SUPPORTING COMPANIES IN THEIR SUSTAINABLE JOURNEY

Authors: Benjamin Poel benjamin.poel@edu.novia.fi
Lydia de Groot lydia.degroot@edu.novia.fi
Robin Symmank robin.symmank@edu.novia.fi

Supervisors: Roger Nylund Novia University of Applied Sciences
Biniam Amare Tefera Sustain4Future

Date: December 12th 2022

European Project Semester

Vaasa, 2022

NOVIA
UNIVERSITY OF APPLIED SCIENCES

1 PREFACE

This final report and project are part of the European Project Semester 2022, Vaasa.

First of all, we want to express our gratitude for the opportunity to perform the EPS in Novia in Vaasa. This is a fantastic chance for international teamwork training and personal development. We want to thank Sustain4Future, especially Biniam Amare Tefera for guidance on this project. Next, we would like to thank the coordinator of the EPS, Roger Nylund and also the Project Management teacher Philip Hollins. Last but not least we want to thank Shane Young for giving us help to program and design the calculation tool. A hearty thank you as well to each and every EPS participant; it was a pleasure working with you all on this program.

This paper was done by three students with the supervision of Sustain4Future. The work on this study started on the 3rd of September and was finished by the 15th of December. It will present the findings and product made by the project group. Included are the process of teamwork, reporting templates for companies and an emission calculations application.

Enjoy reading,

Benjamin Poel,

Lydia de Groot,

Robin Symmank.

Vaasa, 12th December 2022.

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2 ABSTRACT

The world is now facing more challenges regarding the environment and sustainability than ever before. To address these problems, more transparency and simplification of reporting and calculation are needed. Developing comprehensive templates and calculators on this topic is one way to ensure that this issue becomes clearer to individuals or companies.

The main goal was to create a calculation tool for emissions caused by companies. Together with Sustain4Future, the project team developed a fully functioning calculation tool to calculate and analyse companies emissions.

In order to achieve this goal, the team conducted research on this subject, particularly sustainability. Sustain4Future provided information and a range of online courses on the topic, to ensure in depth knowledge.

The Team simultaneously received project management lectures from Novia. With this information, the team was able to launch the project methodically.

The first giving task is to make a complete and clear template for companies which includes the GRI guidelines and the EU guidelines for non-financial reporting. This is done by researching the up-to-date regulations und guidelines and making one complete Template of it. Therefore, this template provides a comprehensive overview for companies to ensure ease of use.

Afterwards, an applications was created to calculate and analyse companies emissions. This was done to help the sustainability consulting company Sustain4Future with their work. A fully functioning prototype app was created with Microsoft Power Apps which serves as the foundation of a future professional tool.

This report's content will also focus on the team's collaborative efforts.

3 THE INTRODUCTION

3.1 EUROPEN PROJECT SEMESTER

EPS is defined as European Project Semester. This Project is offered in 11 countries at 13 universities. The program's objective is to encourage international students to develop their cooperation abilities in intercultural teams and learn about various technical subjects. The EPS program is designed to meet the degree's design requirements and provide engineering students all the skills they need to meet the demands of the modern global economy. (Novia, 2022)

The Semester consist of:

- Teambuilding (1 ECTS)
- Project Management (2 ECTS)
- English academic writing and cross-culture communication skills (3 ECTS)
- Swedish language (2 ECTS)
- EPS (22ECTS)

A task completed by a multidisciplinary, international team of three to six students is the semester's primary subject matter. The available projects are offered at the beginning of the semester, and afterwards the students are given the chance to specify which project they would wish to take part in. The students are then split into teams according to their personal preferences, primary fields of study, and country of origin. Each group shall have a decent balance of nationalities and skill sets.

This year the EPS had 18 participants from 4 different nationalities. Novia offered 7 Projects of which 5 were chosen by students. The projects this year were: Building a submarine, Sustain4Future, Zambia renewable Energy, building a Weather Station and creating an Escape room. All projects have project tutors, who typically doubles as a teacher or otherwise collaborates with the EPS program. In Technobothnia, a vast laboratory facility co-owned by three universities, the University of Vaasa, Vaasa University of Applied Sciences, and Novia University of Applied Sciences, a classroom was provided specifically for EPS students.

Students must submit a Midterm-report (30% of the grade), which includes a formal report and a 30-to-40-minute presentation, as well as an Endterm-report (70% of the grade) that also includes the same.

3.2 SUSTAIN4FUTURE (S4F)

Sustain4Future Consulting (Figure) is an independent supply chain and operational excellence consultancy providing unique expertise to solve clients' end-to-end sustainable supply chain circular Economy challenges. (S4F, 2022)

The company consults medium and small enterprises in the Jakobstad region on how to become more sustainable. The Jakobstad Region consists of the following 5 municipalities in Ostrobothnia, Finland: Jakobstad, Kronoby, Larsmo, Nykarleby and Pedersöre.

S4F provides advisory services and support clients' improvement initiatives to make their supply chains more sustainable, competitive and resilient.

The company helps at all levels of the value chain, whether strategic, tactical or operational and also ensures a hands-on pragmatic approach in providing tangible solutions.

Their mission is to deliver practical supply chain and logistics concepts and solutions to support clients' sustainable improvement initiatives.

They value Credibility, Quality, Trust, Teamwork, Adaptability, Integrity, Directness and aim to be the partner of choice for sustainable supply chain consultancy.

Biniam Tefera serves as both the project tutor and the CEO of Sustain4Future.

Figure 1: Sustain4Future

3.3 PROJECT OVERVIEW

The title of the project is S4F, and its goal is to develop a template for sustainable reporting and a Carbon footprint calculator to help SMEs in the Jakobstad region. S4F would like to develop its own assessment tool, carbon calculator, and template for sustainability reports because regulations constantly change. To keep up with the changes, companies either need to buy licenses for the tools repeatedly or make their own tool and apply the changes themselves. Because the first option increases the cost every year, S4F would like us to design these tools for their use.

The goals of this project are to successfully work in an international team and to ensure effective project work in order to accomplish the giving tasks. Since the EPS is also about personal growth and learning, the learning component for the team members is a significant part of this project. Particularly, the subject of sustainability is important because it also pertains to the modern day.

A prototype of the emission calculator will be the main achievement. The tool of choice will be Microsoft Power Apps because it is trustworthy, free, simple to use, and available to all users. This program can link data from several sources, including Excel, and use that data to create an app. With the help of this tool, the team is able to create an interface to provide a superior user experience compared to an Excel chart.

Figure 1: Project Logo

The logo displayed above in Figure 1 was designed to serve as the project team's unique identification mark. It had to convey the project work and be both formal and dynamic at the same time. The leaf form and the colour of the natural green were chosen to represent sustainability. The concept of growth will be illustrated through an upward-growing graph.

4 THE PROJECT TEAM

The project group analysed itself at the beginning of the semester. This way, the team knows what personalities are being dealt with and how the group can complement each other. By making the Belbin test and analysing the results, the project group gets to know each other even better. At the end of this chapter, the project group knows their weak and strong points. This can be helpful later on in this semester.

