



# Business Model Analysis

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# 1.Introduction

The “sustainability and long-term effects” workpackage of the EMERGREEN project builds on the previous experiences, outputs and deliverables developed in the project to support the sustainability and long-term effects of the project beyond its end. The WP focuses on exploring ways to exploit the project results and expand them into new regions and services areas, thereby increasing their impact and maximizing their effect. This is accomplished through activities such as the identification of new case scenarios where the services and the technologies tested in the project can be applied for a more effective public services provision, demo sessions to engage with future adopters of the services, and analysis of innovative business models for public services provision in remote areas, which is the aspect of the workpackage that this document addresses.

The business model analysis contributes directly to one of the three main objectives of the EMERGREEN project – becoming a driver for new innovative public services in the NPA. It consists of an analysis of alternatives for technology-led public service provision in remote areas. It considers all the following aspects: community involvement, organisational change, creation of ecosystems comprising reusable technology components as well as the creation of or joining with cooperative marketplaces of technology-led services. The analysis is conducted on a transboundary basis and provides recommendations adapted to the situation of NPA public service providers in remote areas.

## 2. Project Overview

The EMERGREEN or “Emerging Technologies for Greener Communities” is an interregional project funded under the Northern Periphery and Arctic Programme 2014-2020. Commencing in October 2018, six partners from Ireland, Northern Ireland, Sweden, Finland, and Faroe Islands are working together with the goals of strengthening greener communities through new emerging technologies and more sustainable public services provision in remote areas. The common territorial challenge tackled by the project is *how to deliver quality and sustainable public services in remote areas* to overcome factors such as long distances, high service delivery costs due to low demand aggregation, shortages in human and material resources and lack of access to latest innovations. The types of services planned in EMERGREEN also address the challenge of the impact of climate change in the partner regions.

Past experiences show that approaches where the community is involved are a very effective way of delivering more useful public services that respond to real demands. The associated communities are put at the centre of such initiatives and empowered through capacity building and facilitation of their adoption of innovative technological solutions. In addition, challenges faced by the Northern Periphery and Arctic (NPA) regions are considered. Among them we identify:

- Need for establishing a wider range of user-friendly channels for the community to access and participate in the co-production process. No one solution fits all the regions.
- Exploration of new models based on cooperation and open shared solutions to ensure quality and sustainable services.
- Opportunity to introduce new emerging technologies assisting the public services provision and test their impact and viability within this changing landscape.

EMERGREEN addresses these challenges by bringing new innovative models for participative, user-centred and sustainable public services to create greener communities. An open innovation approach involving the relevant stakeholders is followed by the partnership to pilot these services in the five participating regions. The specific services are: 1) Zero Waste Circular Management Service in Derry and Strabane, Ireland, 2) Green growth advisory services in Västernorrland, Sweden, 3) Marine Coastal Erosion Service in Donegal, Ireland, 4) Intelligent green participation in the City of Mikkeli, Finland, and 5) Data storytelling about green energies in Faroe Islands. These services are oriented to changing the behaviour of citizens and business to enable greener communities. More detailed services descriptions are presented in Section 3.

The project’s contributions are two-fold. First, it presents a completely new scenario for the organizations responsible for the provision of the public services from three dimensions: technology-wise, where new emerging technologies will be tested; methodology-wise, reflected in an open innovation approach involving all the relevant stakeholders; and business-wise, where new business models will be explored. This will lead to an increased openness on behalf of the public authorities in applying these new approaches in their task of providing public services. The project

will also produce an increased awareness among users about the key role they can play as a part of the solution. It will generate behavioural change in the way citizens interact with these services, empowering them to adopt a much more active role and moving them from a more passive role into to a more participative one. Second, it enhances the capacity of communities to effectively manage their resources and develop in a sustainable way.

### 3. Partner Service Descriptions

Five services are described in this section, namely: 1) Zero Waste Circular Management Service, 2) Green Growth Advisory Service, 3) Marine Coastal Erosion Service, 4) Intelligence Green Participation Service and 5) Heat Pump and Solar Energy information Portal. Below we describe each service and their potential stakeholders.

#### 3.1. Derry City and Strabane District Council - Recycling Chatbot, App, and Waste and Recycling Website

##### 3.1.1. Contextual background

The latest population estimates for the Derry City and Strabane District Council (DCSDC) area give a population total of 150,680. These estimates also indicate that the region has a younger profile than that of Northern Ireland (NI) as a whole. It is estimated that DCSDC has 33.5% of its population aged 24 and younger (31.9% in NI) whilst 14.9% of the population in DCSDC is aged 65 and over (16.4% in NI). The overall population of DCSDC is projected to decrease slightly to 150,496 in 2022 before dropping back to 145,852 by 2041. It is projected that the number of those aged under 16 will fall to 28,040 (19.2%) in 2041, down from 32,806 (21.8%) in 2016. By 2041, the number of people aged 65 and over is expected to increase to 35,150 resulting in this age category making up nearly a quarter (24.1%) of the DCSDC population<sup>1</sup>.

Management of domestic waste and behavioural change towards zero waste is one of the challenges facing many metropolitan municipalities and districts, including DCSDC. Uncollected and improperly disposed waste results in the clogging of public areas, streets, and gutters and has grave implications on society. Studies also show that waste management is an issue of concern for householders. The general public believes that improved consultation and education, both formal and informal, about waste management is pivotal for reducing the amount of waste produced to zero<sup>2</sup>.

Currently, DCSDC provides waste management services using the city's online webpage and corporate social media channels. The service is also partially provided through an app that provides information about collections. However, only 4% of the population uses the app. The most beneficial feature of the app is the push notification functionality. The app does not provide information about bins and trash generation at the household level.

DCSDC's recycling rate is 40.5%, while the current infrastructure has the potential to achieve a 73% recycling rate. Thus, behavioural change is a key factor to increasing and meeting the EU and Council's targets. Through the EMERGREEN project, the city aims to deploy a service to change public behaviour towards achieving a zero-waste circular district. The service particularly is intended to 1) improve accessibility to sustainability information for members of the public and businesses in DCSDC, including those in peripheral areas, 2) Improve communications on Waste and Recycling services through digital offerings, and 3) Deliver better service to the public with reduced staff overheads (reduced number of calls into agents). In particular, the aim is to improve digital offerings to the city and district by providing an online response service for

<sup>1</sup> <https://www.derrystrabane.com/Subsites/Derry-and-Strabane-Statistics/Population>

<sup>2</sup> [https://www.epa.ie/publications/research/waste/EPA\\_attitudes\\_on\\_waste\\_ERTDI37\\_synthesis.pdf](https://www.epa.ie/publications/research/waste/EPA_attitudes_on_waste_ERTDI37_synthesis.pdf)

information regarding waste, bin collecting, recycling services, etc. 24 hours a day, 7 days a week. It is also aimed at helping people report issues more easily and freeing council staff from dealing with mundane enquiries, allowing them to concentrate instead on more complex questions.

The main stakeholders for this service include Derry City and Strabane District Council as the service provider. With the new service, the service delivery staff members of DCSDC will only need to deal with complex queries, allowing their time to be better spent on people that need the most help. Other stakeholders include the general public in the Derry City and Strabane district, particularly those in the rural communities, disability groups, and migrants. For these groups, the goal should be to provide up to date information on areas such as on waste management, bin collections, and recycling centre opening hours.

### 3.1.2. Service background

The services created include RIA the chatbot, a new Derry Strabane Recycling App and a new Waste & Recycling website at [www.derrystrabane.com/recycling](http://www.derrystrabane.com/recycling).

The main objectives of the services are to develop more sustainable public services for remote areas through emerging technologies. A key aspect of EMERGREEN is to empower local communities from remote areas to participate in the planning processes and help develop these new public services for greener, sustainable and more socially inclusive regions, making better use of the existing resources.

This project relates directly to Council's Zero Waste Circular Economy Strategy and council believes that by implementing these three new technologies, it will enable people to have better access to information to help them live more sustainably.

The primary stakeholders involved in the testing stages are the public residents of the city and district. However, there will be subgroups within this main group, and they are as follows:

- Older age group
- Disability groups- Eyesight impairments, hearing impairment
- Younger age group
- Migrant
- Students

**Website:** A health-check was carried out on the waste section of the Council's old website and a scoping exercise was conducted, looking at comparative public service sites as a benchmark for our web development. DCSDC identified the London Recycles site as the design model which we drew from to design the new Waste and Recycling website. A tender exercise was conducted and a web design company, Profile Tree, was appointed to build the digital platform, to include features such as online booking and payment systems as well as making the site very visually appealing, which would enhance the overall user experience. The website was built using WordPress and WorldPay was used as the Payment Gateway Platform for integration.

