CHALLENGE

Empowering Zero-Emission Logistics 2023

Cookbook – Instructions

Participating educational programmes

Minor Port Management and Maritime Logistics
Erasmus Universiteit, Maurice Jansen

Minor Haven en stadslogistiek
Hogeschool Rotterdam, Annemieke de leeuw & Alexander de Vries

Connection to industry and research 2nd year & **Minor Change** 4th year
Breda University of Applied Sciences, Peter Kole

Zero-emissie logistiek
Fontys, Peter Heiden

Stadslogistiek, circulariteit & Physical Internet
Hogeschool Utrecht, André Amoraal

Minor Maritime & Port Management – MPM
Hogeschool Rotterdam, Jeroen Visser & Pim Warffemius

Toegepaste Logistiek 4th year
Hogeschool van Amsterdam, Kees-Willem Rademakers

Master International Supply Chain Management
Hogeschool Rotterdam, Ewoud Moolenburgh

Logistics & Supply Chain Management
Hogeschool Rotterdam, Pieter Verschoor

Organisation

www.zeroemissionchallenge2023.nl

UPT Erasmus
ERASMUS CENTRE FOR URBAN, PORT AND TRANSPORT ECONOMICS

Topsector Logistiek

Content

Introduction

Welcome to the Cookbook for the Challenge Empowering Zero-Emission Logistics 2023!

As a student, teacher, or organisation you have accepted a regional challenge. In just a few months you will perform an analysis for the challenge and develop a solution (or solution path). This Cookbook guides you through the steps, provides helpful background information, and provides the basic structure for the work in the sprints and submission. The same with cooking, the Cookbook offers suggestions and templates for assessing the challenge. Based on your own wishes and skills, you can literally follow them, use them as inspiration or solve them differently.

The best participating teams in the Netherlands will present at the national event during the ICT & Logistiek fair on 8 November in the Jaarbeurs Utrecht. The price winners will also be announced there. Mark this day in your agenda!

Start - from September 1st

Select an application area* and contact an organization
- building logistics
- multimodal corridors
- city logistics
- supply chains

For a team of 3-5 students, a captain and organization (company or public entity)

* see https://topsectorlogistiek.nl/uitvoeringsprogramma-2021-2023/

Sprint 1 - September - define your challenge

Analyze the challenge of Zero-Emission Logistics with the stakeholder

Why, who, where, what?

transport modes: emissions and electrification

chain: producers, suppliers and customers

city and region: impact in corridors, hubs and area

Define a sharp challenge

problem statement: what is going wrong?

SMART goals: when is the challenge solved?

Sprint 2 - October - develop a solution (path)

Combine elements of an area-specific solution (path)

Discuss solutions, sketch and develop

technology: vehicles, information, automation

policy: spatial or economic, restrictive or stimulating

behavior: comfort and sustainability

service: reliable, (coste)efficient and sustainable

Show how it can work in practice!

Finish - November 8th - ICT & Logistics fair

Present the solution (path) in a visual and original way

- urgent zero-emissie challenge
- convincing solution (path), taking different interests into account
- clear presentation
- share your solution with others

Why is zero-emissions logistics urgent?

Transport of goods has been called the circulatory system of society. Without logistics, the economy will stagnate. At the same time, the emissions from freight transport are responsible for a significant part of the climate problem. Therefore, it has been agreed at a global and European level that emissions must be reduced. In addition, from 2025, zero-emission zones will be set up in most large and medium-sized cities to improve the quality of life. This is all easier said than done and your sharp analyses and innovative ideas are sorely needed.

