the island. These facts were collected among others during discussions with entrepreneurs knowing the market but also with inhabitants of the island of Ameland. Adding up these facts resulted in the concept of the picnic set.

The picnic set was designed by Sven van Klaarbergen student on the Delft University of Technology. The starting point for this design was a lunch box, for your own backpack. However it turned out to be a little bit bigger for a complete lunch.

The set includes two drinks, two sandwiches, two peaces of rye bread and a bunch of different cookies, drinks below and food on top. A romantic version with a bottle of wine in the middle and some snacks, or a smaller version for children are also possible. The design is based on the lighthouse of Ameland, which will match Ameland because of its appearance. Tourists really like it looking like an iconic building of the island they visited.

Cork, the material used is lightweight, water resistant and cheap. Holding the set like a briefcase, the cords will then close the product. It is insulating the food content. Once empty the bucket will be fun as a toy on the beach, like a bucket to make castle shapes, but instead you build a lighthouse. It floats on the ocean so it can also be used as a bucket to transport water providing additional fun functions for children.

Cork can be shredded and then pressed again to a container. Cork is very useful for composting underground, keeps moist inside the compost, speeds up the process and slowly comports itself.
The Vrachtfiets (Cargo Carier) is an electric driven modular system. Its reach matches with the normal electric bike. The concept was developed by Onno Sminia and Louis-Pierre Geerinckx of Delft University of Technology and it was tested by camping Klein Vaarwater on Ameland.

The Vrachtfiets will be a very effective tool to facilitate services on camping sites. Not only within the camping sites, but also outside the site the Vrachtfiets can fulfill other useful functions. The Vrachtfiets provides easy transport for tourists traveling with their luggage from the ferry boat to their destination, thus making a car superfluous. Furthermore the Vrachtfiets is suitable for other recreation activities and will probably fit biking by physically handicapped people. The municipality of Ameland is working out a program ‘Ameland voor iedereen’ (Ameland for everybody) with the aim of reducing problems for handicapped inhabitants and tourists. Adding more charging points, for example near museums or beach restaurants, then will be advisable.

The Vrachtfiets can function as a promotion tool for the companies hiring out bikes. The concept will support the island’s intentions to become self supporting in 2020, while the Vrachtfiets will strengthen the island’s sustainable image.

Developing and testing de Vrachtfiets provided Delft University of Technology with a lot of publicity, which has resulted in establishing a private company by Onno Sminia and Louis-Pierre Geerinckx. IKEA Delft bought two examples and the Vrachtfiets can now be rented there. Mail delivery Delft is also working with this cargo bike serving post in the city’s narrow streets.
Beach Activity Centre, Ameland

A Beach Activity House has been developed through cooperation between the Cradle to Cradle Islands partners and the participating knowledge institutions. The initiative was taken by Esther Oud, owner of the Outdoor Sportcenter Ameland.

The concept was further developed and improved through cooperation with:
- Melle Koot, Cradle to Cradle® certified designer
- Sebastiaan van der Haar, Cradle to Cradle® certified energy consultant, DHV
- Wetsus
- van Hall Larenstein
- Municipality of Ameland
- Province of Fryslân
- Hanzehogeschool Groningen, building, materials and energy
- Staatsbosbeheer Ameland
- EPEA.

This outdoor sports centre, located on the beach of Ameland, was inspired by and based on the Cradle to Cradle® philosophy. It means that the design of the building, its water and energy supply, food and drinks sold all are produced according to the Cradle to Cradle® philosophy.

The Cradle to Cradle® approach can be recognized among others in the reuse of steel sea containers and wood from the island’s forest for the construction of the building as well as in the Cradle to Cradle® beach furniture on the terrace. The people visiting the centre are actively informed about the specific character of this centre and about the Cradle to Cradle® principles. The centre functions as an inspiring example for tourists, locals and businesses.
Furniture for the provincial hall, Leeuwarden

In Fryslân a new Provincial Hall was built and completed in 2011. The provincial organization intended to make it’s new build office as environmentally friendly as possible. This intention was implemented by means of different measures.