**App:** Based on the new design and layout of the website, a tender exercise was completed and the app design company, Sentireal, was selected to develop the new Derry Strabane Recycling

app. The functionality of this app was benchmarked from the Bin-ovation app, to which DCSDC subscribed at a fixed annual cost. Having control over their own app will make this technology service more sustainable and will offer citizens a handy way to access info on waste and recycling services/materials/tips. The app was built using the latest app technology. It has been uploaded to Google Play and the App Store so users can download it via tablet or smartphone.

**Chatbot:** The Chatbot development process involved a lot of research and data collection at the beginning to create a detailed knowledge base for NUI Galway to start the building process. Data was regularly monitored and tested at different stages by various test groups. The Chatbot is a form of artificial intelligence (AI) used in messaging apps. This tool adds convenience for customers as they will receive automated responses to their questions in real-time, eliminating the need to spend time searching the website or ringing council's helpdesk.

### 3.2. Västernorrland County, Sweden - Green Growth Advisory Service

#### 3.2.1. Contextual background

Huge improvements in energy efficiency are occurring across the European Union. Energy efficiency policies are delivering in terms of reducing consumption, reducing CO2 emissions, creating jobs and saving money for consumers. All these bring monetary and non-monetary benefits to Europe's industry and consumers, including those experiencing energy poverty. In this regard, the Energy Efficiency Directive aims at making consumers more aware of their actual energy consumption so that they can change their behaviour towards saving energy. Direct feedback and education on energy consumption are vital for harnessing the full energy savings potential of homes. The new target for all new buildings is to achieve nearly zero energy consumption by 2020<sup>3</sup>. To achieve this target, more research and technological innovation are needed in member states.

In this regard, together with the Region and the municipalities, Västernorrland is working to realise more efficient energy use in its region and to increase the share of renewable energy use through projects in collaboration with public and private actors. The energy office in Västernorrland is an important part of the EU energy policy and is run in accordance with the EU statutes as an independent energy agency. Västernorrland County has applied demand-side management since 1995 and the target is for each measure to yield an energy efficiency improvement of at least 50%. Within the county, energy is primarily used for electricity, heating and cooling premises, ventilation, lighting, technical medical and IT equipment, as well as in the field of transport. It is extremely important to use energy as efficiently as possible in order to limit cost increases and reduce the county's impact on the environment and climate<sup>4</sup>.

To progress the sustainable building and energy efficiency programme, the next priority for the city is in cultural and behavioural changes associated with energy efficiency. In this regard, through the EMERGREEN project, Västernorrland aims to deploy a digital service which will enable better communication, interaction and information offering through an immersive collaborative learning environment for citizens and businesses. The service will assist advisors in their task of providing advice to the community to be more energy-efficient and solve the issue

<sup>3</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/good\\_practice\\_in\\_ee\\_-web.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/good_practice_in_ee_-web.pdf)

<sup>4</sup> <https://www.rvn.se/en/v1/in-english/startpage/in-english/environment-and-energy/energy/>

of reaching a wider audience. In particular, the new service will: 1) Improve communications on energy and climate with businesses and the general public and 2) Improve the public awareness of the available services, grants and overall efficiency of different energy options. Currently, this service is delivered via phone calls and face to face meetings with part-time advisers and is thus limited in its availability.

The primary stakeholders of this service are members of the public or citizens who need information and advice on solar panels, heating, electricity consumption, lighting and subsidized financing possibilities for installing energy-efficient equipment. Other secondary stakeholders and beneficiaries of this new service are local energy advisors who currently have very limited availability to provide information and advice to the citizens, and local energy suppliers. People looking for information related to climate change, businesses, and policymakers are also important stakeholders.

### 3.2.2. Service background

**The Solar Energy Chatbot** is a service to assist local energy advisors in the region in their task of providing advice to the community to be more energy efficient, including supporting solar energy development. The decision to develop a solar energy chatbot comes from the fact that the majority of questions the advisers receive concern solar energy. And currently, the advisers' services are delivered via phone calls and face-to-face meetings, thus limiting the availability of information for the wider public. At the same time, solar energy is growing in the whole of Sweden, including the Västernorrland region, thus there is a need to provide consistent information and promote this type of energy within the communities. By developing a solar energy chatbot we could unload some of the workload from the advisers, making them more available, and at the same time making it possible to provide advice regarding solar energy to the public 24 hours a day.

The service has been developed and tested in Västernorrland (Sweden). Primary stakeholder of this service are citizens who need information and advice on solar panels and solar energy. During the initial discussions it was decided to focus the service on the solar energy (that is developing significantly in Västernorrland) and test it in a form of a chatbot technology. The decision was made by the Energy Office of Västernorrland, which is a project partner, and local energy and climate advisers' group.

The development of the chatbot consisted of the following steps:

**Developing scenarios** – initially 16 scenarios with different questions and answers were developed by regional energy advisers' group. Scenarios covered such topics as installation, costs, direction of solar panels, sustainability, etc. They consisted of few versions of a question-and-answer combination with some follow-up information. In the following phases scenarios were further developed and new ones were added.

**Preparing a survey for testing** – an evaluation survey was developed online. The aim of the survey was to check how the users interact with the chatbot, what is their general feedback and to correct errors. It focused on exploring the existing scenarios and checking how interactions flowed when following a certain scenario.

**Internal and external testing; focus groups** – Online testing and in-person focus group testing mostly focused on identifying new scenarios for the chatbot, as well as exploring mistakes and improving the tool. Numerous users, from the potential users, expert in solar energy to university students, tested the chatbot at the different stages of its development. A few rounds of testing were performed with the local energy advisors, whose work chatbot is supposed to support. Their feedback was equally important and fed the process with valuable comments.

The first round of external testing showed positive feedback towards the chatbot. The users appreciated the use of chatbot technology as a service provider in public sector. It was mentioned a few times that one does not often see chatbots on Swedish websites, especially the public ones. Another benefit of the chatbot that was mentioned is the fact that it gives information specific to the region. Many of the answers that the chatbot gives are general and can be found on other websites (it also often refers to other sources), but at the same time the user can check his/her own property on the regional interactive solar energy map or contact the energy advisor in his/her municipality. Those personalized functions make the chatbot more attractive for a user.

**Developing two language versions** - The chatbot has two language versions, which enables conversation in English for those who do not speak fluent Swedish.

**Technical testing** – before launching the chatbot on the organization’s website.

**Launching and testing in real life conditions** - The chatbot was officially launched under the website, which initiated the testing in real-life conditions:

<https://www.rvn.se/sv/Utveckling/Miljo/energikontoret-vasternorrland/solceller/>

The deployment was followed by an information campaign in social media. The general feedback from the users was positive. Solar energy is a new and interesting topic and people are looking for more information. Region-specific advice given in the chatbot was a plus. The users also appreciated the ability to learn about the local energy advisors and this service was promoted.

An important result was promotion of the chatbot technology as a service provider/a tool for the public sector, as this kind of technology is not widely used in public services. It was thus showed and promoted that this kind of technology can be relatively cheap and efficient in communicating public services with general public.

The chatbot ensures equal access for everyone. It requires an internet connection, but does not discriminate against those without the internet, because similar services can be still obtained by phone or personal contact with energy advisors. It complements local energy advisors’ work by enabling contact for those who, for whatever reasons, have limited opportunities to contact energy advisors directly.

The chatbot is not fully accessible for those with sight-disfunctions. It was discussed if some form of voice recognition would be possible to overcome that, but the use of such technology went far beyond the scope of the project.

### 3.3. Donegal County Council - Marine Coastal Erosion Service

#### 3.3.1. Contextual background

While Ireland has predominantly cliffed coasts, its position in the centre of north-west Europe's coastal margin (between 52 and 55 N) gives it a wider significance for national, European, and international coastal erosion studies<sup>5</sup>. Extensive studies have been established concerning coastal vulnerability and its links to issues of coastal zone management. In addition, the EU also aims to protect the marine and coastal environment and ensure sustainable use in the future through the Marine Strategy Framework Directive. To better manage coastal and shoreline erosion, many cities have started adopting innovative technological solutions. Adaptation technologies are defined as the broad set of processes covering the know-how, experience, and equipment used by humans to monitor and reduce the adverse consequences of coastal change and exploits any benefits<sup>6</sup>. It is important to note that adaptation consists of more than simply implementing a specific technological solution to monitor and control coastal erosion as the use of such services require awareness, public participation, and engagement.

Donegal County Council has the mission of leading economic, social and cultural development of County Donegal. One major improvement that the Council has is to manage its coasts and coastal erosion. Managing the Donegal coast now is much different task than managing the coast heretofore. There is a growing awareness of the pressures which a developing tourism industry will place on coastal resources.<sup>7</sup> In addition, the population of Donegal is largely a coastal population and traditionally the produce of the coast has been of great benefit in sustaining the population. Much of this development will be located in coastal areas adjacent to fragile habitats and will require careful management. Thus, it is very important for Donegal County to maintain all the social and economic development by monitoring and managing the coast and coastal erosion. Predictions suggested that erosion rates will increase so at some point in the future we will need to change our approach in terms of managing.<sup>8</sup> Thus, Donegal County Council framed a new and innovative coastal erosion monitoring and management initiative/service advantaging from crowd-sourcing solution. The Council has a long track record in applying new innovative technologies and methodologies to public participation and crowdsourcing.

