

BeeStreet

Project Description

Client

	Municipality of Leeuwarden
	This project is about designing a circular system to deal with extreme weather situations on the city level. Solutions that combine greening and cooling elements with smart irrigation and rainwater collecting systems are expected.

Theme

Netherlands is experiencing drastic changes in rainfall patterns in relation to global warming. The rainfall used to be evenly distributed, which allowed the existing infrastructure in the city to rapidly get rid of the rainwater that gets collected on the streets. However, recently rain is falling in large quantities in a short amount time following a shower-like pattern. The infrastructure is not adapted to dealing with such large puddles of water on the streets. The assignment is to design a solution to use the excess water for creating greener streets.

The BeeStreet is part of the project Smart Leeuwarden. Smart Leeuwarden tries to find an answer to the question of how we can respond to the changing inner city. The city of Leeuwarden has many water channels and parks, but not much greenery on the streets themselves. The city wants to be an example in using the rainwater in a smart way to create greener streets, which will also provide additional benefits such as cooling, attracting bees and creating a pleasant atmosphere.

Contacts

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Design challenge

Due to urbanisation, the rain water can not sink into the ground and the sewer system must process all the water and get overloaded. The cities are becoming more and more stone and concrete areas and we are increasingly faced with heavy rainfall. Since 1950, the number of days with heavy rain, with 50mm or more rainfall, doubled and will increase. This water can be used for the greening of the cities with which we can solve another problem. We therefore want to use the rainwater, possibly store it, or if possible delay it to use later. This can be done through green roofs or green walls, infiltration zones and above- or underground storage.

How can we apply new technology in the outdoor space for the benefit of the experience of residents and entrepreneurs in the city centre in a creative way for people and for bees, a solution for heat stress, rainwater storage and especially for a cosy street! For instance, during longer periods of heat, the bricks become hot and reflect the heat to the surrounding, which causes heating in cities. The rainwater that is stored can be used to supply the green area with water during warm and dry days.

Your challenge is to design a circular system of rainwater use for Leeuwarden that can be an example for other cities in Europe. You have to think of smart solutions to store the rainwater in the city keeping in mind what happens during heavy rainfall and how to guide all the water.

The citizens, shopkeepers and shop associations will be the owner of the system in their part of the street. The municipality of Leeuwarden only facilitates the development of the systems. The new owners have to maintain the systems and the plants. Therefore your communication with local stakeholders will be crucial.

We also want you to consider a communication campaign to inform and persuade the new owners of the product you will be designing as well so they feel proud that they are a part of this green community.

Target group

- citizens
- entrepreneurs in the city (shop keepers, restaurant and café owners)
- visitors streets
- municipality

Deliverables

1. Design a circular greening and cooling system for Leeuwarden.
2. Design an aesthetic green plan.
3. Communication strategy to inform the new owners.

The project pitches are scheduled on 10 September 2018.

1. Out of Phase 1:
Product design proposals in a socio-technical system context are presented to the customer.

2. Out of Phase 2:
Product-service system proposals, product concepts and how these concepts fit in a circular economy are presented to the customer.
3. Out of Phase 3:
Prototype, marketing ideas and test results are presented to the customer.
4. A strong advice is reported *for Smart Leeuwarden in which you emphasize*
 - chosen method of dealing with rainwater
 - translation of this method to a product/product-service system and reasons why this is the best fit and the most successful one to develop
 - why the prototype looks this way and why the product development fits into the circular economy
 - how the solution fits the demands/requirements & technical details
 - main findings & conclusions and advice for the client

Planning

The Circular Design Internship uses Design Thinking as method for the design process. You will present a prototype to your client at the end of each phase of the programme. In these phases you will go through all stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test. Based on the insights that you gain, your design will develop in an iterative manner. You will start your process by looking at the larger system in which your product functions. From there you will focus towards the design of the physical product.

Phase 1: socio-technical system design

The first phase of your project centres around the socio-technical system that your product will be part of. This system is made up of a large number of mutually interdependent elements that are not necessarily formally related, such as product-service systems, infrastructure, and legislation. You are asked to develop a conceptual design of this system and the product. The main output of this phase should be an overview of the smart irrigation system. By looking at the current system around rainwater and green in the city you can form an understanding of problems of opportunities in the system. From this, you will be able to determine criteria for the new system and develop a new design for the system. Methods that you could use are system blueprint mapping, actor mapping, and value chain mapping. Evaluate the new design to determine the best direction for product-service system development in the next phase of the project.