Regarding furniture for instance, most pieces of furniture are constructed in a way that they can be re-assembled at short notice. As a result all pieces of furniture can be put at any point in the building. Wooden desks, cabinets etc. are made out of waste wood. Another very appealing measure taken is that all waste paper produced in the office is being recycled and returns into the building as toilet paper, called Satino Black. For this measure the Province cooperates with van Houtum in Swalmen the Netherlands, which is a Cradle to Cradle® certified company by EPEA sinds 2010.

To stimulate consciousness among people working in the Provincial Hall Cradle to Cradle® cleaning liquids are used and Cradle to Cradle® products are used as presents and given to business acquaintances.

Roosevelt Island, New York

The involvement of New York stakeholders in C2CI demonstrate the value and worldwide ambitions of the project. The NY contacts started in 2009, as part of the celebrations NY 400 between New York and The Netherlands.

During the H2O9 Forum workshop ‘Decentralized and Self Sufficient Water Systems’, organised by the Province of Fryslân, interest was gained from the NY Roosevelt Island (RI) authorities. Under the flag of the Province of Fryslân the spatial planning company Urban Answers in NY joined the project with support of the RI authorities and with permission of the Interreg IVB North Sea Programme. A feasibility study was carried out on Roosevelt Island and in September 2011 a broad workshop ‘Innovative Solutions in Water and Energy Technology for Quality of Life’ with NY stakeholders (Governmental, Companies and Universities) was organized in Fryslân. The success of this workshop has led to the initiative of the RI authorities to develop a 10-years plan how to implement C2CI-results on Roosevelt Island.

Two traces are running at the moment: the involvement of a New York University to the University Campus Fryslân and the investigation of possibilities for pilot projects on Roosevelt Island.
A Smart Grid is an electricity network that uses digital technology to monitor and manage the generation and transport of electricity from all sources in order to meet the varying electricity demands of end users as efficiently as possible.

Fryslân has huge ambitions aimed at making the energy use more sustainable, reducing dependence on fossil fuels and limiting the associated CO₂ emissions. It also has specific focus on generating renewable energy from green gas, wind, sun, ground source heat and ambitions to increase electric driven boats to 3000 in 2015.

Uchechi Paddy Obinna is a PhD student on the University of Twente. He is working on a study aimed at mapping out potential scenarios for sustainable energy production on and around the Frisian lakes and the development of a methodology to determine the necessary and desired functions of intelligent networks, the so called Smart Grids.

The research will examine the quantity and suitable location for implementation of sustainable energy (solar, wind, micro-CHP), the intelligent functions that will have to be added to the relevant networks (electrical, gas, heat) and the parameters that will be needed to describe this and what their ranges are.

The investigation will include a study where the level, variability and allocation of the energy demand in the water sector will be inventoried for today and into the future. This will include the development of scenarios for the future water sector, where electricity-driven water transportation can take various shapes. The current supply of solar, wind and other sustainable energy sources in the province of Fryslân will be mapped at the same time.

The results will be included in a simulation model. One (of many) consideration in this will be the criteria related to linking energy supply to energy demand, the cost of generating energy and the reduction in CO₂ emissions. This information is utilized in order to systematically develop ideas for new product-service combinations that will become possible by the introduction of Smart Grids in the water sector in Fryslân.

The deployment of smart grids on and around the waters in Fryslân could help to ensure energy efficiency, reduce the carbon dioxide emissions associated with energy generation from fossil fuels and further the energy transition ambitions of the province.
The University of Oulu has responsibility for supporting the regional development and the wellbeing of the Northern part of Finland, where demographic changes affect mostly the peripheral areas. Sustainable development, conservation of cultural heritage and its possibilities for future development as well as usefulness and openness for innovative solutions are typical for the development of the islands and the region in general.