4.1 BELBIN TEST

4.1.1 ROBIN

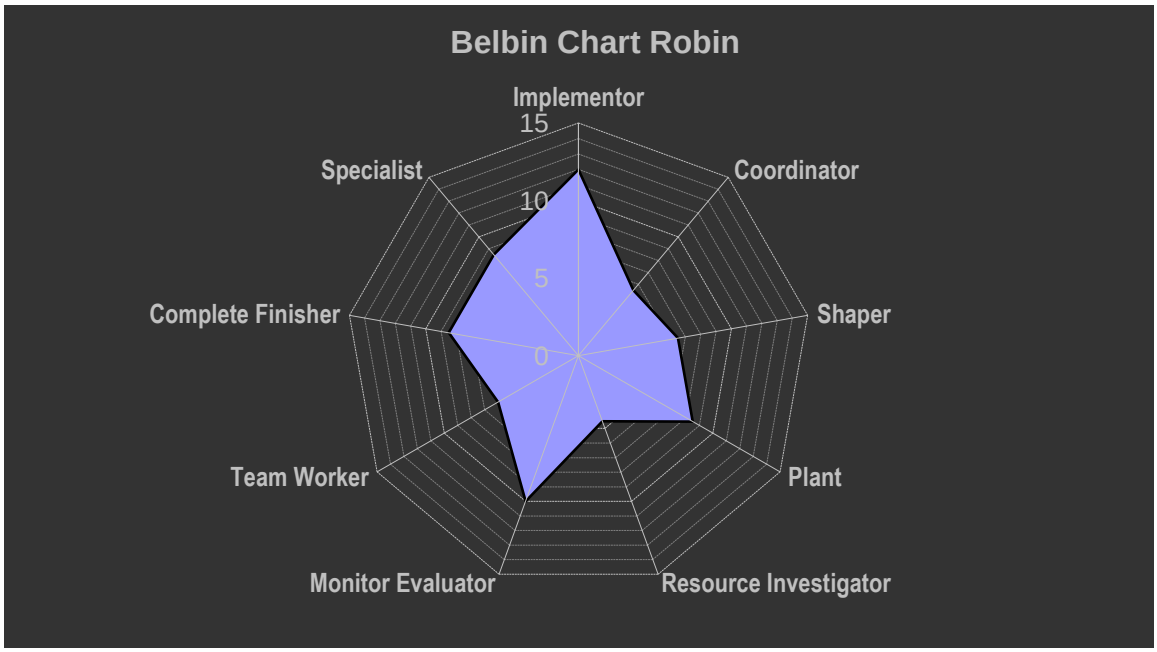


Figure 2: Belbin result Robin

The Belbin test's outcome (Figure 2)was as anticipated as it demonstrates that I have a broad understanding of all areas and no strong leaning toward any single one. Since my maximum score on the questions was just 2.5 and I could relate to some of them more than others, I gave the questions very low marks. The spider diagram's gaps are being filled in, which suggests that the team is complementary, but also share some similarities in several areas.

I generally concur with the test's findings because I consider myself to be a person with diverse strengths in a professional setting. My greatest asset Implementer makes sense because I enjoy putting plans into action while remaining receptive to fresh ideas and adjustments.

Given that I don't perceive myself as someone who should be connecting with people outside of my field of work or having a large social network in general, Resource Investigator appears to be one of

my limitations. The coordinator would be in the same position, even though I prefer to plan ahead to make things come together.

In conclusion, I'm glad I took the test, especially because it was my first encounter to the Belbin test. The accuracy is reasonably high, and the outcomes are logical.

4.1.2 BENJAMIN:

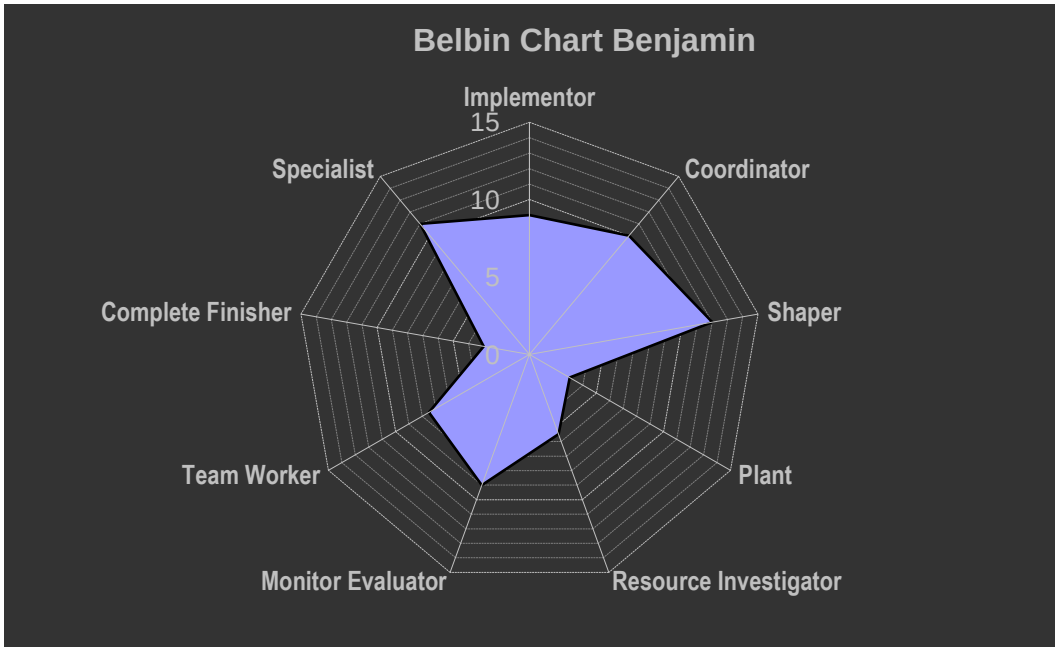


Figure 3: Belbin result Benjamin

The Belin test displays my personality. See Figure 3 for the results. I will explain my view on this test down below:

First of all, a big part of the analysis is correct in my opinion. My main strength/role according to the Belbin Test is the Sharper Role. I agree with this one. I like to keep track of the progress in the group and motivate the group. This correlates well with the sharper role.

The role with the second highest score is the Specialist. I partly agree with this role. The specialist tends to work more on his own and is dedicated to reaching his goal. Moreover, as the name says, the specialist contributes to the group with his specific knowledge. That last part is something I don't recognise in myself. My field of education is well-rounded but not very specific. On the other hand, when I am sure about a certain topic, I will not hesitate to prove my point.

The coordinator and monitor evaluator came also out with higher scores. I agree with these roles. I even thought that these roles would come out even higher. These two roles are both rational-focused in my opinion. Roles where it is important to keep the overview and think rationally. I consider myself a rational person and that's why I expected these roles maybe even slightly higher.

The roles that are scored the lowest on are the plant and the complete finisher. I know that these are my weak points. The plant is quite creative and my strength is not in creativity. It's also important to know that about yourself to let others take tasks like these. The complete finisher is also not my part. I am more focused on the big picture than on the details. I think that this is why I scored low on this part of the test.

All things considered, I think the test displays my personality quite well. It is a good refresher at the beginning of the EPS project to know what your strengths and weaknesses are. This way we can figure out which role to take in the team.

4.1.3 LYDIA

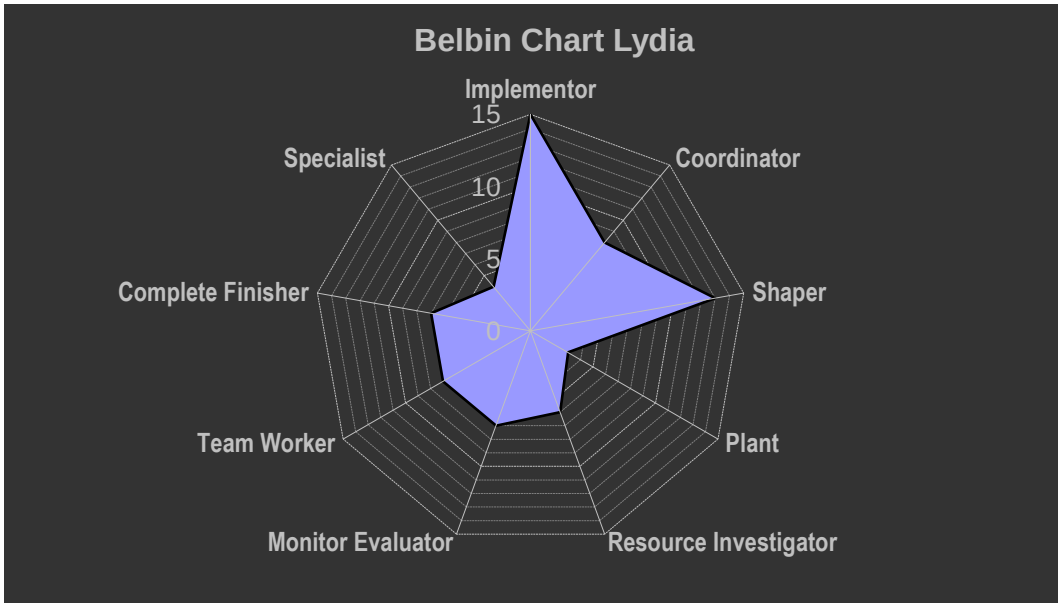


Figure 4: Belbin result Lydia

After taking the Belbin test, my results were as stated in Figure 4. The two team roles that stand out for me are Implementor and Shaper. The implementor likes to plan out working strategies and work as efficiently as possible. I recognize myself in this because I like to plan my days ahead. Usually, I take the lead in a team. I like to have an overview of the whole project so I can see what needs to be done and when. This is my strength, but also my weakness. Because I naturally take the lead in a group, it can take extra time. The time that I can't invest in other parts of the project that I like as well. If I look at Robin's chart, he also has great qualities in the Implementor department. This might lower my workload as a planner and organizer.