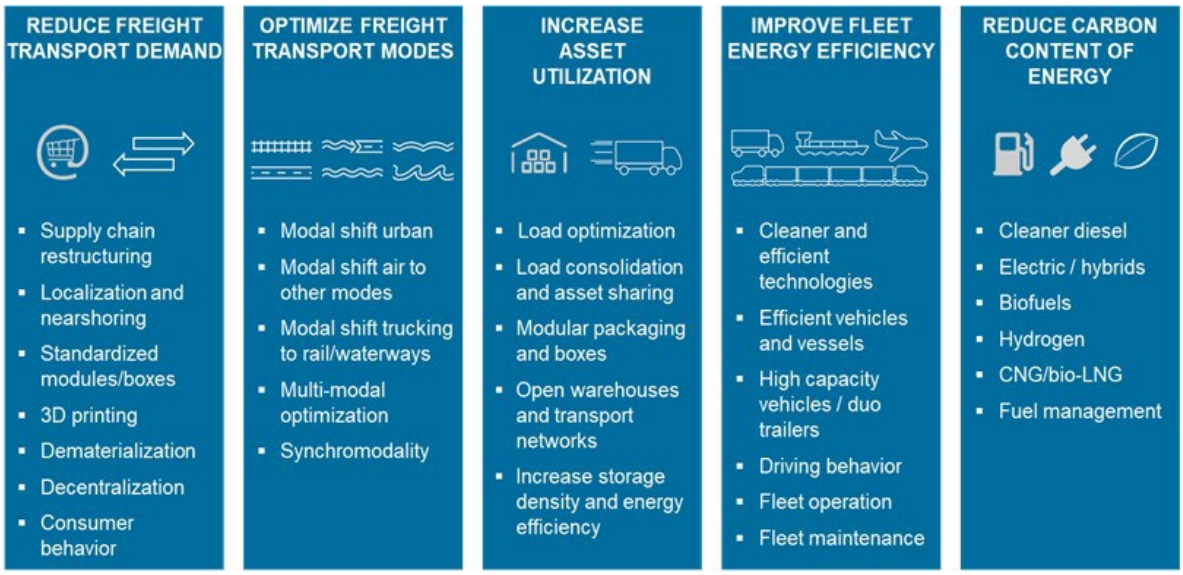
Broadly stated, there are three ways to work on this zero-emissions challenge:

1) Short-term: Improving the efficiency of the existing fleet by more sustainable driving behaviour, cleaner technologies and better use of transport modes.
2) Medium term: Reorganising the supply chain by consolidating, standardising, sharing information, sustainable consumer behaviour and efficient use of distribution facilities.
3) Long term: Applying alternative fuels and electric vehicles/vessels.

Fortunately, not all emissions have to literally go to zero. A large reduction is already challenging enough for now.

New solutions often sound very promising, however there are no silver bullets which simply cut all emissions. Therefore, it important to stay critical as a team. Will hydrogen solve alle the energy problems, as some parties' claim, or will it pose other challenges that also need to be addressed? To what extent can we continue with increasing freight transport in a limited space and infrastructure? Are all parties in the chain willing to share their data, or will this require a policy measure?

Measuring is knowing! This is also true for reducing the emissions in a complex transport chain. More tools are becoming available to measure the CO_2 emissions of freight transport (GLEC, BigMile) and guidelines are developed for measuring them (ISO, CEN). But how do you apply this in practice? By offering relevant choices to customers, or by focusing on emissions from other parties in the chain?



From 'Decarbonizing Logistics – distributing goods in a low-carbon world', a book by Alan McKinnon (2018)

Good luck!

For more information about the challenge, visit the following website:
www.zeroemissionchallenge2023.nl
For questions please mail to:
challenge.upt@ese.eur.nl

Team

The first step of the challenge is to form a team. The teams compete for the best submission but working together is often smart to help each other to reach a higher level.

Forming a team

De teams of the Challenge work in a composition of 3-5 students, a lecturer, and an organisation (e.g., a municipality or a company). Each team chooses one of the application areas*.

Logistics and transportation are everywhere in different forms. We have formulated four application areas for you to choose from. The choice of application area depends on your educational programme and your cooperation with an organisation. The application areas are as follows:

- Construction logistics
- Multimodal corridors
- City logistics
- Supply chains

The reduction of emissions can also be realised in a production- or business process, or with consumption related to these application areas. If your challenge is broader than one of the application areas, please describe this in step 2.

Check the website for more information: https://topsectorlogistiek.nl/uitvoeringsprogramma-2021-2023/
* If you have a reason for a different team composition, in consultation we can discuss the possibilities.