In the Varjakka area a new concept has been developed, combining the historic old cultural environment and recreational tourism with nature. The project aim was a rescue and renovation of nationally valuable cultural buildings in an ecological sustainable way. On the long term development of Varjakka islands and Hailuoto as a sustainable tourism center and learning environment (historical, natural and seaside attractions and themes). This project was part of a broader Oulunsalo Inspiria project; creating new ways of working/living environments. The concept was developed and realized through cooperation between:
- University of Oulu
- Municipality of Oulunsalo, companies
- Municipality of Hailuoto

A number of interesting studies have been executed to support implementation of concrete project plans.

Among others generating geothermal energy from the sea sediments, the use of wood and pellet and furthermore green energy from windmill parks from the region. On the field of water sustainable handling of liquids and dry compost toilets were studied and regarding materials the use of wood and sustainable procurement were the central issues. Furthermore technology on the field of lighting and reducing water use has been studied. Real time monitoring and visualization of energy use were also important tools to be studied and developed.

As the founder of the Cradle to Cradle concept Michael Braungart invited Taiwan to participate in the Cradle to Cradle Islands project. The Minister of EPA in Taiwan, Stephen Shu-hing Shen therefore signed an invitation to express Taiwanese commitment to identify a number of steps towards the Cradle to Cradle® goals.
WISLE.org: a secondary network

The Cradle to Cradle Island project got worldwide attention after it had been launched in February 2009. Numerous articles and publications had been issued and lots of islands worldwide showed their interest in the project.

To be mentioned here are Roosevelt Island in the USA, Oulu Hailuoto Island in Finland, Taiwan, Australia University of Melbourne, Thailand and Starteiland Sneek. Furthermore the islands Bonaire, Curaçao, Saba, Saint Eustatius, en Sint Maarten on the Nederlandse Antillen.

This opened the possibility to develop a secondary network including the new partners inside- as well as outside the EU. The purpose was to extend the network of existing partners for further spreading the Cradle to Cradle® concept. This network, first named as C2CI Knowledge Exchange Network (KEN), provided the opportunity to share and exchange information and benefit from the C2CI project results during the project as well as after the project ending in 2012, thus stimulating dissemination of the project results and future implementation.

For an extension of the network new communication tools had to be developed. Various innovative ICT’s and appropriate (social) media are available for fast and effective communication and for interactivity among the network partners. However for purposeful working on raising worldwide awareness about the C2CI project and the Cradle to Cradle® concept a new website was created by an external webdesigner.

A group of experts including the project partners among others the Lead partner together with several universities and EPEA functioned as a counseling group. Governmental organisations, knowledge institutions, (private) companies, and other relevant stakeholders cooperating in clusters aiming at stimulating and facilitating the future implementation and dissemination of the C2CI approach functioned as the target groups of KEN.

The website WISLE.org was launched at the activity for the European Day on 13 May 2011.
Background of the project

Islands around the North Sea face many similar problems. In wintertime they have a limited population, while during the summer season most of them are flooded with tourists. This means great pressure on resources such as water and energy. Among the island population this creates an increasing urge for self-sufficiency in energy, preferably renewable energy that does not threaten nature and landscape. Especially nature and landscape are important resources benefiting tourism, which is their most important source of income.

In 2007 the Dutch islands signed a common Ambition Manifesto aiming at complete self-sufficiency in 2020 aimed at realising activities regarding the four central theme’s of the project, sustainable mobility, energy efficient building, green gas and water and energy). These isles planned cooperation with regional governments, companies and knowledge institutions. International cooperation was also seen as a very important opportunity to learn from other experiences.

Most islands around the North Sea are dependent on the main land in terms of water and energy resources. At the same time, almost all islands call for self-sufficiency in energy. The Cradle to Cradle® project responded to this situation by helping the islands to create innovative solutions for water, energy, and materials using Cradle to Cradle® principles. By applying the Cradle to Cradle® concept they associated with the world wide trend for more sustainability and they took profit from the economical chances this concept offered. At the same time the isles functioned as excellent labs for experimenting with new technologies, thus being a catalyst for innovation.