The shaper is known for helping the team to keep focus and making sure that the team keeps on moving. This characteristic goes hand in hand with the implementor. The implementor makes sure there is a strategy, and the shaper makes sure the team keeps on track. At my home university, I study Industrial Product Design. So, a lot of creative people in one team. During brainstorming sessions of meetings, creative people tend to drift off topic. I am usually the one that identifies these situations. I try to get the group back to the topic.

What stood out for me was the lack of the characteristics of a Complete Finisher. I don't agree with this outcome. In my professional career, I always finish reports or assignments on time. I filled this test in, with my professional side in mind. If I take this characteristic to my non-professional life, I do agree with this. Hobbies don't have my highest priority. This results in unfinished projects or a long list of projects I want to get started with.

In conclusion, I do agree with some parts of the test. At my home university, we spent a lot of time knowing your weaknesses and strengths. This is how I know that I am a Complete Finisher.

4.2 COMBINED TEAM CHART

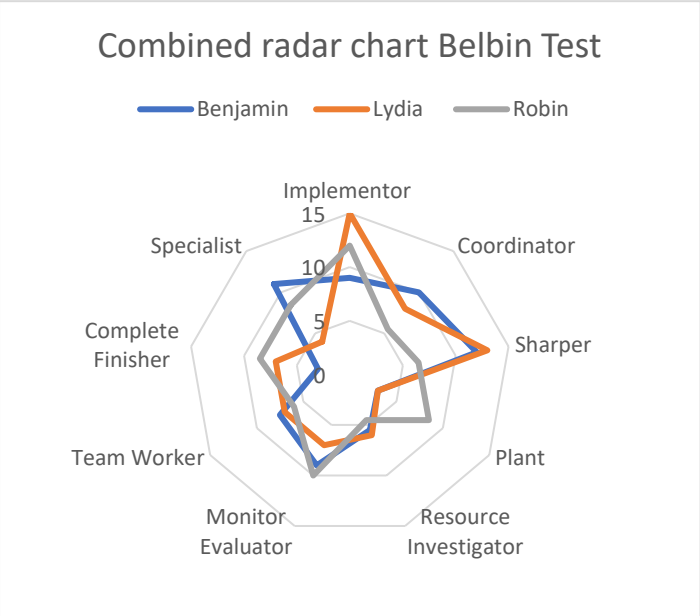


Figure 5: Combined Belbin Result chart

Team Role	Contribution	Allowable Weaknesses
Plant	Creative, imaginative, free-thinking. Generates ideas and solves difficult problems.	Ignores incidentals. Too preoccupied to communicate effectively.
Resource Investigator	Outgoing, enthusiastic. communicative. Explores opportunities and develops contacts.	Over-optimistic. Loses interest once initial enthusiasm has passed.
Co-ordinator	Mature, confident, identifies talent. Clarifies goals. Delegates effectively.	Can be seen as manipulative. Offloads own share of the work.
Shaper	Challenging, dynamic, thrives on pressure. Has the drive and courage to overcome obstacles.	Prone to provocation. Offends people's feelings.
Monitor Evaluator	Sober, strategic and discerning. Sees all options and judges accurately.	Lacks drive and ability to inspire others. Can be overly critical.
Teamworker	Co-operative, perceptive and diplomatic. Listens and averts friction.	Indecisive in crunch situations. Avoids confrontation.
Implementer	Practical, reliable, efficient. Turns ideas into actions and organises work that needs to be done.	Somewhat inflexible. Slow to respond to new possibilities.
Completer Finisher	Painstaking, conscientious, anxious. Searches out errors. Polishes and perfects.	Inclined to worry unduly. Reluctant to delegate.
Specialist	Single-minded, self-starting, dedicated. Provides knowledge and skills in rare supply.	Contributes only on a narrow front. Dwells on technicalities.

Figure 6: Team roles according to Belbin

To obtain a general understanding of the traits pertaining to the Team, the Belbin test results (see Figure 5) will be integrated. It is interesting to observe, that the team has qualities as Implementors, Shapers as well as Monitor evaluators. Qualities unrepresentative are Recourse investigator and Team worker. Characteristics the team lacks are outgoing, enthusiastic, communicative, developing contacts, and exploring opportunities. Resources investigator skills and teamwork abilities will need to be strengthened. Listing to each other and communicating is key here. In Figure 6 all the roles are described in more detail. It's important to acknowledge the weak points therefore the group can take them into account

4.3 TEAM CANVAS

Based on the combined Belbin test, the group set up a team canvas. See Figure 7. A team canvas is a visual representation of the group's values, beliefs, and rules. It also describes the roles, personal goals, assets, needs, and expectations per team member

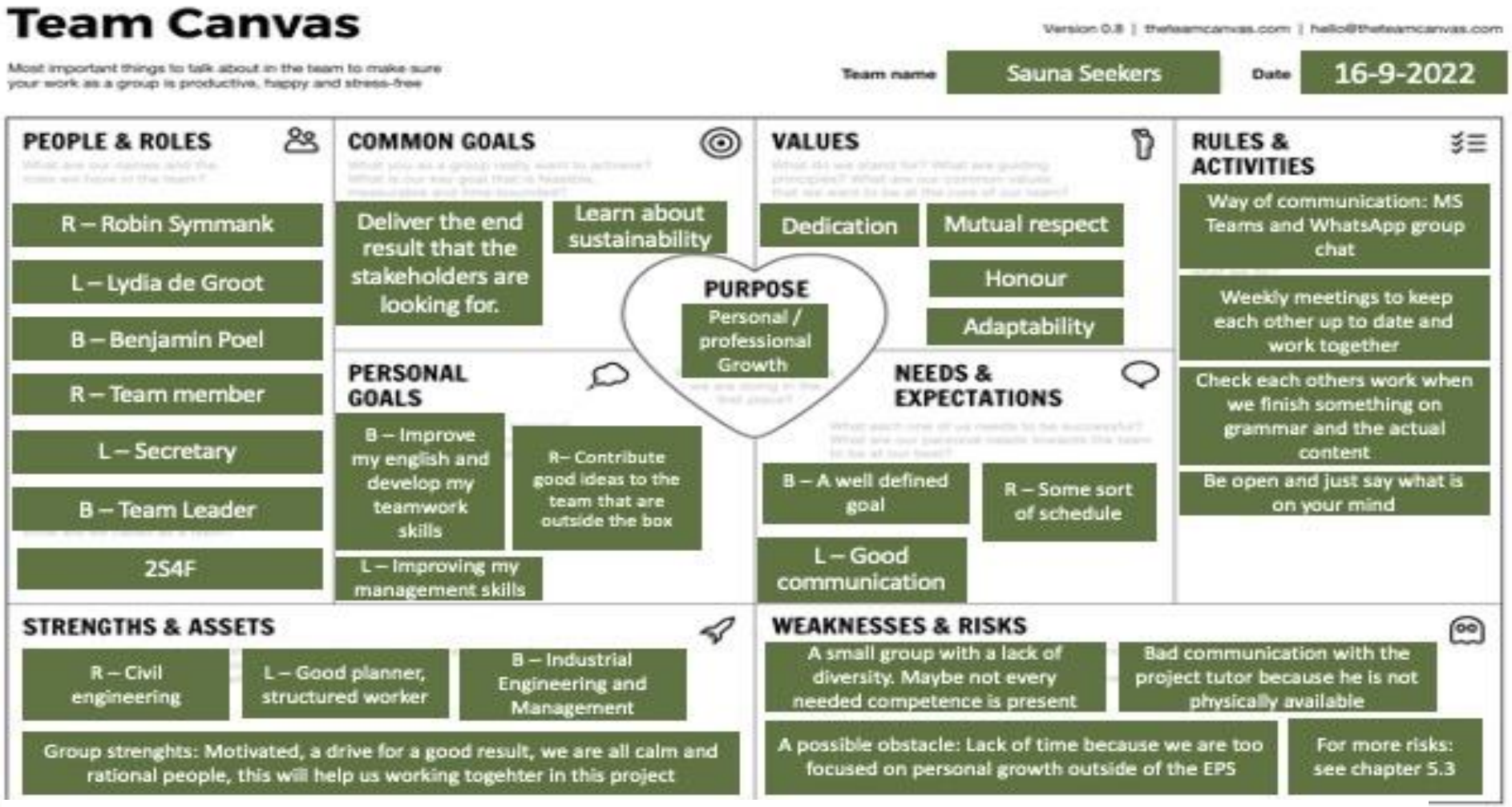


Figure 7: Team Canvas

5 START-UP PHASE

5.1 BRAINSTORM ABOUT SUSTAINABILITY

Sustainability is the core part of this project. As a starting point, the project group brainstormed about sustainability in general. Brainstorming can be used to gather and assess a variety of ideas, as well as to inspire new and creative ones. Everything that the group associated with sustainability is written on the whiteboard (Figure 8). This was done to establish a common ground to go further from there.