1. Describe the team composition (include name and functions)

2. Specify the application area for your challenge

3. Register your team using the form below

https://erasmusuniversity.eu.qualtrics.com/jfe/form/SV_7VVWIzJDCL3DnIG

Sprint 1 – Define the Challenge

During the first sprint of the Challenge, you will break down the challenge step-by-step into four W-questions: Why, Where, Who, and What. You start with the Why-question and next you work out the Who- and Where-question. Then you will formulate the What-question of the Challenge. In the end you have formulated and substantiated a clear challenge. In sprint 2 you will design a solution and with that you will answer the How-question. It is important to collect your own information, for example in consultation with the organisation involved in the team and in (online) public sources. Below are some suggestions to get you started:

General

Decarbonizing Logistics (2018)
Search for this book in the library.

Smartport Rotterdam – roadmap Smart Logistics;
https://smartport.nl/en/roadmaps-projects/smart-logistics/
(For English: click on the flag in the right corner)

Knowledge institute for mobility (KiM);
https://english.kimnet.nl/
(For English: scroll at the bottom of the website and click on "English")

Zero-emissie initiatieven

Zero emission zones
www.opwegnaarZES.nl
(For English: click on "English" in the right corner)

MAGPIE project: Smart Green Initiatives
(Zero emission initiatives in the port)
https://www.magpie-ports.eu/magpie-port-of-rotterdam-led-collaboration-working-towards-a-zero-emission-port/

Global Logistics Emissions Council:
https://www.smartfreightcentre.org/en/

Zero-emissie zones and hubs

City hubs
(Interactive map in Dutch)
www.stadshubs.nl

Toward greening city logistics
(Scientific article)
https://www.mdpi.com/2305-6290/7/1/19

Smart Logistics Projects
(For English: click on the flag in the right corner)
https://smartport.nl/en/roadmaps-projects/smart-logistics/

WHY? Why is zero emission important?

Urgency zero emissions

The importance of reducing emissions in the logistics and transport sector

The logistics sector is under pressure due to emission reduction policy. An important goal for the entire sector is to strive for large reduction of emissions. Why is it important to reduce the emissions in the sector? What happens if the sector does not become more sustainable?

Some useful suggestions to answer the Why-question (These working methods are not mandatory!):

- Use news articles to substantiate the urgency of the emissions in the logistics. Make a slide with an overview of news articles.
- Use the Fishbone Diagram to make a case-effect analysis.
- Use the Iceberg Method to discover hidden patterns and structures. Consider, for example, the question: Why is it so difficult to realise zero-emission logistics?

1. Describe why zero emissions is important for the logistics sector

WHO? Which organisation are you focusing on?

Specify the organisation

Which organisation are you focusing on?

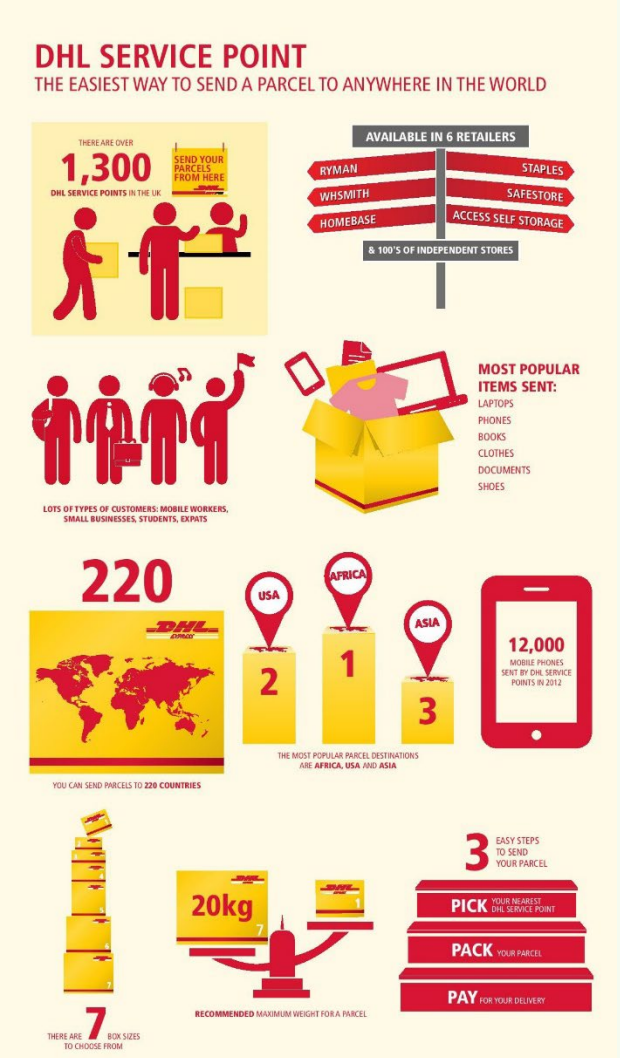
Different types of organisations are needed to realise zero-emission logistics. Every logistics organisation can contribute to reducing emissions in the sector. During the challenge you focus on one organisation. In the Who-section, you describe the organisation by making an organisation profile.