The outcomes were directly applied on the islands themselves, but can also be transferred on the national and world wide level.
The Province of Fryslân acted as the Lead Partner in the project. The theme related studies have been carried out basically in the involved knowledge institutions. EPEA (Environmental Protection and Encouragement Agency Internationale Umweltforschung GmbH) in Hamburg played the role of scientific expert, coach and jury of the entire Cradle to Cradle activities in the Cradle to Cradle Islands project. The activities of the three Development Clusters were led by the specific knowledge institutes EPEA and Wetsus, in cooperation with the universities of Delft and Aalborg.

Each project partner cooperated in one or more development clusters:

1. Development Cluster Energy/Mobility
   This cluster was led by Delft University of Technology in cooperation with the University of Aalborg. The other cluster partners were: PURE Energy Center, Province of Fryslân, Wetsus Water technology, Insel- und Halligkonferenz and the University of Zeeland. The participating islands were Samsø, Tjörn, Anholt and Spiekeroog.

2. Development Cluster Energy/Water
   This cluster was led by Wetsus Water technology. The other cluster partners were: Vitens, OOWV in cooperation with the Municipality of Spiekeroog, IRRI and Frisian Waterboard/Wetterskip Fryslân. The participating islands were Ameland and Spiekeroog.

3. Development Cluster Energy/Materials
   This cluster was led by EPEA. The other cluster partners were: Delft University of Technology, Insel- und Halligkonferenz, Runde Environmental Centre, HZ University of Applied Sciences, Storvagan Environmental Centre. The participating islands were Föhr, Pellworm, Runde and Lovoten.

The Province of Fryslân had a leading role regarding the set up of incubator centres on the islands. The Province also took the initiative to establish a transnational C2CI Network of governmental organisations, knowledge institutions, companies and other relevant stakeholders. As a part of each transnational meeting the activities and task of this Network was discussed and developed. This work resulted in an operational network that will further implement and disseminate the project results.
To meet the complete range of problem areas relevant regarding a Cradle to Cradle approach on the islands the issue of energy has been related to three central issues; Mobility, Water and Materials.

This made the project partners distinguish three development clusters. Within these clusters the relevant issues have been worked out during the project period. Each development cluster included several issues to be developed.

1. Cluster Energy/Mobility
   • Testing and applying the concept of ‘Blue Energy’, mixing salt water and fresh water in order to produce electricity for island environments.
   • Investigate the increased use and feasibility of renewable energy sources like solar, wind, wave and tidal energy.
   • Designing and testing sustainable product services for island mobility, e.g. the Cargo Bike and monitoring systems for water and energy use.
   • Optimizing sustainable transport between and on the islands.
   • Linking energy savings to the modernisation of housing, e.g. Multi House an integrated institution to benefit community and social life for different target groups.

2. Cluster Energy/Water
   • Sustainable supply of drinking water by desalination of sea water.
   • Sanitation and separation of household water in several streams.

3. Cluster Energy/Materials
   • Design of an Eternal Island Holiday House: energy producing, made with local materials, transportable and degradable.
   • Set up of an innovative Research Centre on Biopolymers to adapt for instance environment polluting plastics into new in water dissolvable environmental friendly products and to make use of local available resources like algae.
   • Local production with the innovative materials, e.g. Phillips Lifestyle Cradle to Cradle® sustainable products and a Cradle to Cradle® Picnic set.
   • Cradle to Cradle® solutions for the local marinas and surrounding buildings.