The aim of the EMERGREEN initiative is to 1) engage public participation as citizen scientists in the field of marine coastal erosion mapping through crowd-sourcing imagery and 2) control and manage coastal erosion to help with the coast-line development. These captured images will be used to monitor the coastal zone fluctuations and changes over time and form a valuable resource as a baseline for any climate adaptation mitigation measures. In this project, Donegal County Council will be a partner in charge of piloting the Marine Coastal Erosion service in Donegal. They will engage with the relevant stakeholders and put their experience at the disposal of other organisations interested in similar technologies or services.

<sup>5</sup> <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/europe/united-kingdom-amp-ireland/Devoy.--2008.--Coastal-Vulnerability--the-implications-of-SLR-for-Ireland.pdf>

<sup>6</sup> <https://www.osti.gov/etdweb/biblio/1010716>

<sup>7</sup> <https://research.thea.ie/bitstream/handle/20.500.12065/1521/Collins%2C%20Anthony%201996.pdf?sequence=7&isAllowed=y>

<sup>8</sup> <https://www.engineersireland.ie/Engineers-Journal/News/coastal-erosion-in-ireland-a-perspective-on-past-and-present-management>

Primary stakeholders of this service are the general public, coastal residents, and visitors/tourists accessing the beach areas. In addition, coastal managers and ambassadors are two secondary stakeholder groups associated with this service.

### 3.3.2. Service background

Donegal County Council have developed a new service called ‘Donegal Coastal Stories’ in conjunction with partners at the National University of Ireland, Galway (NUIG) and the European Regions Network for the Application of Communications Technology (ERNACT) under the EMERGREEN project.

Following a Coastal Erosion Risk Management (CERM) study that was commissioned by Donegal County Council and funded by the OPW for the Donegal coastline on the Western side of the Inishowen peninsula, five individual sites were identified for inclusion in the CERM study, located at Rockstown Harbour, Tullagh Bay, Pollan Strand, Five Fingers Strand and the Binbane coast road. Given the high amenity values associated with the Five Finger Strand and Ballyliffin Golf Club, which are located in the hinterland of the Pollan Strand, at least two of the five study sites could be considered of high local importance and the recommendations of the report highlighted the need for ongoing monitoring of each of the five sites studied.

The aim of the new Donegal Coastal Stories service is to engage public participation as citizen scientists in the field of marine coastal erosion mapping through crowd-sourcing imagery to monitor and manage coastal erosion to help with coastline development. The captured images will be used to monitor the coastal zone fluctuations and changes over time and form a valuable resource as a baseline for any climate adaptation or mitigation measures. The service will be tested in Donegal (Ireland) and the primary stakeholder of the service is the general public, coastal residents, and visitors/ tourists accessing the beach areas. In addition, coastal managers and ambassadors are two secondary stakeholder groups associated with this service.

Following the publication of the Coastal Erosion Risk Management study and representations made to the Council from elected members and community groups, developing a monitoring solution for key sites was considered as a priority for the council. The Council’s Environment and Information Systems departments work collaboratively on numerous projects and the EMERGREEN project was considered as a viable driver to deliver a monitoring solution.

The main service objective is to collect data on coastal dynamics using Citizen Science. A mobile application has been developed for the public to capture data on changing coastal dynamics along with supporting a website which will deliver ‘Coastal Stories’ that have been developed over time. Several suitable monitoring locations have been identified and we are now asking members of the public to engage themselves as Citizen Scientists and to capture changes in coastal dynamics using their smartphones and an app at a number of locations where a fixed stainless-steel plinth has been erected. The stories that will be captured by the public will help our experts to determine management practices for our valuable coastline.

Due to the nature of the project, it was necessary to identify key viewpoints where hardstands and stainless-steel plinths could be located. Local knowledge and GIS were used to identify key viewpoints. We had issues relating to land ownership for the fixed plinth location at our flagship pilot site which boasts a ‘bird’s eye’ view of Trawbreaga Bay. These issues are now resolved, and a number of additional sites were identified for monitoring. During the scoping exercises for

additional sites, preference was given to lands that were within the Council's ownership. Good practice was established at the outset and all landowners along with neighbouring landowners were consulted with and informed of the nature of the project, the aims, objectives and how they could become part of the 'Story.' Most of the landowners that were met by members of the project team shared their own story on the dynamics of the Bay and shown a willingness to participate in the project.

Working with project partners at the Insight Centre, NUI, Galway, a test version of the app was developed, and council staff could download the app via an .apk file and start capturing data. Staff and members of the local community have been capturing data before and after major weather events at several of the monitoring locations and have been providing continual feedback on app limitations and suggestions for improvement.

Covid-19 and the emergence of remote working proved to be troublesome for the project; particularly due to the nature of the project being 'hands on', requiring meetings with the public and requiring travel to plinth locations. However, the new ways of working adapted to Covid-19 restrictions enabled project partners to meet more frequently and effectively by virtual means and the engagement with all stakeholders encouraged higher levels of participation than could have been envisaged. This engagement with project partners enabled the sharing of ideas and feedback on the test versions of the app and website.

As the government restrictions on Covid-19 rescinded, a temporary steel plinth was erected at the Doagh Famine Village, which receives heavy footfall. Members of local community groups assisted in the testing of the service which led to changes in plinth and app design. The project was promoted primarily by the plinths which were installed at very scenic locations that receive a lot of footfall by tourists and members of the local community who visit the sites on a regular basis. The plinths carried very basic information on how to use the service along with a QR code where users could download the app, which contains a YouTube video on how to use the service and more information. The service was also promoted via the projects designated Twitter page, @DLCoastalStory, the Council's social media channels along with being promoted via the project partners.

Stainless steel plinths were installed following the testing phase and a formal launch of the service with local community group members and elected members. Each stand carries the graphic and a unique plinth name which is included in the mobile app. As the usage of the app increases, the council will monitor usage and identify gaps in participation. Twitter will then be used to encourage members of the public in using the service on an ongoing basis.

In order to limit the amount of time that the user spends keying information into their phone and reading, a QR code was designed so that the user would simply use their smartphone to read the code and download the app. Once the app is downloaded, the user is presented with a short video about the service followed by a 'How to participate' video and community group testimonials.

Following testing, several suggestions were made by stakeholders on amendments that were required on the final stand and the final release of the app. These were taken on board and incorporated into the design process.

More information on the service and the download link for the app can be found at the following location: [www.donegalcoastalstories.ie](http://www.donegalcoastalstories.ie).

### 3.4. University of Helsinki/City of Mikkeli, Finland – Digital Participation Platform

#### 3.4.1. Contextual background

The City of Mikkeli is a Finnish regional centre of the region of South Savo in Eastern Finland. The city is a home to about 52000 inhabitants in 2021 and has a surface area of 3,229 sq.km. The city has a relatively compact built-in central area with about 30000 residents and a large surrounding, predominantly rural area with a low population density and small local service centres. The city together with the region of South Savo is in the Lake Region of Finland comprising thousands of lakes. In the region, there are almost fifty thousand free time residencies that are mostly used by their owners or are rented, out of which over ten thousand are found within the city alone<sup>9</sup>.

The strategy of the city of Mikkeli recognizes five strategic components<sup>10</sup>:

1. Sustainable and smartly renewing Mikkeli
2. Entrepreneurial and competent Mikkeli
3. Enabling living environments
4. Well-being-promoting activities and services
5. Community spirit and inclusion

The public services of the city of Mikkeli employ approximately 2000 people and are divided into three broad service areas:

- Culture, education, and wellbeing
- Housing and operational environment
- Municipal corporation and vitality services

Following from the strategic objectives, the City of Mikkeli (an associated partner) works together with University of Helsinki Ruralia Institute to help improve the sustainable living and greener society. As a result, City of Mikkeli and Ruralia Institute decided to implement a new citizen initiative that encourages citizens to share ideas and initiatives that allow them to shape the city's greener services. The service areas of the City of Mikkeli served as test beds for piloting the digital participation service designed and implemented during EMERGREEN project.

The aims of the new service include 1) to improve sustainable living and greener services in the city, 2) to promote sustainable lifestyles and improving sustainability in general in city of Mikkeli, 3) to promote innovative and versatile interactions (citizen to government and vice versa, but also citizen to citizen) to improve citizen engagement in public services and 4) to bring together citizens of Mikkeli to promote sustainable and green lifestyle.