Work form: Make a profile of the organisation and think about the following elements:

- Name of the organisation
- Type of the organisation. Consider the following three:
  - Public institution (e.g., municipality or government)
  - Knowledge institution (e.g., research institution)
  - Company (e.g., transportation company)
- Core activities of the organisation related to logistics
- Size of the organisation (e.g., the number of employees)
- Mission and/or vision of the organisation
- Tools and type of skills within organisation
- Performance: Financial and non-financial performance indicators.

Present the profile in an attractive way!

See the example of DHL:



2. Make an organisation profile

WHO? Which organisation are you focusing on?

Stakeholder field

Which stakeholders are important to the organisation?

Collaboration between different stakeholders is important to reduce emissions in the logistics chain. In this Who-section you will perform a stakeholder mapping.

Working method 1: Ask your organisation which stakeholders are important and why. Describe the various parties, their required commitment and cooperation.

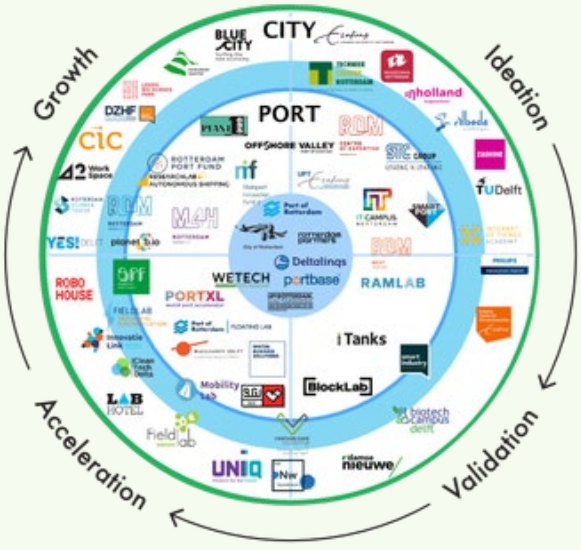
Example: A transport company would like to reduce emissions by investing in electric trucks. It is important for the transport company that charging stations across the transportation corridors will be built. The government is an important partner because they are responsible for the public infrastructure. You can write down the following:
Government > Responsible for the public infrastructure

Working method 2: Visualise the stakeholders by performing the stakeholder-mapping. Draw your organisation in the middle of a diagram and draw important the logos of important stakeholders around it. Create categories to organise the stakeholders in a logical way. For example, public and private stakeholders or their place in the logistics chain. See the example of the port authority.

Tools: You can use digital tools to visualise the stakeholders, for example in PowerPoint, MIRO, and Mural. You can also draw it by hand and share a photo.

Some useful suggestions to answer the Who-question (These work methods are not mandatory!):

- Apply the Roleplay Method to understand and describe the different stakeholders to each other.
- MIRO has an example-template you can use: Ecosystem mapping



Example: Stakeholder mapping (Port of Rotterdam)

3. Visualise the stakeholders of your organisation in a map

WHERE? Where does the challenge take place?

Specify the geographic scope of the challenge
Where does the challenge take place?