   • Purification and re-use of the effluent of waste water treatment plants.
   • Storage of rainwater underground during winter times to realize sustainable water supply in summer. (Aquifer Storage and Recovery).
Results on the islands

The activities leading to tangible results mainly took place on the islands of

- Ameland, The Netherlands.
- Texel, The Netherlands.
- Shetland Islands, United Kingdom.
- Spiekeroog, Germany.
- Föhr and Pellworm, Region Uthlande Germany.
- Samsø, Denmark.
- Tjörn in cooperation with Astol, Dyrön, Tjörnskalv and Härön, Sweden.
- Runde, Norway.
Texel, the Netherlands
LED lighting on solar energy

13,644 inhabitants.
Surface area: approx. 170 km²

Texel is the biggest and most populated of the islands in the Wadden Sea and also the westernmost archipelago, which extends to Denmark. The dune landscape on Texel is a unique habitat for wildlife. Texel is known for its wildlife, particularly in winter, when birds of prey and geese take up residence. About one third of Texel is a protected nature reserve.

On the basis of road safety, social security and liveability a practical directive has been determined for the application of public lighting. An executing plan focusing on sustainability and darkness provides LED lighting and generation of energy by means of solar panels. This contributes to the aim of Texel foreseeing in its own energy need by 2020, while darkness then should be accepted as a core quality. Texel hopes to set an example and inspire the many tourists who visit the island and stimulate other governments and organisations as well.

Project leader: Municipality of Texel, Bert Dennenberg. Partners: Texel Village councils of Den Burg, Den Hoorn, De Koog, De Cocksdorp, De Waal, Oosterend and Oudeschild, Delft University of Technology, EPEA International Umweltforshung GmbH.
Ameland, the Netherlands

3,533 inhabitants.
Surface area: approx. 59 km².

In order to ensure that future generations can also enjoy the island’s unique qualities, Ameland aims to add sustainability to its strategy to improve nature, create awareness among residents as well as among tourists and develop a new kind of tourism on Ameland. To achieve the sustainability goal, Ameland entered several agreements:

**Sustainable Ameland:** Since 2007 the municipality of Ameland has an agreement with three private companies, Eneco Energy, Gas Terra and the NAM (Dutch Earth oil Company). They agreed to make Ameland a breeding ground for innovative sustainable developments.

**Sustainable Wadden Isles:** Ameland signed also an agreement with all five Wadden islands and the provinces of Fryslân and Noord Holland, to make all Wadden islands (sustainable) self-supporting (in water and energy) by the year 2020.

**Energy-agreement:** An agreement was closed on between the local, provincial and central government about sustainable energy, CO2 reduction and innovative projects in the north of the Netherlands. The project can help the isle to achieve the objective of a sustainable Ameland in the year 2020.

**Eternal Holiday House**
An existing holiday house located at the Dutch isle of Ameland, was upgraded to become an “Eternal Holiday House”, a house which is energy- and water positive, i.e. produces more energy and clean water than is consumed in the house itself - without decreasing the level of comfort and health standards, taking material choice into consideration in the Cradle to Cradle® philosophy.

**RENOVA/RESEO-tool**
Developed by Delft University of Technology RESEO stands for Renovation Strategy for Energy Optimisation of holiday houses in the North Sea islands, inspired by Cradle to Cradle. RESEO provides 6 steps to energy renovation. It is part of the RENOVA Decision Tool and can be used as a guide and a database on energy renovation.

**Cradle to Cradle Beach Activity House**
This outdoor sports centre was build with reused sea containers. Water and energy supply as well as food and drinks sold all are produced according to the Cradle to Cradle® philosophy. Wood from the island’s forest was used for the beach furniture on the terrace. People visiting the centre are actively informed about its specific character of this centre and about the Cradle to Cradle® principles.

**Vrachtfiets, Cargo Carrier**
Developed by Delft University of Technology the ‘Vrachtfiets’ is an electric driven modular system and a very effective tool to facilitate services on camping sites. The ‘Vrachtfiets’ also provides easy luggage transport for tourists, thus making a car into a superfluous tool. Furthermore the ‘Vrachtfiets’ is suitable for other recreation activities and will probably fit biking by physically handicapped people. The concept will support the island’s intentions to become self supporting in 2020 and strengthen the isle’s sustainable image.