Figure 8: Brainstorm 16-9-2022

5.2 STAKEHOLDER ANALYSIS

At the beginning of the project, it is important to analyse the different stakeholders that are involved in the project. By analysing the stakeholders, the project groups know how to handle the different stakeholders and keep them satisfied.

Stakeholders for this EPS Project are written down in Table 1.

Table 1 Stakeholder communication

STAKEHOLDER	INTEREST	COMMUNICATION	FREQUENCY	CONTACT
1- Biniam Tefera	High	Microsoft Teams Email	High	biniam.tefera@novia.fi
2- Roger Nylund	High	Email	High	Roger.Nylund@novia.fi
3- Novia university of applied sciences	Medium	Email	Low	admissions@novia.fi
4- Home Universities	Low	Email	Low	studieninfoservice@bht-berlin.de abroad.AII@avans.nl Hanze@groningen.nl
5 - Companies in the Jakobstad region	Low	None	None	https://www.jakobstadsregionen.fi/en/this-is-the-jakobstad-region/
6- Sustain4future	High	None	None	https://sites.google.com/view/sustain4future/contact
7- Benjamin, Lydia, Robin	High	Microsoft Teams Whatsapp …	High	benjamin.poel@edu.novia.fi lydia.degroot@edu.novia.fi robin.symmank@edu.novia.fi

The stakeholders that are stated above are not all as important. The power-interest matrix below will differentiate the stakeholders. This way, the project group knows how to handle the different stakeholders.

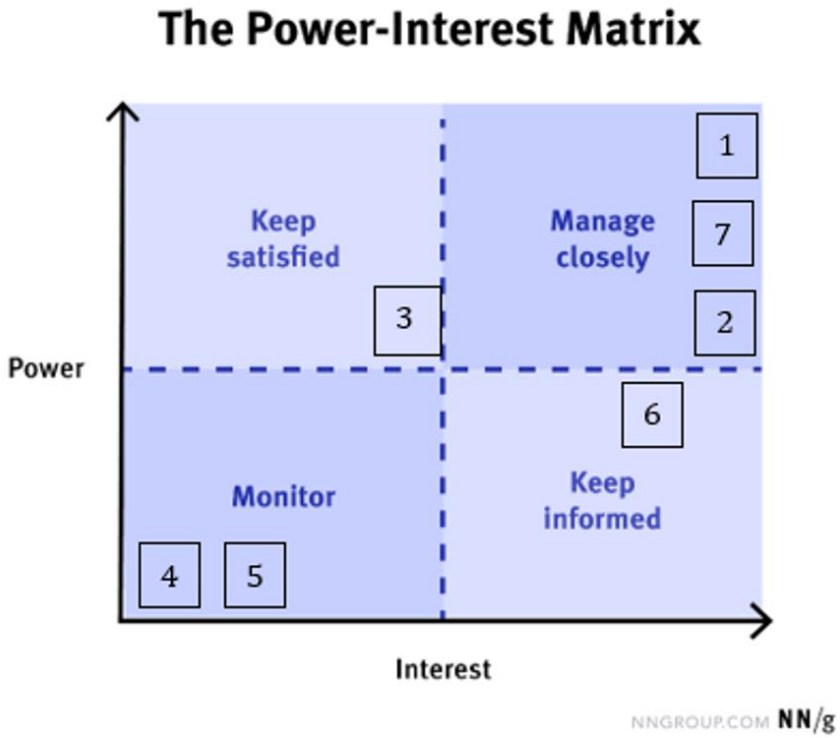


Figure 9: power-interest matrix

1- Biniam Tefera

2- Roger Nylund

3- Novia university of applied sciences

4- Home Universities

5 - Companies in the Jakobstad region

6- Sustain4future

7- Benjamin, Lydia, Robin

Naturally, Project tutor Biniam has the greatest interest and power in this project. Therefore, Biniam is placed in the top right corner. In this corner, Roger Nylund and the team members are also there. Those people have both great power and interest in this project. The project group made a little difference between the stakeholders in the top right corner. That is why Biniam is more in the top right corner than the other stakeholders in Figure 9.

5.3 RISK MANAGEMENT

There are different risks that can occur when executing this project. Down below the risks are listed in Table 2. The project group can think of different precautions to lower these risks. In some cases, the probability of risk seems high. For example, trips/travelling can slow down progress. In this case, it is easy to make a precaution and prevent the risk from happening. Therefore, the probability of this risk is low.

Table 2 Risk table

Risk	Brief explanation	Precaution	Probability (1-10)	Impact (1-10)	Total
1. Illness	Illness can slow down the progress	Take care of ourselves :)	5	3	15
2. Accidents	Usually there are things that are out of control	/	1	7	7
3. Trips / travelling	Different travel schedule's or to much travelling can slow down the progress.	Alling our schedules and make rules about it upfront.	3	4	12
4. Change of plans	It can cause trouble if S4F modifies the project (goal) during the semester	Make proper arrangements with S4F at the beginning of the semester	3	7	21
5. Loss of data	Fail of the technical systems that causes a loss of the document	Make us of a digital backup plan such as OneDrive.	2	10	20
6. Poor communication	Unclear communication can cause misunderstandings	Be clear to each other. Talk things trough properly and ask about things which are not clear	4	6	24
7. Poor vibe in the group	group vibe can cause a group that is not in sync.	Work on group dynamic in our free time.	2	6	12
8. No clear project goal	Working toward a goal is difficult when it is not clear what the project tutor is expecting.	Set up a good communication with S4F in the first few weeks. Asking in-depth questions about the project so the team knows what to expect.	3	8	24

To visualize the risks, the following matrix is used. This matrix provides a clear overview of the risks. The biggest risks can be located at a glance.

Luckily, many of the risks are relatively easy to prevent from happening. Therefore, the majority of the risks are classified as unlikely.

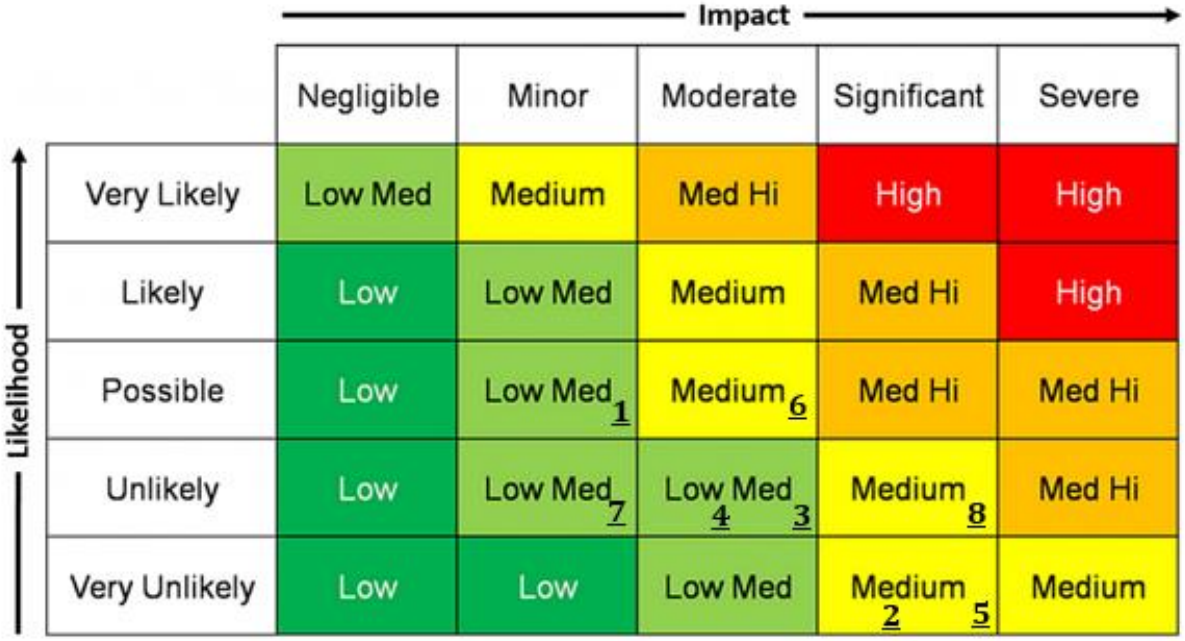


Figure 10: Risk matrix

1. Illness
2. Accidents
3. Trips/travelling
4. Change of plans
5. Loss of data
6. Poor communication
7. Poor vibe in the group
8. No clear project goal

5.4 WORK BREAKDOWN STRUCTURE (WBS)

In Figure 11, the work breakdown structure is presented. In this table, all the tasks per phase are written down. The individual tasks are branded with a letter-number code. These codes correspond with the codes used in the Gantt diagram in chapter 5.5.