Phase 2: product-service system design

The second phase of the project focuses on the product-service system. A product-service system consists of the physical product and the service components, which are offered as a cohesive whole to the customer. In this phase of the project you are expected to look into how the system will be offered to the customer, how the rainwater will be stored, and the communication with new owners works. You will further detail the design of the products used for the whole system. Tools that you can use in this phase are storyboards, scenarios, sustainability diagrams, business model canvas, and PSS system maps.

Phase 3: product-technology design

In the last phase of the project you will focus on the design of the new system. Your task is to further detail the design of the physical product to a level that House of Design and the municipality Leeuwarden will be able to get it ready for production. You are expected to develop a 3D model of the system and to document the design technically. Many tools exist that can help you in the design of the physical system. You can find some tools that are specifically useful for circular design in the OER database of the project.

Conditions

- A budget for product development might be available.
- Any potential intellectual property rights arising from the project reside with the client and its partners in project Smart Leeuwarden.
- Weekly checkpoints with the tutors.
- 3-weekly presentations for tutors and client.
- ...

Stakeholders

	Municipality of Leeuwarden
	NHL Stenden Hogeschool
	Multi-campus university of applied sciences involved in design and research activities of BIOCAS.
	House of Design
	Sustainable design centre that initiates and organises projects to make sustainable innovation visible and tangible.
	Hogeschool Van Hall Larenstein
	University of applied sciences.

New product/market combination for Lankhorst

Project Description

Client

Lankhorst <i>Engineered Products</i>	Lankhorst
	Lankhorst Engineered Products develops and produces high quality plastic products, based on recycled as well as virgin materials.

Theme

Lankhorst produces thick walled products from recycled plastic for high-end applications. When plastics are being recycled, interminglement and contamination of polymers often makes it impossible to use the plastics for the same application again. Other applications are still possible, mainly in larger products with thick walled products. Besides, the lower end applications, where the mechanical properties of the plastics are less important, are being fulfilled with recycled plastics. The fact that the applications require high loading correlates with the use of recycled plastics, since due to the high loads, the products have to be voluminous. Therefore large amounts of plastics are needed. The quality of the plastic is then clearly important to be able to provide products that can fulfill their tasks in a reliable way.

The continuous goal of Lankhorst is to expand the possibilities of application and look for alternative markets and products to increase the recycling of plastics and create high value products from recycled plastic. These products often, but not always, already exist in wood, steel or concrete. Creating these products in recycled plastic however needs a whole different perspective on the design of the product. Your challenge is to find a new product/market combination, which suits recycled plastic and the production technology of thick walled products of Lankhorst.

Contacts

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Design challenge

Your challenge is to find a new product/market combination, which suits recycled plastic and the production technology of thick walled products of Lankhorst. That means, look where the added value of the material and the product gives the best opportunities to create a successful combination on the most suitable market. Of course you explore the circular aspects as well. When you have found the best fit, you design and construct the product, build a prototype and test it first on the requirements/demands and after that technical and in its context with the target group.

Target group

- Lankhorst core markets include: civil and construction engineering, recreational industry, agricultural industry, marinas, local councils, authorities and governments, contractors, architects, gardeners and industrial companies.
- The target groups needs to be extracted from for example “city as text” and the “Ansoff growth matrix and related growth strategies”.

Deliverables

The project pitches are scheduled on 10 September 2018.

1. Out of Phase 1:
Product design proposals in a socio-technical system context are presented to the customer.
2. Out of Phase 2:
Product-service system proposals, product concepts and how these concepts fit in a circular economy are presented to the customer.
3. Out of Phase 3:
Prototype and test results are presented to the customer.
4. A strong reported advice for the client

Planning

The Circular Design Internship uses Design Thinking as method for the design process. You will present a “prototype” to your client at the end of each phase of the programme. In these phases you will go through all stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test. In this project particular project for Lankhorst Empathize, Define and Ideate are Phase 2 and Prototype and Test Phase 3. Based on the insights that you gain, your design will develop in an iterative manner. You will start your process by looking at the larger system in which your product functions. From there you will focus towards the design of the physical product.

Phase 1: socio-technical system design

In this phase you will look into the current products and markets of Lankhorst. With, for example, the Ansoff growth matrix and related growth strategies, you come up with a

proposal for at least three different interesting product/market combinations.. Besides that you will do some, for example, field research, a city as text (de stad als atelier: <https://profielen.hr.nl/2013/leren-door-met-wildvreemden-te-praten/>) and desk research related to the question: “Which kind of products could be made of the recycled plastics material Lankhorst uses and fits their production technology? During this phase you will compile demands and requirements needed for your concepts and we strongly recommend you to step outside your product design comfort zone and be creative.

Some remarks:

- Find processes and product out of the box.
- Look into mondial, local, urban, social, demographic, etc. trends and growth.
- Get familiar with the subject and meaning of “Circular” and its impact on the project.
- Eco-indicator, CO2-footprint, circular performance, eco-design strategies and the circular economy system diagram.
- Life cycle analysis, SimaPro.
- Function analysis.