In addition, the envisaged service, digital participation and co-creation platform, aims to advance the following objectives: To increase citizen engagement and participation in e-public

<sup>9</sup> Free-time Residences 2020: [https://www.stat.fi/til/rakke/2020/rakke\\_2020\\_2021-05-27\\_kat\\_001\\_en.html](https://www.stat.fi/til/rakke/2020/rakke_2020_2021-05-27_kat_001_en.html)

<sup>10</sup> The strategy of the city of Mikkeli (in Finnish): <https://www.mikkeli.fi/sisalto/tietoja-mikkelista/hyvinvointi-strategia-jatalous/strategia>

services and their development; and to try out and advance new modalities of citizen, public and private engagement such as co-design and co-development of services and/or artefacts by exploiting resources available on the platform. Currently, there are several citizen initiatives at the national level and at the bigger cities. However, in the City of Mikkeli, limited participatory services are provided and available to the citizens.

Prior to defining the key parameters of the digital participation service, UH interacted with and conducted systematic interviews among the different service areas of the city. The interviews addressed the use, experiences, and future expectations regarding the digital services, focusing particularly on digital engagement and participation by the citizen.

A major aspect of the service co-design and co-development with citizens is the involvement of the stakeholders and final end-users of the services since they are foreseen as a key part of the solution. Therefore, besides the city and the institute, the primary stakeholders of this service are the citizens or residents of the City of Mikkeli and, in particular, youths. Local government can also take advantage of this community development by empowering citizens through local development initiatives and putting them at the middle of city initiatives and development.

### 3.4.2. Service background

The University of Helsinki, Ruralia Institute, developed a digital participation platform Omaidea (henceforth “Omaidea”, in English “Own idea”, [www.omaidea.fi](http://www.omaidea.fi)) to address the EMERGREEN project’s overall aim to promote greener communities in remote areas. This development was realised together with the local stakeholders such as the City of Mikkeli (an associate partner).

The Omaidea was developed to address several interrelated objectives:

- To promote innovative and versatile citizen participation in the City of Mikkeli and South Savo region, especially in remote and sparsely populated areas
- To raise awareness on sustainability issues, circular economy and climate change
- To engage citizens to actively contribute to and promote everyday sustainability solutions and green lifestyles, and
- To involve citizens in the digital participation platform’s further development.

Relevant technologies, methods and systems were assessed in a published report prior to selecting a suitable service platform. In selecting the technology for the participation service, importance was given to the following criteria that were established through interaction with the regional stakeholders and ICT experts.

The suitable participation technology should be:

- web-based
- open access and therefore freely available
- highly modifiable to suit various participation needs
- low cost of technical support (launching, updating, and maintaining the service), and
- easy to use from the end-users’ perspective.

Consequently, utilisable participation platforms were reduced to two potential options based on the above-mentioned requirements: Consul and Decidim. Although based on the same programming language (Ruby on Rails), Decidim was preferred over Consul due to its novelty,

modular design, wider selection of participatory tools, and a vivid development community. Decidim-based Omaidea was deployed, tested, and used in several pilots during the EMERGREEN project.

The local amendments, styles and design characteristic of the Omaidea were realised locally with technical support from a private sector ICT developer Metatavu Ltd. Modifications and extensions made to the Decidim's basic code during the development of Omaidea are stored and available in Github.

The platform in its present form is targeting Finnish speaking audiences. Although some indicative translations into English are shown, it should be noted that the English content is not updated. The development and implementation of the Omaidea was a sequential process consisting of the following steps along the project periods:

Period 1: 1.11.2018-31.2.2019: Analysis of relevant technologies available for citizen participation and engagement.

Period 2: 1.4.2019-30.9.2019: Local stakeholder interviews (12) and contextual analysis to understand the needs, priorities and contextual conditions in the City of Mikkeli and the region of South Savo.

Period 3: 1.10.2019-31.3.2020

- Shortlisting of potential technologies and comparing between the most promising ones (Consul vs. Decidim) considering the stakeholders' preference and perceptions, and other contextual factors
- Development, installation and testing of the first Decidim-based prototype of the service by NUIG.

Period 4: 1.4.2020-30.9.2020

- Refinement of the service prototype, design of the user interface and installation of platform software on the permanent domain address corresponding with the service name Omaidea (<https://omaidea.fi>)
- Pilot testing of the first public version of the Omaidea with local stakeholders and the Ruralia Institute's internal test users.  
<https://omaidea.fi/processes/kehitysversiokommentit/f/29/>
- Implementing the changes resulting from the feedback of the test users (e.g., feasibility of use, clarity of content and quality perception of the service).

Period 5: 1.10.2020-31.3.2021

- Designing and implementing three (3) sustainability related participation pilot processes within the Omaidea. The activities were supported by focused content on the Omaidea's social media channels created during the period (Instagram: Omaidea.fi; Facebook: Omaidea.fi; Twitter: OmaideaF). The themes of the participation processes were biowaste, food waste, small-scale climate action and the future food systems:
- "Bio-waste challenge" including 3 mini-surveys, thematic communication and discussion activities (November-December 2020). The participatory activities involved from 30 to 62 participants on the platform.

- “Food waste challenge, part 1” (the same process was extended later to cover other food waste issues on Period 6) including a “wake-up” survey, thematic communication and information sharing on food waste (January-early February 2021). The participatory activities involved 45 participants on the platform.
- “Small-scale climate action” idea competition including idea generation, voting for the ideas, and thematic communications (February 2021-April 2021). The climate action process was promoted in collaboration with the city of Mikkeli youth services. The idea competition resulted in 21 climate action ideas and altogether 103 support votes on the platform. Three most supported ideas were rewarded with a gift card of 20 € each.

Period 6 (extended): 1.4.2021-31.3.2022

- “Food waste challenge, part 2” (April 2021-June 2021). The second part of food waste challenge was an idea competition on ideas and practices to limit food waste. The idea 6 competition was promoted in social media and in Mikkeli high school through two online lessons in ecology classes given by the project team. The campaign resulted in 15 recipes utilizing leftover food or other ideas to avoid food waste. The ideas were eventually supported by a public voting for the best ideas and three most supported ideas were rewarded with a gift card of 25 € each.
- “The future food systems and cellular agriculture” consisting of a writing competition based on the future visions of cell-based agriculture. The activity was introduced as an additional participation process to test the suitability of Omaidea in collecting data for research and development activities (December 2021-January 2022, with an extension until March 2022).

Pilot testing of the first public version of the Omaidea was realised with the local stakeholders (e.g., the City of Mikkeli) and within the Ruralia Institute in 2020. Feedback was collected via a questionnaire. Each of the 32 targeted testers received a personalised email invitation with a link to the corresponding Omaidea page to use and evaluate the platform while at the same time answering the survey. The feedback from test users addressed development needs related to the usability, clarity and readability of the service. The changes suggested by the testers were applied to the Omaidea to a reasonable extent. However, the modular design of the Decidim-based software did not support an easy adoption of the user-generated development ideas. For example, neither users nor administrators could easily add and manage pictures or other visualisations on the platform due to the software design issues.

An internal core team in the University of Helsinki, Ruralia Institute, comprising of a senior researcher, a project manager and a communication assistant, worked together through the key stages of the Omaidea development and continually reflected on strengths and weaknesses with outside organisations such as ICT company Metatavu Ltd. The performance of Omaidea was critically evaluated after each public participation process, as listed under period 5 and 6 activities. Basic settings of the platform were reprogrammed to suit the needs of the project and to improve visual presentation such as the displayed font sizes and visibility of the voting results.

Moreover, the importance of up-to-date social media communication measures to capture the attention of the targeted users (e.g., young people) were emphasised. In addition to the ICT developer Metatavu Ltd., the most active external collaborators and testers of the Omaidea were youth services and selected schools from the City of Mikkeli. Collaboration with these

public sector actors proved to be valuable during COVID-19 as the Ruralia Institute’s core team members could not personally attend live events.

### 3.5. Faroese Environmental Agency (FEA) - Energy Division – Heat Pump and Solar Energy information Portal

#### 3.5.1. Contextual background

The Faroe Islands today has 53,000 inhabitants in approx. 17,000 homes, most of which are single-family houses. The vast majority of these are heated with oil burners, which have been the most common form of heating since the end of World War II.

Heating houses, apartments and buildings currently accounts for more than 30% of the Faroe Islands onshore greenhouse gas emissions. This is a major challenge to the government’s aim to reduce annual greenhouse gas emissions by at least 50% of 1990 levels by 2050. There are some measures in place to stimulate this issue, though Faroe Islands, as many other countries, has not yet put a ban on oil boilers in new homes. More policies are expected, but there is still a long way to go.