PHASE	R1 - Starting Phase	D1 - Deliverable 1 - Sustainable reporting Template	D2 - Deliverable 2 - Carbon footprint Calculator/cycle	F1 - Creating the final report
TASK	R1.1 - Desk Research	D1.1 - Research GRI Standards	D2.1 - Define variables in terms of the building	F1.1 - Finnish the Project Management aspects and add them to the report
	R1.2 - Belbin Test	D1.2 - Research requirements for non-financial reporting (EU directive)	D2.2 - Define variables in terms of logistics	F1.2 - Design the Report
	R1.3 - Planning	D1.3 - Research on taxonomy regulations	D2.3 - Define variables in terms of Supply Chain	F1.3 - Include the Final Deliverables
	R1.4 - Team Canvas	D1.4 - Look in to an older / example report / template	D2.4 - Make the different variables work together	F1.4 - Write the conclusion
	R1.5 - Setting up Team´s	D1.5 - Compare existing report with the new regulations	D2.5 - Design a tool	F1.5 Check the report
	R1.6 - Stakeholder mapping	D1.6 - Design an template that is up to date	D2.6 - Test the tool	
	R1.7 - Risk analysis	D1.7 - Verify the results with Biniam	D2.7 - Improve the tool designed based on feedback	

Figure 11: Work Breakdown Structure

5.5 GANTT CHART

The Gannt Chart gives an overview of the project phases.

WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION	% of TASK COMPLETE
R1	Project Set-Up	Team				
R1.1	Setting up the Projectmanagement tool	Team	8-9-2022	8-9-2022	1	100%
R1.2	Team Canvas	Team	8-9-2022	9-9-2022	2	100%
R1.3	Belbin Test	Team	12-9-2022	12-9-2022	1	100%
R1.4	Hi Level Plan	Team	10-9-2022	16-9-2022	7	100%
R1.5	Deskresearch - learing about sustainabilty	Team	12-9-2022	7-10-2022	8	100%
R1.6	Stakeholder Analysis	Team	10-9-2022	16-9-2022	5	100%
R1.7	Risk Analysis	Team	10-9-2022	16-9-2022	5	100%
D1	Deliverable 1					
T1.1	Research GRI Standards	Robin	28-9-2022	14-10-2022	13	100%
T1.2	Research requirements for non-financial reporting (EU directive)	Benjamin	28-9-2022	14-10-2022	13	100%
T1.3	Research on taxonomy regulations	Lydia	28-9-2022	14-10-2022	13	100%
T1.4	Look in to an older / example report / template	Team	28-9-2022	14-10-2022	13	100%
T1.5	Compare existing report with the new regulations	Team	14-10-2022	18-10-2022	3	100%
T1.6	Design an template that is up to date	Benjamin+ Robin	18-10-2022	25-10-2022	6	100%
T1.7	Verify the results with Biniam	Team	18-10-2022	25-10-2022	6	100%
D2	Deliverable 2					
T2.1	Defining Scope 1 and 2	Benjamin+ Robin	25-10-2022	21-10-2022	4	100%
T2.2	Define variables in terms of the building	TBD	25-10-2022	Half november	17	100%
T2.3	Define variables in terms of logistics	TBD	25-10-2022	Half november	17	100%
T2.4	Define variables in terms of Supply Chain	TBD	25-10-2022	Half november	17	100%
T2.5	Make the different variables work together	TBD	25-10-2022	Half november	25	100%
T2.6	Design a tool	Lydia	Beginning November	End of novemver	23	100%
T2.7	Test the tool	TBD	Beginning November	End of novemver	22	100%
T2.8	Improve the tool designed based on feedback	TBD	Beginning November	End of novemver	17	100%
F1	Creating the Final Report					
F1.1	Prepare the Midterm-Report	Team	During	During	30	100%
F1.2	Finnish the Project Management aspects and add them to the report	TBD	During	During	70	100%
F1.3	Design the Report	TBD	During	During	70	100%
F1.4	Include the Final Deliverables	TBD	During	In the end	1	100%
F1.5	Write the conclusion	TBD	In the end	In the end	5	100%
F1.6	Check the report	TBD	In the end	In the end	5	99%

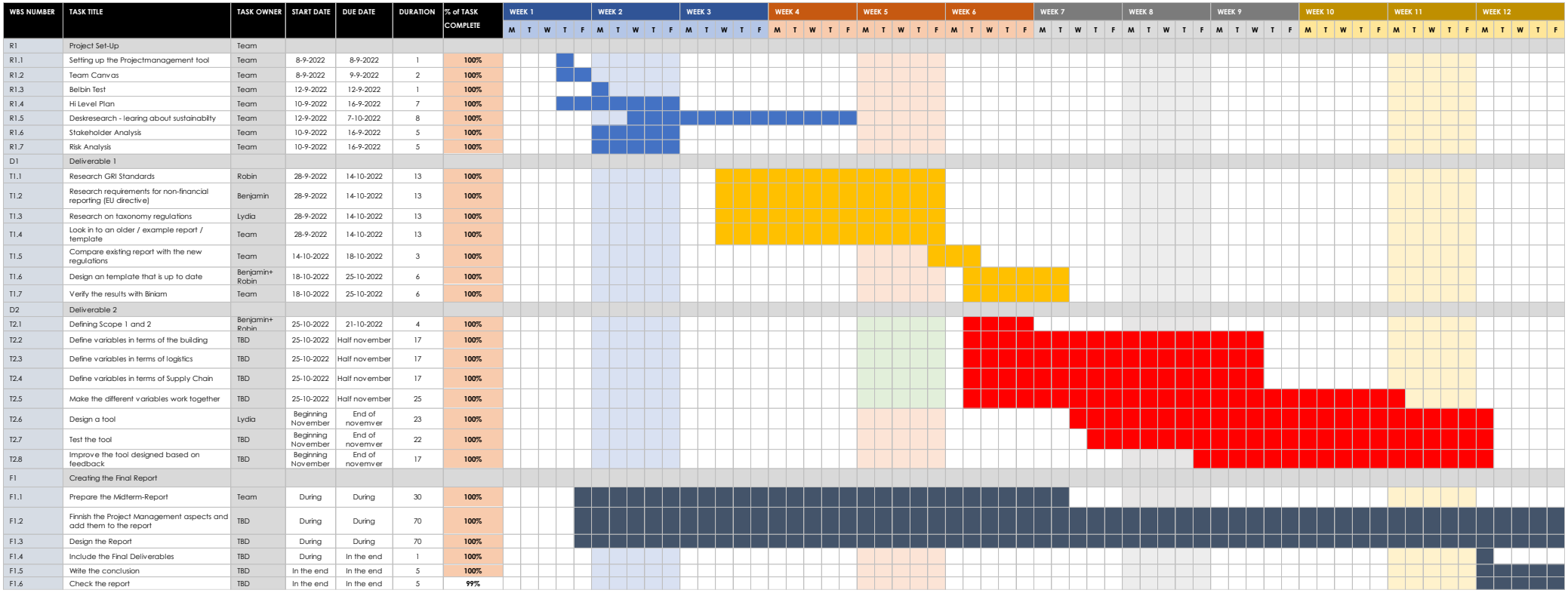


Figure 12: Gantt Chart

6 DESK RESEARCH

At the start of the project, it is important to look into the knowledge that is already out there. In this chapter, the already-known information that could be useful for the project is researched and documented.

6.1 COURSES

Research on sustainability and other topics will only be briefly covered here because it is still part of the work even though it is outside the scope of this project. S4F provided two courses for the project team listed below:

Course 1, leadership for sustainable change: (University of Helsinki , 2020)
https://mooc.helsinki.fi/mod/book/view.php?id=6358&forceview=1

Course 2, The new sustainability for Businesses: (Aalto University, 2021)
https://sustainablebusiness.aalto.fi/en/course/

For example: in course 1 there is a chapter about climate change and the different scenarios (see Figure 13). This figure demonstrates different scenarios for global warming depending on emission output. It demonstrates the importance to lower emission output in order to stop global warming.