**Picnic set**
Looking for its own identity regarding recreational activities Ameland asked Sven Klaarbergen, PhD student on Delft University of Technology, to develop a Cradle to Cradle® Picnic set, containing a variety of local foods and drinks. The design is based on the lighthouse of Ameland and carries Cradle to Cradle® characteristics being made of cork. Having a picnic using this set makes a stay on Ameland into a unique experience.

**Lake Grevelingen, the Netherlands**

| 381,000 inhabitants (Zeeland). | Surface area: approx. 1790 km² |

**Cradle to Cradle® Marina**
The Cradle to Cradle® Marina of the Future along one of the dykes of the Delta Works will be realized in 2015. This marina will be built on new land and partially on floating pontoons. Several design studies have been started, like the design of the harbor master offices, climate friendly holiday accommodations, the design of pontoons and a study focusing on possibilities to enhance biodiversity by means of artificial reefs for fishery and for breeding local food.

**Project leader**: HZ University of Applied Sciences, Brigitte Pommée. **Partners**: Province of Zeeland, Marina Yachting Consultancy, Marina Port Zélande, Delft University of Technology.

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**Pellworm, Region Uthlande, Germany**

**Climate friendly holidays**
Through consistent energy-saving measures Pellworm aims to further increase and market its already existing energy surplus using an up-to-date energy concept, preferably become a regional power supplier for the islands. Climate friendly holiday accommodations were designed.

1,041 inhabitants.  
Surface area: approx. 37 km²

Uthlande encompasses the North Frisian islands Amrum, Föhr, Pellworm, Sylt and Helgoland. The region has 34,000 inhabitants.

**Project leader**: Insel und Hallig Konferenz, Annemarie Lübcke. **Partners**: Spiekeroog Sylt, Föhr, Amrum.

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**Spiakeroog, Germany**

| 814 inhabitants. | Surface area: approx. 18 km² |

**Energy and Climate Protection Concept**
The isle of Spiakeroog has very specific nature and culture characteristics. With regard to this special situation the Energy and Climate protection Concept was developed to make the isle self sufficient on the field of water supply and on the long term become independent from the mainland. The Energy Swot Analyse Tool developed by Aalborg University was integrated in the concept as well as the design of an Energy Efficient Swimming Pool elaborated by Delft university of Technology.

The project results demonstrate that sustainable use of energy is also possible in areas with a high state of nature and culture protection. The results of the concept can be transferred to other islands or regions with a comparable sensitive landscape.

**Project leader**: Municipality of Spiakeroog, Birgit Schade. **Partners**: EPEA, OOWV, Region Uthlande, stakeholders Spiakeroog, Nordseebad Spiakeroog GmbH, University of Oldenburg, Aalborg University and Delft University of Technology.
Shetland Islands, United Kingdom

21,940 inhabitants on 15 islands.
Surface area: approx. 1,466 km²

Sustainable wool processing mill
An old industrial building was redeveloped into a wool processing mill enabling processing local wool in a low carbon manor, using solar water heating and wind power. This does not only reduce the operating overheads of the wool mill, but will also significantly improve the sustainability of its end use products. In this way re-development of a disused commercial building and the deployment of the first integration of rain water recycling into a local community owned commercial project will be realised.


Valhalla Brewery
To reduce energy costs along with significantly reducing the associated CO₂ emissions an initial study into the energy requirements of the site and proposed solutions was made. Also an abandoned military building was redeveloped to be used as an advanced energy efficient brewery. The project integrated wind turbine technology and heat pump technology to significantly reduce the demands for carbon based energies. Thus increased brewing capacity was accommodated with greatly enhanced sustainability both in terms of water use and energy use.