In this section you will visualise the geographic scope of your challenge. Does your challenge focus on a specific region or city district or is it a global chain. Show the geographic scope and consider the following levels:

- Global level
- European level
- National level
- Provincial level
- Municipal level
- City district
- ...

When analysing the challenge, it is important to be as concrete as possible. Therefore, also consider the following questions for your geographic scope:

- Which cities are involved?
- Which infrastructure?
- Which rivers?
- Which roads?
- Which nodes?
- Which transport modes?
- Which goods flows?

Work form: Visualise the geographic scope! For example, use a map or visualise a chain and display the relevant cities, infrastructure, rivers, roads, nodes, or transport modes...

Tools: You can use digital tools to visualise the stakeholders, for example in PowerPoint, MIRO, and Mural. You can also draw it by hand and share a photo.

4. Provide the geographic scope

WHAT? What is the challenge?

Define the challenge for the organisation and region

What is the challenge?

Challenges to reduce emissions are often complex. A schematic representation of the problem, like a mind map, can help to get an overview. Use the previous parts for defining your challenge:

- Why (urgency)
- Who (organisation)
- Where (level and region)

Working method 1: Create a Mind Map! Draw the organisation and/or challenge and place the visualisations of previous parts around it.

Tools: You can use digital tools to visualise the stakeholders, for example in PowerPoint, MIRO, and Mural. You can also draw it by hand and share a photo.

Working method 2: Formulate the challenge from the Mind Map. The following criteria are important to define a clear challenge:

- Formulate the challenge in one sentence.
- Start formulating with '**how**' or '**design'** or '**think**'. This way of formulating invites innovations and ideas.
- Mention the organisation for which you are developing the challenge in the formulation.
- Apply a concrete focus. Do not formulate the goal too broadly or too general, as this can make the solutions less inspiring.
- Formulate the challenge attractively. Which (final) outcome excites you?

Some useful suggestion to answer the What-question (These work methods are not mandatory!):

- The Chain Notes Method can help you to walk through a process by giving the word to another team member to describe a process and the corresponding bottleneck.

5. Share the Mind Map and the formulation of the challenge

WHAT? What are the requirements for the solution?

In contrast to a traditional design process, no ready-made program of requirements is available for new and complex problems. The team will therefore have to list the requirements for the solution themselves.

SMART methodology

There are several ways to propose requirements for a solution. You can talk to the organisation involved and/or analyse documents of the challenge. In addition, it can help to search online for similar challenges and research the corresponding solutions. Set priorities: Some requirements are not that important and are better left out in a short project.

Tool: To make a clear and feasible list, following elements of the SMART methodology:

- Specific: Is the definition of the challenge clear?
- Measurable: Under what (measurable/observable) conditions or form has the goal been achieved?
- Acceptable/Assignable: Are these goals acceptable to the target group and/or management?
- Realistic: Is the goal achievable?
- Time-bound: When (in time) must the goal be achieved?

6. List the requirements for the solution below, with the most important requirements at the top

Sprint 2 – Design a solution

In the second sprint of the Challenge, you will elaborate the challenge step-by-step. This can be done (1) by developing a concrete solution or (2) by elaborating a solution path. That choice depends on the course in which the team participates in the Challenge: sometimes a course continues well after November and then a solution path is more feasible. As in sprint 1, the more concrete the elaboration, imagination, and substantiation, the more convincing the idea comes across. If the project is aimed at developing a solution, then highlight this properly and show how it works in practice. If the subject is still in an analysing and inventorying phase, then elaborate these results and draw sharp conclusions for the path of the solution.

In this sprint, the teams go through a short design cycle, which consists of three steps: review of existing solutions, sketch, and elaboration. The sketch of a developed solution is adjusted at least once based on feedback from the organisation involved. The more often you perform such a design iteration (feedback and adjustment), the better the solution becomes. At the end you evaluate the elaboration of the solution (or solution path) in relation to the assessment criteria of the challenge. While you prepare you submission you can also make adjustments.