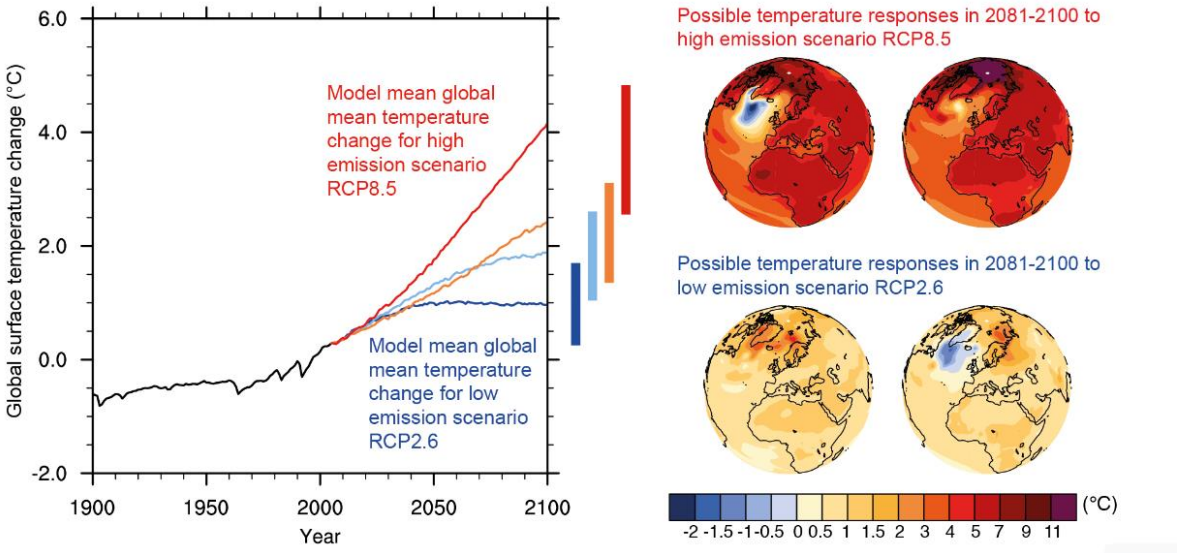


Figure 13: Climate scenarios

6.2 GREENWASHING

The project group received some feedback from various tutors. The feedback from Josefin Stolpe included the topic of greenwashing and how the Carbon Footprint Calculator deals with this issue. This chapter addresses the issue of greenwashing and analyses how the calculator can prevent it.

The definition of greenwashing in accordance with Investopedia is “The act of providing the public or investors with false information about the environmental impact of a company’s products and operations” (Liu, 2022). This is exactly what can happen if the calculation tool is either filled with incorrect data or the user uses the tool incorrectly. The goal of preventing this will be achieved by guaranteeing accurate data for all the components of the calculation tool. The Tool will provide instructions and a clear interface to prevent the input of wrong data. S4F is providing the database for the tool. The calculator for the emissions caused by cars is based on data provided directly from by car manufacturers. Additionally some data for the emissions caused by buildings are gathered from the Carbon Footprint (Carbon Footprint, 2022) Website. This data is trustworthy as it has been certified by various institutions such as the International Organization for Standardization (ISO, 2022). (ISO, 2022) In case this provided data is inaccurate the tool would calculate emissions based on wrong data and calculate wrong emissions for the user. That would result in Greenwashing.

The car emissions calculator only takes into account the average fuel consumption for the kilometers driven each year. This could cause an inaccurate output of emissions as there is different usage of fuel per kilometer among car drivers. For this reason, the tool will also include a calculator to calculate the emissions for each kilometer driven with each car and fuel type.

6.2.1 EXAMPLE OF GREENWASHING – VW SKANDAL

The Volkswagen emissions scandal was one of the biggest greenwashing scandals of all time. It took place worldwide from 2008 to 20015. Especially in the USA, Volkswagen suffered immense damage due to the investigations of the Environmental Protection Agency (EPA). It was revealed that VW had installed a so-called defeat device. (EPA, 2022) This device was capable of detecting a test situation and, in this case, switching on the full exhaust gas cleaning system. This method allowed VW to promote its now so-called "clean diesel" cars as highly efficient, cheap and environmentally friendly.

The EPA investigation found that VW used the devices in about 11 million vehicles worldwide in 16 different models, overwhelmingly VW and Audi vehicles. They emitted up to 40 times more nitrogen oxides (NO_2) in normal operation than in testing situations (Hotten, 2015). Due to VW not being able to meet the NO_2 regulations and the deceiving of their buyers. VW was fined more than 18 billion dollars in the USA to compensate for the damage (Media, 2021). As a result the CEO Martin Winterkorn resigned and more heads of management were suspended. The VW stock price fell in value by a third the days immediately after the news (Simplicissmus, 2021).

A defeat devise is any device that bypasses, defeats, or renders inoperative a required element of the vehicle’s emission control system (EPA, 2022). By using this device, VW engaged in greenwashing on a grand scale by making false claims about the environmental impact of its cars.

7 DELIVERABLE 1 – TEMPLATE

For this project, a total of 2 deliverables will be made. In this chapter, the making of the first deliverable will be described.

Deliverable 1 is two templates that help companies capture their annual report. Companies nowadays have to report a great quantity of information on finance and sustainability. For example on sustainable strategy and management. This can be a difficult and time-consuming task for companies. Mainly because the rules and requirements that these reports must meet are long and complex.

This deliverable responds to this by filtering out this information from these lengthy reports and offering them in a clear template. This deliverable simplifies two reporting methodologies, namely the GRI report standard and the rules and regulations from the European Union; the EU non-financial reporting standards. Those two documents will be further explained in this chapter.

By providing these documents with additional explanations it will be easier for companies to create these mandatory documents.

7.1 GRI

7.1.1 GUIDELINE FILE

GRI helps businesses and organizations understand and communicate their impacts on issues such as climate change, human rights and corruption. GRI stands for Global Reporting Initiative. The GRI Standards are based on expectations for responsible business conduct set out in authoritative intergovernmental instruments, such as the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises and the United Nations (UN) Guiding Principles on Business and Human Rights. The first version of this reporting framework that helps companies was published in 2000. The most recent version of this framework was published in 2016. The template that the project group made is based on this last version (GRI, 2022).

GRI reporting today enhances corporate accountability and offers openness regarding their sustainability objectives, initiatives, and results. Organizations can compile and present evidence that demonstrates significant sustainability impacts using the universal standards and topic standards included in the GRI reporting framework.

Five steps make up the GRI reporting process:

Step 1: Prepare - Establish a vision for the report, form a team to work on it, prepare an action plan, and schedule a kickoff meeting.

Step 2: Connect - Organizations identify important stakeholders, organize meetings with them, and establish priorities with them in order to decide on reporting priority and scope.

Step 3: Define - The reporting team chooses the issues for reporting and action as well as the report's subject matter.

Step 4: Monitor - The reporting team keeps tabs on activities, gathers data, examines procedures and systems, guarantees the accuracy of the information, and takes necessary follow-up measures.

Step 5: Report - Companies select the most effective method of communication, compose, polish, and publish the report.

In addition, GRI provides a range of services, resources, and instruction to help report teams through the many steps in the reporting process, including their evaluation of materiality.

GRI reporting guidelines attempt to address a broad variety of ESG concerns, from environmental management to worker safety and human rights. The goal of the Paris Agreement is to achieve net-zero emissions by 2050, therefore environmental management sustainability reporting has grown in significance for businesses, investors, and clients worldwide.

Companies must carefully monitor their product usage, chemical inventory, and control technology in order to calculate the volume of greenhouse gas emissions (GHG) produced on-site. The same is true for trash tracking, water use, and the production of hazardous waste.

All of them are a part of the GRI reporting framework, which calls for thorough data inputs as well as a deeper understanding of business operations and supplier chains.

Companies should include 30 environmental performance indicators from the GRI in the report on environmental sustainability. There are nine main categories

Materials: These include packaging materials and recycled product content, as well as raw materials (natural resources, produced compounds, and materials required for manufacturing).

Energy: Includes the utilization of renewable energy sources including wind, solar, and geothermal energy as well as initiatives to cut back on energy usage through more energy-efficient processes.

Water: This category includes the overall volume of water recycled or used, the proportion of water that is recycled or reused, and the company's influence on the water sources.