Project leader: Sonny Priest

Cradle to Cradle Islands Facebook Game
The Resource for Life Program was designed and delivered in two schools in deprived areas around Edinborough. The programme is teaching new skills with help of 4 modules; Food, Recycling, Water and Energy. The C2CI Grendle Game helps increasing awareness regarding principles of Cradle to Cradle® products and production. It shows that initial investment in production processes can benefit to many levels, such as sustainability, waste and use of energy.

Project Leader: International Resources and Recycling Institute (IRRI), Nick Lyth. Partner: Grendel Games, EPEA
Föhr, Region Uthlande, Germany

8,600 inhabitants.
Surface area: approx. 82 km²

Repowering wind energy
The island of Föhr aims to facilitate increased use of wind energy and produce as much renewable energy as the islands needs.

Föhrer Wasser
Although the island has sufficient and good quality groundwater, drinking water is transported from the mainland. The isle of Föhr developed models for a water circle for ground water. Producing drinking water on the isle itself will contribute to reduction of CO₂ production from traffic caused by transport of water bottles. A special bottle containing drinking water produced on the isle, Föhrer Wasser, provides good opportunities for promoting the isle of Föhr.

Project leader: Insel und Halligkonferenz. Partners: the local population.

Samsø, Denmark

4,003 inhabitants.
Surface area: approx. 114 km²

Samsø is the official Danish energy island. This island already produces more energy than the inhabitants are consuming. Samsø Energy Academy (SEA) is the knowledge resource centre where Samsø’s know-how and experience with the Danish energy island’s renewable energy projects is organised and mediated. From on-shore and off-shore windturbines and straw-based district heating to solar collectors and canola oil tractors, as well as the island transition to an energy island. Cradle to Cradle® is now part of their sustainable thinking and planning of new buildings and installations.

Within the C2CI project Samsø established 12 dwellings for scientists and researchers. Passive house standard and Cradle to Cradle® building materials are other important issues.

A central biogas plant was build to utilize biomass from all available resources such as waste, farm manure and bio energy crops.

Tjörn is a rocky island located near Gothenburg, on the Swedish west coast archipelago. Tjörn is easily reached from all over Scandinavia. One of Tjörn’s most current questions today is how the island will cope with the future energy supply and concurrently to handle the consequences of the climate change. New technology, innovation and lifestyle changes within transporting are important in order to decrease environmental impact and the carbon dioxide wastes. Use of energy of Tjörn municipality decreases but the traffic increases.

In a national perspective, a decision was made in 1997, to facilitate the adaptation to an ecological and financially sustainable society. In a regional perspective Västra Götalandsregionen has lined up regional environment qualities in order to decrease environmental impact and to develop a sustainable energy and transport system. In this project Tjörn’s activities will be:

- to investigate applications of new forms of energy and mobility focusing on solar, tidal and wind energies, and innovative transport means on and to the islands;
- to exchange experiences with other islands and partners in the project within areas of new ways of energy supply, energy efficiency improvement, energy effective buildings and environmental management systems as well as sustainable infrastructure, information and education.

**Project leader:** Municipality of Tjörn, Ida Mattfolk. **Partners:** Lund University, Aalborg University, Delft University of Technology, Wetsus Water technology, EPEA.
Runde, Norway

Runde Environmental Centre (REC) is a new research and educational facility in the process of being established on the island of Runde on the west coast of Norway. The island is a major international tourist attraction. REC is conducting research on marine and terrestrial environmental issues, facilitates environmental education - for professionals, universities, schools and the general public, highlights the significance of the diverse environments of the area through its educational visitor centre and provides logistical support for researchers and others interested in the environment. REC is identified as a competence centre for alternative ocean energies in the region, and is committed to playing a role in different spatial contexts. In addition, the new building of REC, was designed and constructed to the most modern and energy-efficient standards, financed as a pilot project from the Norwegian government.