Existing solutions

No professional designer starts with a blank sheet, especially when time is short, and stakes are high. Previous solutions have already been developed with great pain and effort. It would be unfortunate to ignore these. Sometimes they suddenly become useful when you adapt a part or combine different solutions.

Brainstorm

In a joint brainstorm you can quickly get an overview of which solutions already exist. The following applies here: look broad, emerging and well-known, low-tech and high-tech. Participants put on the table what they can remember, ask your friends and family, or an Artificial Intelligence (just check if the solution really exists!). We make two suggestions for discussing the solutions.

Working method 1: Place the solutions on paper post-its or on a brain-writing MIRO-board, and order the type of solutions in the following categories:

- Technology: vehicles, information, automation
- Policy: spatial or economic, restrictive, or stimulating
- Behaviour: convenience and durability
- Service provision: reliable, (cost) efficient and sustainable

Working method 2: You can also order the solution graphically in a Design Research Diagram, with one axis going from technology to behaviour, and the other from policy to services.

Consider together what promising applications and combinations of solutions are in response to the SMART objective of Sprint 1 and where something completely new may be needed.

1. Collect as many relevant solutions as possible

2. Order the solutions in different ways

3. Share the outcome of promising applications and combinations, or blind spots

Sketch

Developing promising ideas is an important step in the design process. The aim is to explore the possible solutions as thoroughly and quickly as possible, so that you have enough time to elaborate a promising solution (or solution path). The sketch phase therefore does not go into details, but deals with the main features.

Sketch session

During a joint sketching session, you generate solutions in words and images. Use the SMART objectives and the existing solutions discussed in the previous steps. To make sure your team is not biased for a certain direction, it is important to make, discuss and choose enough variants. Make sure you have enough paper and markers.

- First think of approximately 3 solutions per person in silence and put them on an A4 sheet. Always use a short description in words, and illustration by means of a simply drawn diagram or a reference image (for example a photo of an electric ship, with source reference!)

- Discuss the solutions together, critically, and constructively, and briefly note the strengths and criticisms on the sheet. Together choose the two best solutions. Discuss this with the organisation and collect the feedback.

- Improve both chosen solutions, individually or together. Improve the strengths of the solution and solve the critical points as best as possible. Then jointly choose the best solution of the two to elaborate in the next step.

4. Sketch the solutions in word and image

5. Discuss the solutions and choose the two best solutions. Collect feedback.

6. Improve the solutions based on the feedback and choose again.

Detailed design

The design of a solution is step-by-step, just like the sketch. You do not just start detailing. There is not enough time in the Challenge to detail everything to an operational level, so it is important to first determine the key components of the solution. The solution becomes convincing when exactly these are further elaborated.

Designs of system-engineering

- In this Sprint, you first roughly draw the components (such as data systems, means of transport, warehouses) of the solution. Then you can show the relationship between the components by lines or arrows, for example. This can be done as a relationship diagram on paper or on a MIRO flow-chart.
- Determine some crucial components, or relationships between components, and elaborate them individually.
- Discuss the designs together: Do they fit together well? What could go wrong? Does the solution meet the Challenge criteria*? Improve the results again.

**Challenge criteria: the solution (path) addresses an urgent zero-emission challenge in one of the four application areas; takes different interests into account; combines aspects of, for example, technology, policy, behaviour and services; and it is clearly presented. The next step is about the presentation.*