As of today, the energy used for Residential Heating of the Faroes in 2021 consists of:

- Heating Oil burners 553 GWh
- Heat Pumps 78 GWh
- District Heating 38 GWh

The total energy consumption on land is 2400 GWh and the Energy Policy stipulates replacing oil with other alternatives with lower CO<sub>2</sub> footprint.

The “Heat Pump” part of the Info Portal is a web-based service to assist local stakeholders on the islands in choosing alternative heating solutions for their homes. The service guides people in choosing a smart heating solution with better efficiency and a reduced carbon footprint. A heating system is expensive to install and operate and impacts the environment through CO<sub>2</sub> emission. Therefore, it makes good sense to carefully evaluate the various options when considering a new installation or upgrading an existing system.

There are two basic heat pump technologies: air sourced heat pump (ASHP) and ground sourced heat pump (GSHP). In the first case, the ‘source’ is outside air. In the second, the pipes are installed directly into a borehole in the ground, which is the ‘source’. But, in both cases, the fundamental principles are the same in that heat is transferred to/from the source using a technology that is similar to the internal workings of a refrigerator.

For ASHP, outside air is a heat container. In the winter, an air-source heat pump moves some of this heat indoors to warm the home. During the summer, a heat pump can operate in reverse, as an air conditioner, by moving heat from indoors to outside. But this is not so relevant on the Faroe Islands, since they rarely experience high temperatures in the summer. During the coldest months of the year, a heat pump alone cannot keep up with a home’s heating needs. Therefore, some other sort of back-up heating system is generally needed, such as ETS or a natural gas system.

Currently, the vast majority (90%) of homes in the Faroes are heated by oil fired burners. The decarbonised future for heating buildings is likely to be electric driven heat pumps as well as

district heating networks in densely populated areas. The first air to air pumps came on the market 30 years ago and were mostly regarded as an extra source of heat supply. Later the first air to water heat pump were put in operation as the main source of heating.

Ten years ago, the government initiated a successful Ground Source Heat Pump initiative with technical assistance from Sweden. Five holes were drilled in different places and equipment was put in operation with detailed observation, monitoring and measurement of relevant parameters. And since then, over 1000 holes are drilled and today 4 drilling rigs are active on the islands. Most new houses are preferring heat pumps for the supply of heat and hot water rather than traditional oil burners. This requires a massive change right across the islands to switch to a new mode of heating. Aside from technical issues, the main challenges are cost, industry skill levels and customer acceptance. Faroe Islands is not the only country facing the challenge of dependence on imported oil for heating and other purposes and there are lessons to be learned from its neighbouring countries.

### 3.5.2. Service background

The “Heat Pump and Solar Power Info Portal” which is a part of the Faroe Islands’ EMERGREEN project, is intended to inform, stimulate and promote greater utilisation of renewable heating from Ground Source and Air Source heat pumps.

The goal was to set up internet portal or platform where people can seek information on practical issues related to all sort of heat pumps. The site will be a part of [www.os.fo](http://www.os.fo) (Energy Shift Platform) which from the beginning has been a partnership by the power company SEV and US Orka; it is currently available at <https://www.orka.fo/>

The northern location of the Faroe Islands means that production from a solar cell plant is only a fraction of a similar plant in southern Europe. It is only during the summer months that solar cells make a difference, but this can compensate for the low electricity production from wind and water in this time of the year. Therefore, we have included a section about photovoltaic systems in our info portal, where we provide information about photovoltaic systems. It is also possible to follow and monitor the production from systems that are set up in different places on the islands.

We have set up an agreement with a team from [www.lunnar.fo](http://www.lunnar.fo), a leading Faroese software company and front-end developer of next generation design and development solutions. They have assisted with design and program work and support FEA with experience from the newest and modern tool for information seeking and sharing.

As the first heat pumps were installed in 2009, a measurement program was started in some of the buildings and boreholes. Measuring equipment logging different temperatures, flow and energy was to show how the system behaves over time. The result of this measurements will be presented on the portal so interested customer can use them as guidelines.

Users of the portal can make their own heat pump calculations using the heat pump calculator that allows the user to determine their estimated savings and payback time by switching to a heat pump.

FEA has also made agreements with the companies that operate drilling rigs to make video recordings of the drilling process where they explain and go through the entire process of drilling

a hole and installing the hose and other equipment. In addition, animations, figures photo sequences of the process that show the different steps will be created so that people better understand the principals behind a heat pump installation.

**Storytelling:** This is an important part of the Info Portal. Crowdsourcing is the collection of information, opinions, work and running experience, economic costs etc. from a large group of people. In this case, homeowners have been given the opportunity to share their experiences once they have installed or switched over to using heat pumps. The advantage of crowdsourcing includes cost savings, speed, and the ability to hear from people who have skills and experiences they can share with new users of heat pumps.

## 4. Business Model Development Methodology

This section describes the approach to the development of EMERGREEN services business model. The development approach was executed carefully to anticipate and guarantee the longevity of the project's outputs and their impact.

The business model aims to summarise the value propositions of the project results, the project partners and actions as a whole and design comprehensive and practical methodologies in the form of service delivery-based business models, for the exploitation and implementation of the developed solutions in EMERGREEN project. This document is not only for use by the project partners but aspires to set a methodology for the exploitation of project results and actions in other initiatives. The deliverable was designed in the last months of EMERGREEN project after the majority of the partners had reached the expected level of organisational and technological readiness to exploit and implement the services.

The content and context for this deliverable were fed through the training, capacity-building actions, and service assessments detailed below. In addition, activities such as desk research conducted by the deliverable leader and consultations with partners on the best approaches to sustain the impact of the project were deemed useful.

The co-design of service delivery-based business models resulted from interactions between project partners, service end users and alliances obtained from the past three years. The services are presented as well-rounded compact structures that can be implemented by one or more partners.

The project tailored the Business Model Canvas (Figure 1) and applied it in the development of service delivery Business Models. The Canvas was adapted and used in the co-design of the service-based business models. Therefore, each service brief is outlined through the value proposition and co-creation journey for scalability of the service.

<b>Key Partners</b> <i>Identify the key partners in providing your services</i>  	<b>Key Activities</b> <i>The most important activities necessary to deliver the value proposition</i>  ...	<b>Value Propositions</b> <i>Identify the core value being provided to citizens. What exactly is the organisation trying to give to citizen? What problem are you solving/what need are you satisfying. How is what you offer different from what is currently available?</i>  ...	<b>Customer Relationships</b> <i>What type of relationship do you have with your citizens? How do you engage new citizens? How do you keep citizens engaged?</i>  ...	<b>Customer Segments</b> <i>Who are your target citizens? What do they like/need/enjoy? Is it a small niche community or mass market?</i>  
	<b>Key Resources</b> <i>The resources or assets necessary to deliver the value proposition</i>  ...		<b>Channels</b> <i>What channels will be used to deliver value products and services? Supply/distribution/marketing /communications channels</i>  ...	
<b>Cost Structure</b> <i>Identify the key costs. How do key activities and key resources contribute to the cost structure? How do costs relate to revenue/benefit streams? What proportion of costs are fixed and variable?</i>  ...		<b>Revenue Streams</b> <i>How is value generated from each customer segment and using what channels?</i>  ...		

Figure 1. The Business Model Canvas adapted by the EMERGREEN partners

## 5. Services Business Models Development and Analysis

### 5.1. Website/Chatbot/Recycling App Business Model - Derry City and Strabane District Council

#### 5.1.1. The DCSDC business model analysis

Business Model Elements	Derry City and Strabane District Council Business Model
<b>Key Partners</b>	<p>Zero Waste North West</p> <p>North West Migrants Forum</p> <p>NUI Galway</p> <p>Sentireal</p> <p>Profile Tree</p>
<b>Key Activities</b>	<p>DCSDC continue to monitor the effectiveness of our 3 new areas of technology: website with online booking and e-commerce functionality, chatbot technology (RIA) and Waste &amp; Recycling App</p> <p>We are engaged in a continuous process of testing with internal teams regularly getting feedback from them and tweaking elements of the service to suit their needs</p> <p>We are campaigning to increase awareness of these technologies through social media competitions, vinyl wraps on bin lorries, at recycling centres and by regularly updating social media to drive app downloads particularly</p> <p>Encouraging sharing of content and feedback from service users.</p>
<b>Value Propositions</b>	<p>We are empowering local citizens with information relating to sustainability in an instantaneous way through our chatbot technology, app and improved website</p> <p>Our online booking system for recycling centres had over 22k users less than a month after launching in May 2022, improving traffic management, particularly in a COVID-19 climate, and easing stress on staff and users.</p> <p>Our recycling app has bin reminder features which can be synced to users' smartphones, helping them with practical household waste management and easing pressure on our frontline phone systems.</p> <p>The e-commerce waste product purchasing will significantly reduce pressure on phone systems and admin staff and will also mean users can access these products outside of office hours.</p> <p>Chatbot technology will give citizens information on what they can recycle, how to reduce their waste, bin collections routes and services at recycling centres 24/7.</p>