Phase 2: product-service system design

The second phase of the project focuses on the product-service system. A product-service system consists of the physical product and the service components in a circular economy (<https://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram>), which are offered as a cohesive whole to the customer. At the end of this phase you will come up with three concepts (product-service system proposals). It is preferable that the three concepts each have a different kind of engineering principal. Beside that you will have to make clear which circular design strategy you have chosen and why and how circular these concepts are. All concepts are worked out to the same level of details so one of them is easy to pick. You will look into persona’s, SWOT, do a artefact analysis, a stakeholder- and actor analysis, put op a Porter value chain, a customer- and user journey use storyboards, scenarios, sustainability diagrams, business model canvas, and PSS system maps.

Phase 3: product-technology design

You are expected to develop an deliver a 3D model, run tests, document the design technically and give a strong advice in terms of

- chosen product/market combination
- translation to chosen product and reasons why this product is the best fit and the most successful one to develop
- why the prototype looks this way and why the product development fits into the circular economy
- how the solution fits the demands/requirements & technical details
- main findings & conclusions and advice for the client

Reflect on process and prototype in clear conclusions and recommendations. You can find some tools that are specifically useful for circular design in the Open Educational Resources (OER) database of the project.

Conditions

- A budget for research and prototyping might be available upon discussion.
- Working at the company / client one day a week.
- Weekly check-points with the tutors.
- 3-weekly presentations for tutors and client.
- ...

Stakeholders

Lankhorst <i>Engineered Products</i>	Lankhorst Engineered Products

 hogeschool	NHL Stenden Hogeschool

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Biocups for festivals

Project Description

Client

	LIMM Recycling
	LIMM Recycling is a sustainable business providing a recycling system for drinking cups, founded in Appelscha and Smilde in 2009.

Theme

LIMM focuses on contributing to the Circular Economy by recycling plastic coffee cups. LIMM chooses for a regional orientation, in the belief that sustainable entrepreneurship is also about caring for each other and investing in your own region.

The company offers a recycling system for polystyrene coffee cups. In this system, cups are delivered in the requested size and colour to the client together with a special collection bin and cardboard boxes. Used coffee cups are disposed in this collection bin, stored hygienically, and collected by LIMM Recycling when the bin is full. New cups are given to the organization. The used cups are then recycled into new products, such as coat hangers and flowerpots.

LIMM Recycling is currently expanding its market to new product categories, and is looking to make their products even more sustainable project. BIOCAS is one of these projects, which focuses on the development of a new drinking product made from bio-plastics for festivals. LIMM Recycling already made progress in development of the material for the new product, but needs your help with its design.

Contacts

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	Job	Owner of LIMM Recycling
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Design challenge

LIMM Recycled is involved in one of the subprojects of BIOCAS together with NHL Stenden, WorldPerfect, House of Design, and Van Hall Larenstein. The goal of this subproject is to develop a sustainable drinking product made from bioplastics and to set up value chains for the product at festivals.

Disposable plastic drinking cups that are commonly used at festivals, universities and governmental institutes form an environmental problem. People leave them behind at festivals after use, mostly on the ground. This creates a big mess. And worst of all, the plastic ends up in canals, lakes, and even in the sea. The bio-plastic products that will be developed as a part of BIOCAS are meant to replace the throwaway cups that are currently in use. From a sustainability perspective, the use of bio-plastics can offer considerable benefits over the use of petroleum-based plastics.

Your challenge is to design a new way in which festival visitors can enjoy their drinks at festivals, using plastics made from biomass. What would an ideal drinking product for festivals look like? How can the system around the product be organized? How can it be made circular? The new design should replace the cups that are currently used at festivals. We want you to look into the behaviour, wants and needs of people that visit festivals and reimagine the design of the festival cup. It should be more than a throwaway item. Your solution will need to intervene at different system levels: the socio-technical level, the product-service system level, and the product-technology level.

Value chain

The aim is to set up a new sustainable value chain for the product. We want you to think about what is needed to realize the product, who need to be involved, and what their roles in the value chain will be. A meeting will be organised for the development of the value chain. You are expected to contribute to the organisation of this meeting and to use the output of the meeting.

Behavioural change

We would like to see that the new cup is not left behind on the ground at festivals, because this creates a big mess. Communication around the use of the new product should help change the behaviour of people. It must invite visitors to keep their cup during the festival and perhaps even longer.

Collecting the cup

To make sure that plastic does not end up as waste in nature, you will need to develop a new collection method for the drinking cup as part of the product-service system. While it is preferred that the drinking cup is used more than once, the options of a cup that is recycled, a durable take-back cup, and a biodegradable cup all have to be considered.