Biodiversity: This section includes information on how the firm affects the biodiversity of neighbouring or adjacent protected areas, as well as areas that are thought to have high biodiversity. It also includes company initiatives for controlling these impacts.

Emissions, Effluents, Waste: Includes total weight of treated, transported, or imported hazardous waste as well as the percentage of waste shipped internationally. It also includes total weight of direct and indirect emissions of GHGs, ozone-depleting emissions, NOx, SOx, and other air emissions by type, total water discharge by quality, and destination.

Products and Service: Provides the proportion of sold goods and packaging made from recycled or reused materials.

Compliance: Provides the aggregate dollar amount of fines and sanctions for noncompliance.

Transport: Describes how moving raw materials and final goods will affect the company.

Overall: Provides the total sum of investments and expenses related to environmental preservation.

The GRI reporting system requires precise and succinct data in order to offer information on all of these performance indicators. Just gathering and calculating this kind of data requires a team of specialists using the appropriate equipment. This information plays a significant role in why GRI reporting is regarded so highly worldwide and has led to some tangible outcomes. (Winters, 2021)

7.1.2 THE PROCESS

Scope

First of all the scope of the template needed to be set. The scope and expectations are discussed with S4F. The GRI standards consist of different divisions, as can be seen in Figure 14.

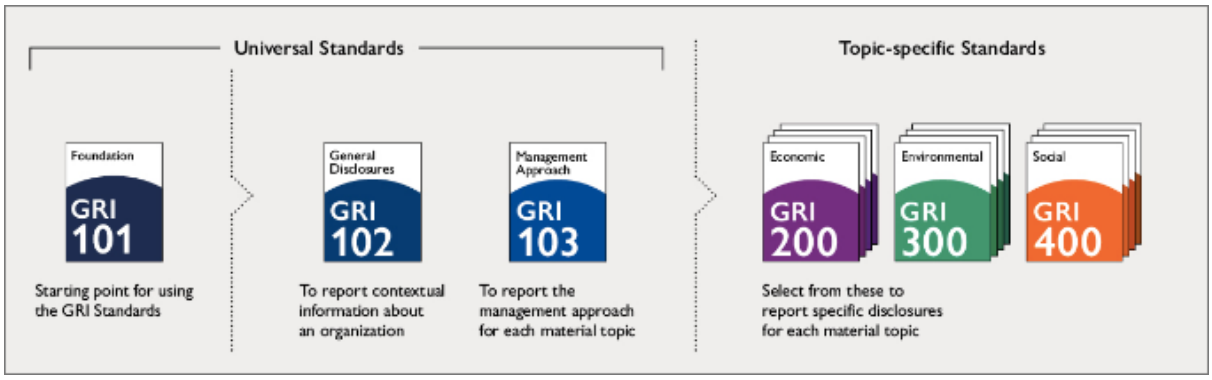


Figure 14: GRI divisions

GRI 101, 102 and 103 are applicable for every company or organization. GRI 200,300 and 400 are topic-specific standards that only apply to certain sectors or industries. In consultation with S4F, it was decided to only include the universal standards.

The process:

Next up, the project group did desk research on the GRI standards. The group has been through some reports of big companies like Nokia (Nokia, 2019) and Hydro (Hydro, 2020). This way the group had a clear idea of what GRI was and what is expected when making a template for this type of report.

Thereafter the project looked into the document that is provided by GRI itself (GRI, 2022). This is an almost 900 pages report. The project group scanned the content and decided which information is necessary to include in the template. As mentioned earlier the template will only cover the universal standards. As a result, much of this document can be disregarded.

The project group copied the headings from the source file and then provided additional information. This makes it even clearer what a company needs to describe for each GRI bullet point. These descriptions are based on the information that is provided by GRI itself as well as information from other sources. For example, the Nokia report that is mentioned earlier on (Nokia, 2019).

Lastly, the template document is provided with a clear introduction and overview of the GRI standards. This way the document is easy to understand and there are no more ambiguines.

7.1.3 THE OUTCOME

All this has resulted in a clear template that companies and organizations can use for making their annual report. This template can be found in Appendix 3: GRI Template, at the end of this report.

7.2 EU GUIDELINES FOR NON-FINANCIAL REPORTING

In addition to the GRI Template, a template has also been created for EU rules.

7.2.1 GUIDELINE FILE

The European Commission has written guidelines for reporting non-financial matters. This includes sustainability and human resources issues for example. The European Commission has published these guidelines to help companies and organizations disclose relevant non-financial information more consistently and comparably.

The guidelines are presented by the EU in two main documents. The last version of the first document was released in 2017 (European Commission, 2017). In this document are the guidelines for basic topics like a Business model, policy and due diligence, outcome, principal risks, and their management, Key performance indicators, social and employee matters, and respect for human rights.

In the second document that was presented in 2019 (European Commission, 2019) the European Commission added guidelines related to climate change. The 2016 version also included climate change but by presenting the 2019 add-on, the European Commission elaborated more on this topic.

The Directive consolidates the trend toward including the main principal corporate social responsibility standards in routine management reporting. As a result, they end up in the annual report on the performance of organizations. The Directive will be applicable to all businesses with more than 500 employees, although it will not apply to subsidiaries whose earnings are added up for reporting.

Additionally, it mandates that businesses submit reports on a variety of topics, including how their operations affect the environment, human health and safety, greenhouse gases, the use of renewable energy, water and air pollution, social and employee policies, equal opportunity, working conditions, respect for union rights, communication with local communities, and efforts to protect and develop them. The protection of human rights and steps to avoid abuse, both of which have already been outlined in specific rules, as well as relationships with workers, clients, and suppliers, are also mentioned.

Companies must clearly state the steps they take to combat corruption and bribery as well as the tools they use to stay away from malpractice.

For each of the aforementioned elements, the material must also cover the risks associated with the company's products, services, proprietary trading, and third-party trading, as well as a brief description of the business strategy, controls used, and results attained. Along with describing how the organization is managing them, it must also list the relevant non-financial sector metrics.

The Directive refers to national and international norms of financial reporting but does not mandate any specific format for reporting. The only prerequisite is that the business must disclose the standard it is utilizing.

To make it easier for their non-financial results to be disseminated in a "pertinent, useful, and comparable" manner, the European Commission has announced the publication of guidelines containing key indicators. Although they will not be required, they should assist businesses in gathering the data.

The EU's commitment to gender diversity in European firms is another factor supporting the change of the accounting directives. According to the Directive, listed firms are required to report on their diversity policy, targets, and outcomes with regard to the governing, management, and supervisory bodies, providing indicators including age, sex, geographic origin, training, and professional experience.

According to the comply or explain principle, which is frequently employed in corporate governance regulations, a firm is required to provide an explanation if it can't release a certain piece of information while considering potential repercussions. Under this principle, listed firms without diversity programs may defend their lack of transparency in this regard. This has increased the flexibility with which EU member states can transpose the standard.

The company's financial auditor must confirm that the data is included in the management report before it is put into effect on a nationwide scale. Member states may decide how much external audits the information must undergo while implementing the Directive.

The new Directive emphasizes the importance of reputation management, branding, and non-financial reporting. For businesses who want to be on the cutting edge in the future, these can offer an outstanding competitive advantage. (UNION, 2014)

7.2.2 THE PROCESS

Scope: Unlike the GRI standards where the project group only made a template for the general part, this time most of the document had to be included in the template. Although there were some exceptions. At base, everything out of the 2017 and 2019 documents had to be included. But these documents had special additions for special organizations like banks and government institutions. These exceptions are left out of scope.

The process:
As the 2019 version is an addition to the 2017 version, the 2017 document has been taken as the basis of the template. The project group studied this document carefully and discussed collectively which information was essential to include in the template. Just like in the GRI template there was a need to weigh up what information was needed and what information could be omitted. By including only the essentials, the project group tried to keep the template as clear as possible. In doing so, the group had to be careful not to lose any valuable information.

When the needed information from 2017 was in the template, the group moved on to the 2019 addition document. It was tricky at first because these two documents' format do not quite match. The group tried to put the different parts in the most logical place possible. This resulted in a layout where the mentioned topics in 7.2.1 figure as chapters. Subsequently, the 2019 parts are hereby subsumed. This results in a basic description per topic after which this topic is then implicated in climate change.

7.2.3 THE OUTCOME

All this has resulted in a clear template in which both documents are mixed. This template can be found in Appendix 4: EU non-financial reporting template, at the end of this report.