<b>Customer Relationships</b>	<p>The service is providing the public with information on sustainability and creating digital platforms for recycling services including online recycling centre bookings and bin product payments.</p> <p>The website with integrated chatbot technology and app make sustainability information much more accessible for the public, especially outside of office hours. We will continue to engage new citizens by promoting our app and website content through online and offline campaigning including social media, vehicle livery, outdoor advertising and PR.</p>
<b>Customer Segments</b>	<p>All citizens living in Derry City and Strabane District. Waste services are a key requirement for all citizens.</p> <p>These technologies will improve accessibility to services for people without English as their first language and users of all ages from young children to older people, people with disabilities and environmental groups.</p>
<b>Key Resources</b>	<p>The following are key resources for delivering the value proposition:</p> <p>Website: Hosted on DCSDC's server <a href="http://www.derrystrabane.com/recycling">www.derrystrabane.com/recycling</a></p> <p>Mobile App: Derry Strabane Recycling available on Google Play and App Store</p> <p>Chatbot: Hosted by NUIG on DCSDC Server</p> <p>Instructional Videos available on DCSDC Council's YouTube Channel</p>
<b>Channels</b>	<p>DCSDC Corporate Social media channels with information/tips/service changes/competitions being published regularly.</p> <p>Push notifications sent to users via the app.</p> <p>Google Reviews will be used to gain customer feedback on site services</p> <p>Offline marketing tactics to promote technologies will be employed including outdoor and PR</p> <p>Cross promotion via stakeholder and community group networks</p>
<b>Cost Structure</b>	<p>Costs for maintenance of software/systems will be maintained by Derry City and Strabane Council. It is envisaged that the service will run on an ongoing basis.</p>
<b>Revenue Streams</b>	<p>Revenue can be measured in terms of user statistics over time. If successful, this model can then be rolled out to other Council services e.g., leisure service, to increase its value and public accessibility.</p> <p>These statistics will be achieved using Google Analytics, Twilio data, App Store download info, Woo Commerce Reports and social media metrics.</p>

### 5.1.2. Feasibility of the DCSDC services

Indicators	Timeline
<b>Key Issues</b>	<p>Identification of new opportunities in which this service can be integrated</p> <p>Organisation and interest of partners in continuing to implement the service</p>
<b>Key Factors (Internal)</b>	Supply of human and capital resources to organise and implement the service
<b>Key Factors (External)</b>	<ul style="list-style-type: none"> <li>• Limited access to resources post-EMERGREEN</li> <li>• Active citizen participation in the service and continuous engagement</li> <li>• Continuous interest in the service</li> <li>• Adaptability to cope with changes in the format of the service</li> </ul>
<b>Uncertainties</b>	<p>Time constraint to prepare the materials for the service</p> <p>Disinterest from the citizens to continue with the service</p>
<b>Success indicators</b>	<ul style="list-style-type: none"> <li>• Number of service end users who have already participated in activities of the service</li> <li>• Service design is iterated, and service is provided in continuity according to the identified needs of the citizens and the organization</li> <li>• Service developed to address long-term needs of the citizens</li> <li>• The co-creation practice that was adopted in designing and developing the service</li> </ul>

### 5.1.3. Sustainability of the DCSDC services

Sustainability levels	Indicators
<b>Scale up</b>	Visibility and recognition of co-creation approach in the local communities in which co-creation is promoted and developed.
<b>Scale out</b>	Through the transnational platform, the service has a potential to be expanded to other networks and initiatives in Europe and beyond.
<b>Scale deep</b>	The DCSDC employees who engaged in the EMERGREEN project successfully learnt about and participated in the co-creation journey may become trainers for other employees and even other organisations in the area

## 5.2. Green Growth Advisory Service Business Model - Västernorrland County, Sweden

### 5.2.1. The Region Västernorrland business model analysis

Business Model Elements	Region Västernorrland Business Model
<b>Key Partners</b>	Local Energy and climate advisors National University of Ireland, Galway (NUIG) General public
<b>Key Activities</b>	Test the service with many and different user groups so the service matches the users' needs. Keep the information provided by the service up to date and relevant.
<b>Value Propositions</b>	The main service objective is to provide an advisory service on solar energy that is easily accessible for the citizen and can reach out to a wide public. At the same time, the service can assist local energy advisors in the region in their task of providing advice to the community on being more energy efficient by unloading some of the advisors' workload, making them more accessible for tasks that the service cannot solve.
<b>Customer Relationships</b>	The advisory service provides information about solar energy to the public in an interactive form. One challenge is to get the citizen to use the chatbot instead of using other information sources. Promoting the service on different channels to reach the target group is, therefore, necessary to drive traffic to the service to engage with the citizens.
<b>Customer Segments</b>	The target citizens are the general public interested in solar energy. The advisory service contains some information adapted for county Västernorrland, such as solar maps, but anyone interested in solar energy that has internet access and speaks either Swedish or English could use the service.
<b>Key Resources</b>	Website for citizen access to the advisory service. Resource to keep the advisory service information up to date
<b>Channels</b>	Website for citizens access to the advisory service. Social media promotion and information about the advisory service. Word of mouth marketing and marketing from energy and climate advisors.
<b>Cost Structure</b>	There are costs for hosting the server and maintenance. Resources for keeping information up to date may vary depending on developments on the solar energy market and how that affects information in the service.
<b>Revenue Streams</b>	The value generated is first the possibility to unload the workload for the existing energy and climate advisors and free up time for them to provide advice to the community to be more energy-efficient in other ways. And second, supporting and accelerating solar energy development via the information the service provides for citizens.

### 5.2.2. Feasibility of the Region Västernorrland service

Indicators	Timeline
	Long term
<b>Key Issues</b>	<ul style="list-style-type: none"> <li>• Identify opportunities to continue with the deployment of the service in Västernorrland</li> <li>• Clarity to define preconditions and resources for implementing the service</li> <li>• Promotion of the service among new employees and management</li> <li>• Provision of resources from the previous management</li> <li>• Updating of tools and knowledge acquired through the project as it might become outdated as new knowledge is uncovered</li> </ul>
<b>Key Factors (Internal)</b>	<p>Change of management and priorities</p> <p>Supply of human and capital resources to organise and implement the service</p>
<b>Key Factors (External)</b>	Dissemination and outreach might be time consuming, and a lot of work might be required to find target audiences whose use of the service outcome is in-line with the new management priorities
<b>Uncertainties</b>	<ul style="list-style-type: none"> <li>• Not enough time to prepare action plans and evaluate the process and create a safe number of target audiences before change of management takes place</li> <li>• Time and resource constraints in preparing and organising the service provision</li> <li>• Administrative barriers</li> <li>• Sufficient demand from local/regional policy makers</li> <li>• Disinterest from the partner to continue with the service</li> </ul>
<b>Success indicators</b>	<ul style="list-style-type: none"> <li>• New management priorities being in-line with the co-created service in the EMERGREEN project</li> <li>• Action plan to implement the service at least for a period specified to establish interest of the new management team</li> <li>• Satisfaction of the service end-users and additional requests for more services</li> <li>• Local, regional and international policy makers recommend this service and collaboration with research and academic partners</li> </ul>

### 5.2.3. Sustainability of the Region Västernorrland service

Sustainability levels	Indicators
<b>Scale up</b>	Representatives and departments of various public organisations are aware of benefits to embedding co-creation in public sector innovation and development of new services and policies.
<b>Scale out</b>	Reach new target audiences to different sectors of public administration and geographical scope.
<b>Scale deep</b>	Recommendations to the units and departments on how to transform their public services into more inclusive and participatory experiences.