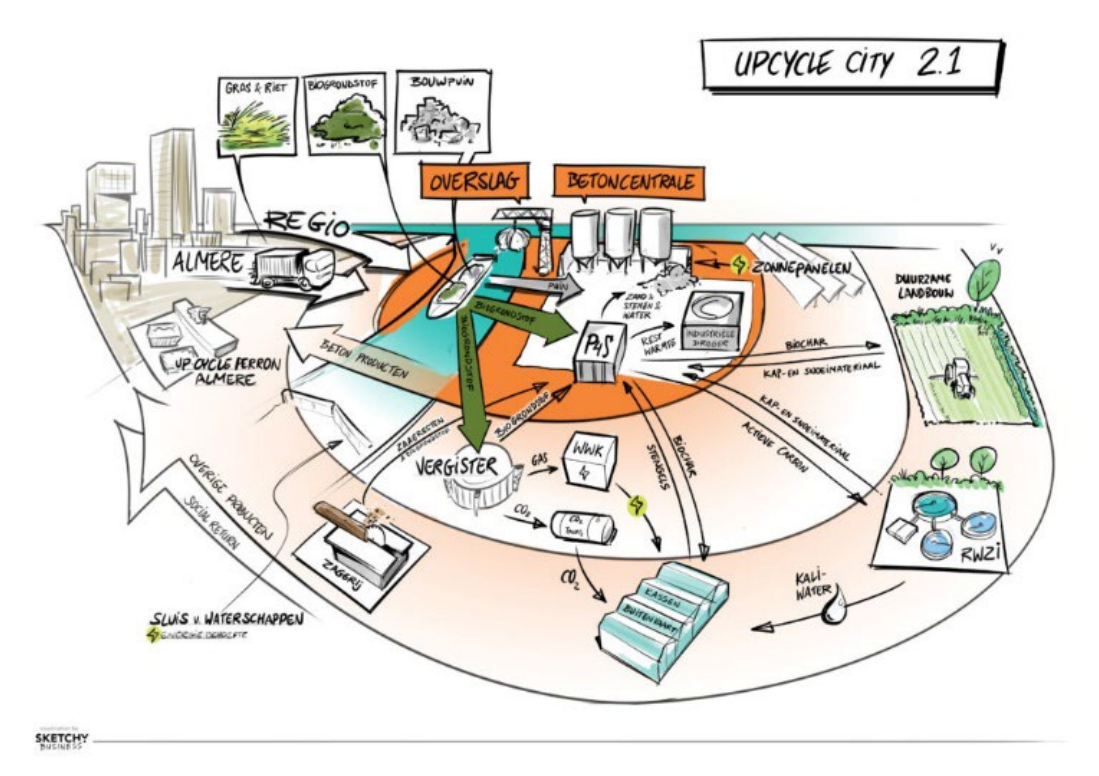


Image: https://www.p4salmere.nl/circulaire-keten/ by Sketchy Business

7. Elaborate the solution in a system of components and relations

8. Detail crucial components and relations

9. Discuss and improve the design

Preparation closing event

It is important to share your challenge and solution with the outside world. Your challenge can raise awareness about emissions in logistics. In addition, the accompanying solution can even inspire other organisations to get started right away! In this last step you will do everything you can to bring out your challenge. You will do this by making a **poster and pitch** of the challenge and the corresponding solution.

All posters will be displayed on the Challenge website. A selection of the 20 best submissions, 5 per application area, will be invited for the live presentation at Jaarbeurs Utrecht. The selection will be made by Top Sector Logistics and Erasmus UPT on November 1st. The posters must be received by October 30th at the latest via challenge.upt@ese.eur.nl (use a Dropbox, GoogleDrive or other data link for large files).

The ICT and Logistics fair will be organised on November 8th. On this day, the 20 selected student teams will have the opportunity to pitch the challenge and solution to companies and other organisations. On this day the prices will also be awarded for the best student teams! In addition, you will have the opportunity to **speed date** with companies.

</ICT& LOGISTIEK>

PITCH Present your challenge and solution!

All teams make a poster. The teams of the 20 best entries will present their poster with a pitch at the Jaarbeurs on 8 November. The poster and pitch are sharpened versions of what you made during sprint 1 and sprint 2. The pitch takes between 5-10 minutes. Below are some tips and examples:

Working method 1: Prepare an Elevator Pitch:

- Come up with a surprising opening sentence and grab the attention
- Choose one message and keep your focus
- Make your pitch short and powerful
- Be confident and avoid words such as "maybe", "possible" ...
- Make the pitch interactive (e.g., use a statement or question)
- Be enthusiastic and focus on the impact!

Working method 2: Make a poster:

- Clearly state the challenge and its solution.
- Use the visualisations you have already made during the sprints.
- Make the presentation in A1 portrait format with high quality. PowerPoint and Indesign templates with the correct dimensions will be shared.
- Suggestion: use ready-made icons from e.g., Flaticon.com or vecteezy.com to quickly create clear infographics.