REC acts as a catalyst for environmental sustainability on the island of Runde, within the region and beyond. The activities REC is working on are:

- Developing and testing renewable and local sources of energy, e.g. wave energy, wind energy and biofuels.
- Testing a variety of alternative ‘green’ technologies, regarding renewable energy, waste recycling and resource conservation, e.g. heat exchange systems and vacuum toilets.
- The REC building will serve as a model for implementing sustainable technologies in energy, waste and sewage treatment.
- Developing alternative building materials and designs based on Cradle to Cradle® principles.
- Increase infrastructure and opportunities on the island to reverse the migratory trend away from the island.
- Developing alternative tourism models based on Cradle to Cradle® principles.
- Developing a data base on Cradle to Cradle® ideas, strategies and methods.

280 inhabitants.
Runde is a very small island

Conclusions and follow-up activities

Conclusions
The Cradle to Cradle Islands project has been executed very successfully by 22 partners from six countries around the North Sea. The project already resulted in a number of innovative products, described in this booklet. The outcomes can directly be applied on the islands themselves. They can also be transferred to the North Sea Region area as a whole and even far beyond.

The islands now function as research centers and testing grounds for several innovative solutions. Not only these tangible products but even more the specific way of cooperating, in three development clusters characterizes this Interreg IVB project. Cooperation has always taken place in a very inspiring atmosphere. EPEA and the other scientific institutes played a very supporting and inspiring role. The Cradle to Cradle® concept introduced a new way of thinking providing new approaches fitting the individual islands. Ideas implemented and published attract a lot of interest, within Europe as well as from all over the world. Roosevelt Island in New York and Taiwan are good examples of this world wide interest. The extra website launched called www.wisle.org offers an excellent opportunity to continue and expand the fruitful contacts, remain all interested experts and organizations informed and provide a framework for exchange of knowledge and new ideas, now and in the coming years. Thus gaining a deeper understanding of the Cradle to Cradle® concept.

The Cradle to Cradle Islands project has been one of five nominated projects for the Region Stars Award 2013.

Although at this moment the project is closed a number of partners received extra funding to realize their targets. The Cradle to Cradle Islands project has been very successful. A lot of work can be done now regarding sustainability. It is clear that all partners now are working out the Cradle to Cradle® concept in their regions. Furthermore a new application is being prepared for a follow-up of the project in 2014.
D2D is the follow up for the C2CI project and has been launched for the final call for Interreg North Sea. D2D stands for ‘from Development to Dissemination’ and vice versa. D2D starts where C2CI ended, providing the North Sea Region with the means by which project results can be taken through a development process which will secure a viable, self-sustaining commercial future for them. The aim is to enable small and locally developed innovations (during the C2CI and more) to be realized across the North Sea Region.

D2D will bring partners and products out of C2CI to create a new system for the transfer of innovation and knowledge into viable commercial life for the North Sea Region. D2D will create a process based on combined expertise, supported by an investment fund, that will be an innovation in incubation. D2D is focused on pooling together all existing knowledge, so to establish a transnational incubator facility.

D2D offers an extra channel for boosting the adoption and dissemination of C2C inspired Sustainable Innovations in Europe, in terms of sustainable products, services and systems as well as in terms of methodologies for cities, villages, islands etc. to foster local sustainable innovation and business development. The current project aims at implementing the C2CI results on the mainland and other North Sea islands – using D2D sustainable innovation and business accelerator approach.

Transforming the results of the C2CI project to another level via dissemination and further development will maximize the benefits of the work that has already been done and it will increase the usability of the results by making them available to a wider audience and applicable to new target groups. C2CI project results provide a solid background and very good opportunity to achieve more ambitious goals by continuing building on the results and promoting the work to a wider audience. The project adds new beneficiaries, new activities and intends to develop future perspectives for the North Sea Region based on previous achievements. The new project moves forward its success by accelerating sustainable innovations through promotion, dissemination, benchmarking, implementation and new funding possibilities. The D2D project has a budget for 700,000,- euro and will be finished June 2015.

For an other follow up project on the Wadden Islands funding will be purchased in the Interreg IVA programme for cross-border cooperation between Germany and The Netherlands.
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