### 5.3. Marine Coastal Erosion Service - Donegal County Council

#### 5.3.1. The DCC business model analysis

Business Model Elements	Donegal County Council Business Model
<b>Key Partners</b>	Isle of Doagh Environmental Group Malin Head Community Association General public National University of Ireland, Galway (NUIG)
<b>Key Activities</b>	DCC and key stakeholders will continue to promote the Donegal Coastal Stories service by: Moderating content submitted by the public to build 'Stories' on the website. Regularly updating social media with information on stories submitted to enhance participation. Encouraging sharing of content and feedback from service users
<b>Value Propositions</b>	The main service objectives are to collect data on coastal dynamics using Citizen Science. A mobile application has been developed for the public to capture data on changing coastal dynamics along with a supporting website which will deliver 'Coastal Stories' that have been developed over time. A number of suitable monitoring locations have been identified and we are now asking members of the public to engage themselves as Citizen Scientists to capture images using their smartphones through an app at a number of fixed orientated stainless-steel plinths. The stories that will be captured by the public will help our experts to determine management practices for our valuable coastline.
<b>Customer Relationships</b>	The service is providing the public with an opportunity to play their part as citizen scientists, recording images of the coastal dynamics, from several locations that overlook areas of concern. This service is designed as an analysis tool which, over time, will provide insight and an understanding of the dynamics at play and reach a wide audience through social media.
<b>Customer Segments</b>	General Public Community Groups Tourists Environmental Specialists Data Scientists Marine Tourism
<b>Key Resources</b>	The following are key resources for delivering the value proposition: Website: Hosted on DCC's ArcGIS platform, <a href="http://www.donegalcoastalstories.ie">www.donegalcoastalstories.ie</a> Mobile App: Hosted by DCC/ NUIG

	<p>App. Backend: Hosted by DCC/ NUIG</p> <p>Stainless Steel Plinths: Maintained by DCC</p> <p>Instruction Videos available through the website and on YouTube</p>
<b>Channels</b>	<p>Social media with information on footfall and exceptional images being published.</p> <p>Publicly collected 'Stories' will be shared through the service website and mobile app.</p> <p>Encouraging users to submit feedback on the existing service and to identify any further monitoring locations.</p> <p>Community Groups and word of mouth marketing.</p>
<b>Cost Structure</b>	<p>Costs for maintenance of hardware and software will be maintained by Donegal County Council. It is envisaged that the service will run on an ongoing basis.</p>
<b>Revenue Streams</b>	<p>Revenue can be measured in terms of usage statistics and the value of the imagery gathered over time. This can then be extrapolated out to other sites to increase the value.</p> <p>Development of additional monitoring locations will be subject to coastal studies and where suitable sites are determined. An additional 4 sites in the county which will adopt the service have already been identified.</p>

### 5.3.2. Feasibility of the DCC service

Indicators	Timeline
	Long term
<b>Key Issues</b>	<ul style="list-style-type: none"> <li>• Prioritisation of the needs and citizen participation in using the new platform</li> <li>• Prototyping and implementation of the service in public places i.e., beaches</li> <li>• Systematisation of the available resources to sustain the service use by the public</li> <li>• Evaluation and validation of the implemented service (i.e., validating images)</li> <li>• New procedures for optimisation of the service in the near future</li> <li>• Maintenance and monitoring of the stands at the public beaches</li> <li>• Matchmaking tool to enable wider public to use the service</li> <li>• Optimisation of the volunteer groups/citizens</li> <li>• Incentivising members of the public and ambassadors</li> </ul>
<b>Key Factors (Internal)</b>	<ul style="list-style-type: none"> <li>• Ability of the organisation to co-moderate the service</li> <li>• Matching needs and available expertise</li> <li>• Ability to re-produce and sustain co-creation journey after the end of the project</li> <li>• Dynamics of collaboration and innovation through co-creation and co-production of the images to sustain healthy environment</li> </ul>
<b>Key Factors (External)</b>	<ul style="list-style-type: none"> <li>• Public perception</li> <li>• Public engagement</li> <li>• Matching tools and technologies (mobile phones etc.)</li> <li>• Continuous interest in the service</li> <li>• Satisfaction with the services</li> </ul>

	<ul style="list-style-type: none"> <li>Promoting the service at specific locations</li> </ul>
<b>Uncertainties</b>	<p>Sustainability through volunteering</p> <p>Evaluation of the effectiveness of the service on creating new synergies and encouraging peer exchange</p>
<b>Success indicators</b>	<ul style="list-style-type: none"> <li>Number of new members to the platform</li> <li>Number of joint initiatives</li> <li>Number of new policy agenda items based on the data from the platform</li> <li>Number of new public issues identified and addressed</li> <li>Number of joint events, if relevant</li> <li>Number of returning platform users</li> <li>Number of feedback comments</li> <li>Awarded funding to scale out the solution to other areas of the region</li> <li>Expressed satisfaction by the member of public and ambassadors</li> </ul>

### 5.3.3. Sustainability of the DCC service

Sustainability levels	Indicators
<b>Scale up</b>	Regional representatives are aware of benefits to embedding co-creation in public sector innovation and development of new services and policies
<b>Scale out</b>	Reach new target groups and extend support from different sectors of public administration and geographical scope
<b>Scale deep</b>	Outcome from the service can inform new policy and help policy makers provide recommendations on how to strengthen and transform public services.

## 5.4. Digital Participation Platform Business Model – UH/City of Mikkeli

### 5.4.1. The UH/City of Mikkeli business model analysis

<b>Business Model Elements</b>	<b>University of Helsinki-Ruralia Institute/City of Mikkeli Business Model</b>
<b>Key Partners</b>	<p>ICT know-how and basic coding skills (an in-house unit or an outsourced service) are needed for setting up the service.</p> <p>The layout of Decidim platform is basic. To brand and develop a distinctive identity for a service, usage of professional graphic designer is suggested (to create service's characteristics as visually appealing for maximising the engagement potential target audiences and users).</p> <p>Identification of supportive partners that could encourage participation and share activities on a platform (organisation's internal users and external partners).</p>
<b>Key Activities</b>	<p>Creation of specific, interesting, and relevant participation content for potential users. Steady flow of activities.</p> <p>Building a committed heavy-user base and engagement of leading figures or participation ambassadors.</p> <p>Active and far-reaching communication to various stakeholders and target groups in the various media.</p> <p>Ensuring collaboration stakeholders' commitment and co-ownership of participation processes.</p> <p>Integration of a digital platform to organisation's conventional participation practices.</p>
<b>Value Propositions</b>	<p>Omaidea digital participation platform is a unique and versatile non- commercial forum for citizen engagement and participation.</p> <p>The service is based on open-source code, modular structure and is freely modifiable.</p> <p>The service is flexible and adaptable to variety of purposes.</p>
<b>Customer Relationships</b>	<p>Successful campaigns on the participation platform require early and targeted communication measures in introducing the service and promoting its participatory events.</p> <p>Both traditional communication measures such as personal contacts and exchange of information as well as social media presence are mandatory.</p> <p>Building personal relationships with citizens is crucial but challenging to realise.</p> <p>Meaningful content, positive personal experiences and justified rewards promote long-term engagement.</p>
<b>Customer Segments</b>	<p>The most prominent service user partners of the participation platform are the public service areas' clientele.</p>

	<p>The youth services, schools and other educational institutions, environmental services, municipal planning, and services related to waste management</p> <p>Target citizens should be defined and identified to maintain the focus of the platform activities.</p> <p>Depending on a participatory activity, target citizens may be a closed and well-defined group (e.g., getting specific feedback to focused challenge) or aimed at all citizens in a region (e.g., an information campaign on a newly launched service).</p>
<b>Key Resources</b>	Software literacy, a degree of technical skills and accessibility to digital devices among all stakeholders (service providers, collaborating partners and citizens or end-users of the service)
<b>Channels</b>	<p>Omaidea is a medium for engagement and participation.</p> <p>The parallel visibility and presence of the platform on the media channels used by the target group.</p> <p>The main communication channels of the OMAidea:</p> <ul style="list-style-type: none"> <li>- Instagram account: Omaidea.fi</li> <li>- Facebook account: Omaidea.fi</li> <li>- Twitter account: OmaideaF</li> </ul> <p>Organisation's internal ownership of the platform and engaged staff members are essential for success (all should be committed and involved in promoting the platform).</p>
<b>Cost Structure</b>	<p>ICT-related costs of setting up a Decidim-based digital platform (outsourced installation of beta and production versions, approx. 5000€).</p> <p>Graphical design, brand development and implementation of visual and functional attributes (starting from 2000€).</p> <p>Usage of Decidim-based platforms such as Omaidea involves monthly fixed costs related to service server maintenance (approx. 2000 €/year), irregular Decidim software version updates (approx. 1000€ when needed) and variable costs related to each participation event or campaign (e.g., staff working time and costs related to events, production of background materials, videos or social media materials and potential draw prices for encouraging citizen participation).</p>
<b>Revenue Streams</b>	<p>A feasible cost sharing model to meet the fixed maintenance costs of the service.</p> <p>External public or private funding to realise participation campaigns related to different topics.</p> <p>Adopting and developing a Decidim-based platform internally in an organisation saves resources from outsourcing similar platform services. It also deepens the "ownership" of citizen participation and allows cumulation of experiences within a public organisation (the staff tend to experience outsourced services as distant and are almost without exception based on temporary contracts, changing partners and varying solutions).</p>

Adopting, using, maintaining and developing a digital participation platform in-house creates intellectual capital, know-how and “digital social capital” about digital solutions within a public organisation.

Novel business models such as corporatisation of digital participation activities, creating a “Digital solutions unit” within a public organisation selling their expertise to other public sector organisations or joint ventures between public organisations and private companies in providing digital solutions for public sector within and outside the region.