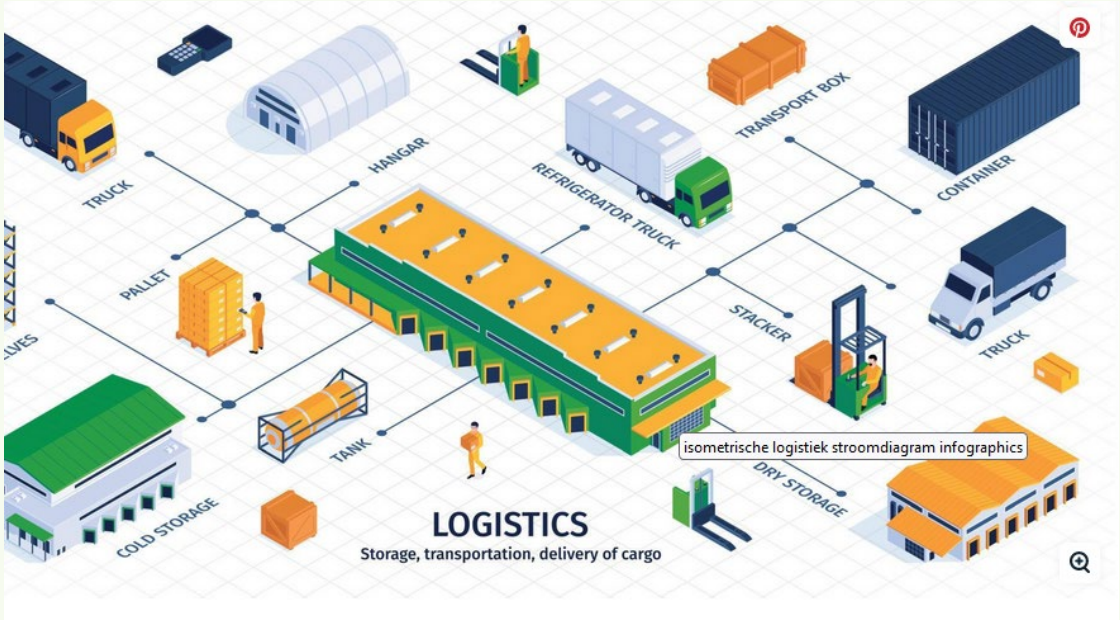


Image: Vecteezy.com

Example
Watch this TEDx pitch of 1 minute
https://www.youtube.com/watch?v=gXwewPgLmkE&t=3s

1. Write down your key points of the pitch

2. Visualise the pitch by making a poster

See PowerPoint template A1 portrait format. Submit the poster digitally by 30 October at the latest by challenge.upt@ese.eur.nl

Checklist

Sprint	Assignment	Check ✓
Sprint 1	1. Describe why zero emission logistics is important in this case	
	2. Make an organisation profile	
	3. Visualise the stakeholders of your organisation in a map	
	4. Provide the geographic scope	
	5. Share the Mind Map and the formulation of the challenge	
	6. List the requirements for the solution, with the most important requirements at the top	
Sprint 2	1. Collect as many relevant solutions as possible	
	2. Order the solutions in different ways	
	3. Discuss the outcome of promising applications and combinations, or blind spots	
	4. Sketch solutions verbally and visually	
	5. Discuss the solutions and choose the two best ones. Collect feedback	
	6. Improve the solutions based on the feedback and choose again.	
	7. Elaborate the solution in a system of components and relations	
	8. Detail crucial components and relations	
	9. Discuss and improve the design	
Closing event	1. Write down the key points of the pitch	
	2. Visualise the pitch by making a poster	
	3. Submit the poster digitally by 30 October at the latest via challenge.upt@ese.eur.nl	

Colophon

The cookbook is developed by Erasmus Centre for Urban, Port and Transport Economics (Erasmus UPT) and is financed by Topsector Logistiek.

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For questions you can mail challenge.upt@ese.eur.nl or visit the website of the challenge www.zeroemissionchallenge2023.nl

EDUCATION CHALLENGE

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