Proven sustainability

It is important to be able to substantiate the extent to which the new product is more sustainable than the current plastic cup. Project partner Van Hall Larenstein will support you in this. Students from Van Hall Larenstein have studied sustainability aspects and will be working on the project at the same time. You are expected to collaborate with them and to exchange knowledge throughout the project. They can support you in decision-making.

Business model

LIMM Recycling will eventually develop the product and provide it to the festivals in the value chain. For LIMM Recycling it is important to know how they can create, capture and deliver value. We want you to develop a business model for the product as well.

Target group

- Festival organizers
- Festival visitors
- Festival staff
- Beer brewers & Other beverage providers

Deliverables

The project pitches are scheduled on 10 September 2018.

1. Out of Phase 1:
Proposals within the socio-technical system of a festival context are presented to the customer.
2. Out of Phase 2:
Product-service system proposals, product concepts and how these concepts fit in a circular economy are presented to the customer.
3. Out of Phase 3:
Prototype and test results are presented to the customer.
4. A strong advice is reported *for LIMM in which you emphasize:*
 - Strategy for changing the behaviour of users
 - Collection method for the material to be recycled
 - Business model for the product / product-service system
 - Value-chain analysis for the product.
 - Translation to chosen product and reasons why this product is the best fit and the most successful one to develop
 - Why the prototype looks this way and why the product fits into the circular economy
 - How the solution fits the demands/requirements & technical details of the product made of bio-plastics
 - Main findings & conclusions and advice for the client

Planning

The Circular Design Internship uses Design Thinking as method for the design process. You will present a prototype to your client at the end of each phase of the programme. In these phases you will go through all stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test. Based on the insights that you gain, your design will develop in an iterative manner. You will start your process by looking at the larger system in which your product functions. From there you will focus towards the design of the physical product.

Phase 1: socio-technical system design

The first phase of your project centres around the socio-technical system that your product will be part of. This system is made up of a large number of mutually interdependent elements that are not necessarily formally related, such as product-service systems, infrastructure, and legislation. You are asked to develop a conceptual design of this system and the product. The main output of this phase should be an overview of the value chain of the new product. By looking at the current system around drinking cups for festivals you can form an understanding of problems of opportunities in the system. From this, you will be able to determine criteria for the new system and develop a new design for the system. Methods that you could use are system blueprint mapping, actor mapping, and value chain mapping. Evaluate the new design to determine the best direction for product-service system development in the next phase of the project.

Phase 2: product-service system design

The second phase of the project focuses on the product-service system. A product-service system consists of the physical product and the service components, which are offered as a cohesive whole to the customer. In this phase of the project you are expected to look into how the new product will be offered to the customer, how it will be collected, and what the business model for the product will be. You will further detail the design of the product. Tools that you can use in this phase are storyboards, scenarios, sustainability diagrams, business model canvas, and PSS system maps.

Phase 3: product-technology design

In the last phase of the project you will focus on the design of the new drinking product. Your task is to further detail the design of the physical product to a level that LIMM Recycling will be able to get it ready for production. You are expected to develop a model and document the design technically. Many tools exist that can help you in the design of the physical product.

You can find some tools that are specifically useful for circular design in the OER database of the project.

Conditions

- A budget for product development might be available.
- Any potential intellectual property rights arising from the project reside with the client and its partners in project BIOCAS.
- Working at the company / client one day a week (?)
- Weekly check-points with the tutors
- 3-weekly presentations for tutors and client
- ...

Stakeholders

	<p>Provinsje Fryslân</p> <p>Regional government of the province of Fryslân that acts as lead partner of project BIOCAS.</p>
	<p>NHL Stenden Hogeschool</p> <p>Multi-campus university of applied sciences involved in design and research activities of BIOCAS.</p>
	<p>WorldPerfect</p> <p>Sustainable consultancy firm from Denmark that will set up a value chain for BIOCAS in Denmark.</p>
	<p>House of Design</p> <p>Sustainable design centre that sets up a value chain in the Netherlands together with NHL Stenden and helps with the design process.</p>
	<p>Hogeschool Van Hall Larenstein</p> <p>University of applied sciences involved in sustainability assessment and value chain and business model development of BIOCAS.</p>

LIMM Recycling is one of the organisations involved in project BIOCAS, which is part of the Interreg North Sea Regio (NSR) programme. The main aim of the project is to develop rural areas in the NSR into prosperous areas by realizing Biomass Cascading Alliances (BCA) covering all stakeholders involved in the value chain of biomass. Eighteen partners from The Netherlands, Denmark, Germany, and Belgium participate in the project.