#### 5.4.2. Feasibility of the UH/City of Mikkeli service

Indicators	Timeline
	Long term
<b>Key Issues</b>	<ul style="list-style-type: none"> <li>• Definition of an action plan</li> <li>• Prioritisation of the needs</li> <li>• Systematisation of the available resources</li> <li>• Evaluation of the implemented solutions</li> <li>• New procedures for optimisation of the service</li> <li>• Matchmaking tool</li> <li>• Optimisation of the volunteer-professional management</li> <li>• Monitoring and evaluation of different engagement levels and the new services</li> </ul>
<b>Key Factors (Internal)</b>	<ul style="list-style-type: none"> <li>• Culture of research and innovation</li> <li>• Ability to reproduce and sustain co-creation with citizens on different dimensions</li> <li>• Dynamics of collaboration and innovation through cocreation</li> <li>• Matching citizens’ needs reported via the platform with the available resources and expertise</li> </ul>
<b>Key Factors (External)</b>	<p>Availability of opensource platforms for larger audiences (limitation of free and trial versions)</p> <p>New funding opportunities to support the development of new initiatives as joint efforts</p>
<b>Uncertainties</b>	<p>Sustainability through volunteering</p> <p>Evaluation of the effectiveness of the service on creating new synergies and encouraging peer exchange</p>
<b>Success indicators</b>	<ul style="list-style-type: none"> <li>• Number of new members to the platform</li> <li>• Number of joint initiatives</li> <li>• Number of new policy agenda items based on the data from the platform</li> <li>• Number of new public issues identified and addressed</li> <li>• Number of joint events, if relevant</li> <li>• Number of returning platform users</li> <li>• Number of feedback responses</li> <li>• Awarded funding to scale out the solution</li> <li>• Expressed satisfaction by the member of public and city representatives</li> <li>• Social media hits</li> </ul>

### 5.4.3. Sustainability of the UH/City of Mikkeli service

Sustainability levels	Indicators
<b>Scale up</b>	The service can contribute to and make an impact at the European level by providing recommendations on inclusive and responsible collaborative research and innovation practice and policy making
<b>Scale out</b>	<p>The service can be used by UH networks to extend their services and member engagement and promote stronger peer exchange and collaboration at the European scale.</p> <p>The service can be integrated with other local and regional services to enable social mobilization and social capital</p> <p>The service could be utilized to promote democracy</p> <p>The service can be used by other EU projects to utilise the services.</p>
<b>Scale deep</b>	Increased citizen and politician engagement would encourage integration of co-creation in the working culture of organisations/development and implementation of EU funded projects.

## 5.5. Heat Pump and Solar Energy Information Portal Business Model – Faroese Environmental Agency (FEA) - Energy Division

### 5.5.1. The FEA business model analysis

Business Model Elements	Faroese Environmental Agency (FEA) – Energy Division Business Model
<b>Key Partners</b>	<p>FEA Faroe Environmental Agency - all Divisions employees</p> <p>Nemlia sp/f</p> <p>Lunnar sp/f</p> <p>Bjørnin sp/f</p> <p>Heat pump dealers/installers</p> <p>General Public</p>
<b>Key Activities</b>	The “Heat Pump and Solar Power Info Portal” has been developed in cooperation with web-page design companies and will be maintained within the same cooperation. More customers stories will be added, and heat pump data sourced.
<b>Value Propositions</b>	<p>The main objective is to inform house/building owners on heat pumps as an alternative to oil burners for space heating.</p> <p>Heat pumps are a relatively new technology in the Faroe Islands and there is a need for unbiased information on available systems.</p> <p>The service includes technological and financial information.</p>

	The service also includes information on solar panels.
<b>Customer Relationships</b>	The service provides the public with relevant and necessary information, both technical and financial, on heat pump technology as an alternative to oil burner for space heating and invites users to communicate their experiences. Furthermore, the service delivers information on solar energy systems in the Faroe Islands.
<b>Customer Segments</b>	General Public Existing and new house/building owners Heat Pump installers Building Authorities Technical Colleges and Universities Students
<b>Key Resources</b>	Website hosted on www.orka.fo Heat Pump calculator data updates Input to additional Storytelling Live Data heating systems database Technology for obtaining live data
<b>Channels</b>	Information will be shared with the public through the service website Promoted on social media Promoted through stakeholders Energy fairs Community Groups and word of mouth
<b>Cost Structure</b>	FEA will bear the costs of operation and maintenance of hardware and software for the heat pump portal. The service will run on an ongoing basis.
<b>Revenue Streams</b>	Value can be monitored in usage statistics, the number of stories appearing on the site and the number of comments from the public.

### 5.5.2. Feasibility of the FEA service

Indicators	Timeline
<b>Key Issues</b>	<ul style="list-style-type: none"> <li>• Acceptance of the new technology (Heat Pump)</li> <li>• Prioritisation of the needs and stories</li> <li>• Systematisation of the available resources</li> <li>• New procedures for optimisation of the service</li> <li>• Maintenance of the service within the cooperation</li> <li>• Monitoring and evaluation</li> <li>• Accuracy and statistical representation</li> </ul>

<b>Key Factors (Internal)</b>	<ul style="list-style-type: none"> <li>• Matching needs and available expertise</li> <li>• Ability to reproduce and sustain the co-creation journey</li> <li>• Culture of research and innovation</li> </ul>
<b>Key Factors (External)</b>	<ul style="list-style-type: none"> <li>• Availability of web-page design companies (limitation of free and trial versions)</li> <li>• Possibility of vendor lock-in</li> <li>• New funding opportunity to support development of the service (scaling)</li> </ul>
<b>Uncertainties</b>	<ul style="list-style-type: none"> <li>• Sustainability through volunteering and potential disinterest in continuing</li> <li>• Sufficient demand from local/regional policy makers</li> <li>• Time constraints in preparing materials for the service</li> </ul>
<b>Success indicators</b>	<ul style="list-style-type: none"> <li>• Community groups engagement</li> <li>• Number of stories</li> <li>• Number of feedback responses</li> <li>• Figures before and after the use of the service (Heat Pump)</li> <li>• Energy consumption</li> <li>• Social Media hits</li> </ul>

### 5.5.3. Sustainability of the FEA service

Sustainability levels	Indicators
<b>Scale up</b>	<p>The service can contribute to and make an impact at the European level</p> <p>The service can provide recommendations on inclusive and responsible collaborative research and innovation practice and policy making</p>
<b>Scale out</b>	<p>The service can be used by other EU projects to reach targeted organisations/communities.</p> <p>Reach new target audiences and extend support to different sectors of public administration and geographical scope</p> <p>The service is expanded to other networks and initiatives in Europe and beyond.</p>
<b>Scale deep</b>	<p>Policy makers could provide recommendations on implementation of green energy</p> <p>The service has the potential to encourage integration of co-creation in the working culture of organisations</p>

## 6.SWOT analysis for the services: a common public service approach

This section contains a SWOT analysis of the services, which has been performed to evaluate significant factors that would affect their implementation in the long run. The goal of this section is to illustrate the potentialities and shortcomings of the services that should be taken into consideration in the ideation and implementation stages by providers of similar services.

<p><b>Strengths</b></p> <p>Profound knowledge and know-how acquired by all partners that can be used transversally in all the services (as primary service providers or supporters)</p> <p>Have a set of highly relevant and applicable factors that can be used in the provision of the services</p> <p>Strong and diverse expertise presented by the partners that can be used to balance the presence of different knowledge and skills for the provision of the services</p> <p>Diverse types of activities can be provided for each service that would meet the needs of a wide range of target audiences</p> <p>A unique approach to co-creation in the form of the co-creation journey that can be the selling point for the project</p> <p>Pool of professionals and organisations with a wide range of expertise in public service co-creation</p>	<p><b>Weaknesses</b></p> <p>Many uncertainties about the partners' commitment and capacity to provide the necessary resources to ensure availability of the services in the long term</p> <p>Lack of visibility once the project ends and promotion of the services and exploitation actions must be implemented by the partners</p>
<p><b>Opportunities</b></p> <p>Creation of stronger collaboration between partners that can be beneficial in the implementation of similar initiatives and actions outside the EMERGREEN project</p> <p>Acquisition of new knowledge and methods/tools that could feed into existing and future development</p> <p>Provide a long-term exploitation strategy and service-based business models to the services developed in EMERGREEN</p> <p>Provide a long-term exploitation strategy and service-based business models to other projects in social and public service innovation</p> <p>Create synergies with other members who are not directly involved in the EMERGREEN project through activities of the services</p> <p>Opportunity to increase the outreach and socioeconomic impact through the provision of the services and collaboration</p>	<p><b>Threats</b></p> <p>The partners need to provide resources not funded by the project and thus, would come from external sources that are not definitive or consistent</p> <p>The quality-of-service provision depends on the overall impression of the end-users. In cases where the services are only developed in the English language, this may discriminate against the involvement of many potentially interested target audiences.</p>