8 MIDTERM REPORT RECAP

The EPS published the midterm report on October 25th. An outline of the team's current situation and future goals will be provided in the paragraph that follows.

The report consisted of the very same document but with less content. The Deliverable 2 was not worked on at this point. The project team and S4F decided together, that it is beneficial to finish the template before working on the calculation tool.

Due to a delayed project start, the team initially concentrated on the project management component. The delay was caused by non-correspondent time schedules with S4F.

The Deliverable 1-Template and the project management topic that was previously covered in this document made up the report's content. The group gave a 25 min presentation to an audience consisting of the EPS participants, Roger Nylund and the project tutors. Biniam Tefera was present via a Microsoft teams meeting. The presentation went as planed and the group received overwhelmingly positive

feedback.

Around that time period, the team also received feedback from the project management teacher Philip Hollins. All the requirements were successfully met.

With that knowledge in mind, the team entered the second half of the program with great enthusiasm. To organize upcoming tasks and split the workload, several meetings were organized. Figure 15: Meeting overview illustrates the team's thoughts on how to proceed the work.

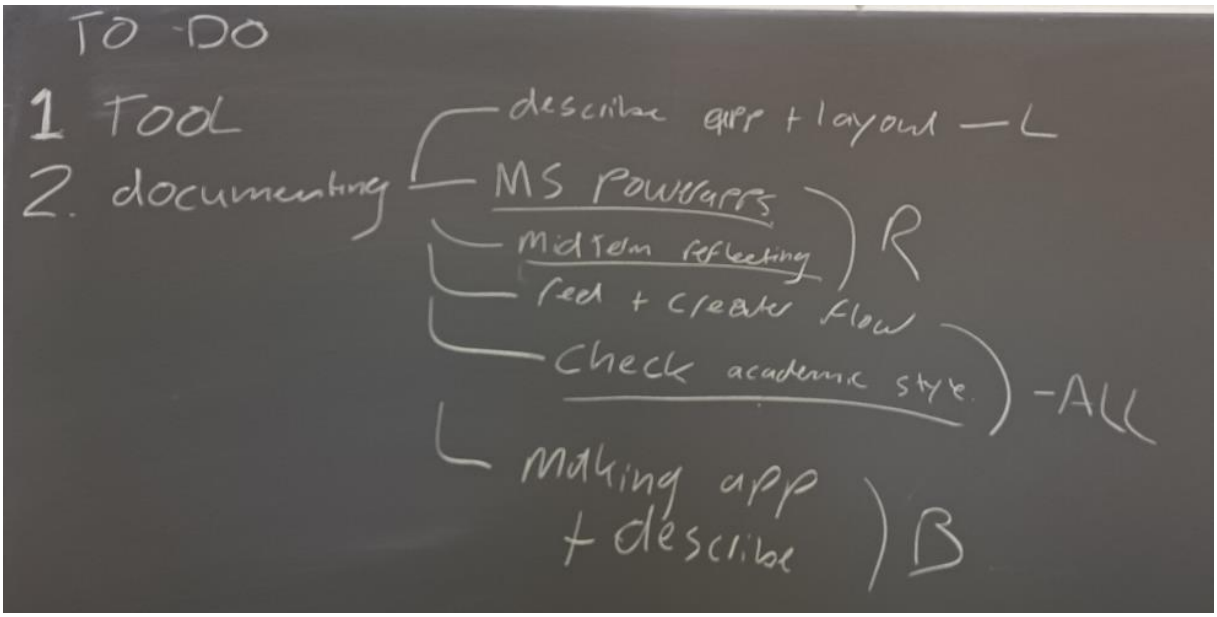


Figure 15: Meeting overview

It was decided to simultaneously construct the calculation tool and document the prose. Large portions of this involved working on the interface and the functionalities. Additionally checking the report on academic writing and the preceding report's details.

9 DELIVERABLE 2 – PRELIMINARY INVESTIGATION

The second deliverable concerns a calculation tool for calculating the carbon footprint of companies in the Jakobstad region. The company Sustain4Future Consulting, helps companies throughout their sustainability journey. An important first step here is to determine the status of the business in terms of emissions. In the current situation, an external party is hired to do this. S4F would benefit from developing its own calculation tool since they would be able to design a tool that would meet their particular demands. This is the task that has been assigned to the project team.

To sum up: The project group needs to develop a calculation tool that can help S4F to determine the carbon footprint of a company. In this chapter, the scope, process and outcome of this deliverable will be described.

9.1 WHAT IS CARBON FOOTPRINT?

First, it is important to dwell on the meaning of carbon footprint and some of background to this.

According to The Nature Conservancy, the meaning of carbon footprint is as follows: ''A carbon footprint is the total amount of greenhouse gases (including carbon dioxide (CO_2) and methane) generated by our actions''. (The Nature Conservancy, 2022).

Everyone has a carbon footprint. Although, some are higher than others. Greenhouse gas is created by all sort of activities. Such as eating, use of transportation, heating etc. This is why certain life choices have a major effect on the personal footprint. This can also be seen in Figure 16 where it can be clearly seen that Western countries have a much larger footprint than Third World countries. If every person lived like a person that is living in the western world, the population would need 5 earths to keep everything going. This demonstrates how crucial it is to be conscious of the environmental footprint and to act accordingly. By designing this carbon footprint tool, the project group wants to help companies with this matter and bring down the carbon footprint in the Jakobstad region.

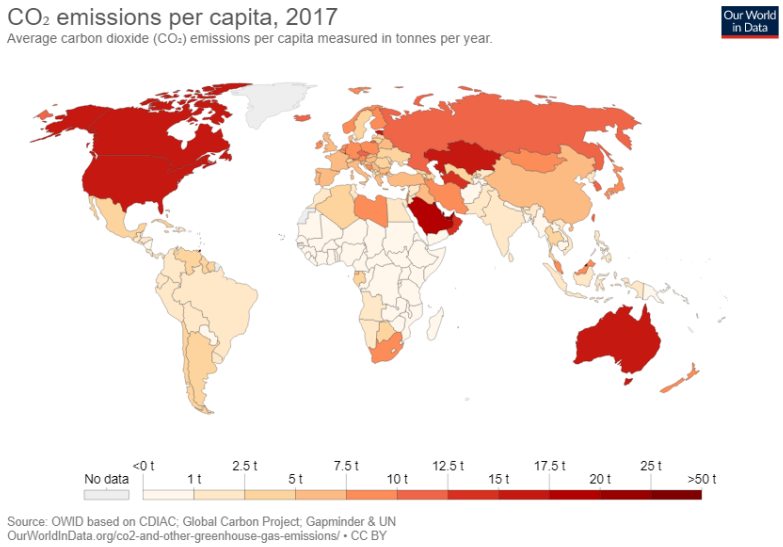


Figure 16: CO_2 emissions per capita 2017

9.2 SCOPE

In a project like this, it is very important to define a clear scope. After all, this is a broad assignment where many variables can be included or excluded. This has a big impact on how big the project becomes.

The project's first objective is to make as much progress as possible and, ideally, present a fully functional prototype. This objective may alter throughout the project because it is challenging to predict how far the team will be able to advance. In the event that the project is unable to complete a prototype, a subsequent EPS project group may carry on with the project research. The project team's main objective is a functional prototype.

Next, it's essential to know beforehand which elements will be incorporated into this calculation tool. Thankfully, S4F has a distinct vision in this area.
The non-profit organization that is called the World Resources Institute has written guidelines on this matter. The document is called ''The greenhouse protocol'' (World Resources Institute, 2011).
According to the greenhouse protocol, a company's emissions can be divided into 3 categories, scope 1, 2 and 3. This distribution can be seen in Figure 17.

Emissions type	*Scope*	*Definition*	*Examples*
Direct emissions	Scope 1	Emissions from operations that are owned or controlled by the reporting company	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment
Indirect emissions	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company	Use of purchased electricity, steam, heating, or cooling
	Scope 3	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Production of purchased products, transportation of purchased products, or use of sold products

Figure 17: type of emissions

Scope 1 contains all the direct emissions. For example, emissions that are created during the production process.

Scope 2 and 3 contain the indirect emissions. Scope 2 describes all the emissions from the purchased energy. Scope 3 is the last scope where all kinds of indirect emissions are included.

Figure 18 displays the distribution in a visual way including examples.

For this project, the group will only include scopes 1 and 2 in the calculation tool. Scope 3 will be left out of scope. Chapter 8.3 describes what is exactly in Scopes 1 and 2.

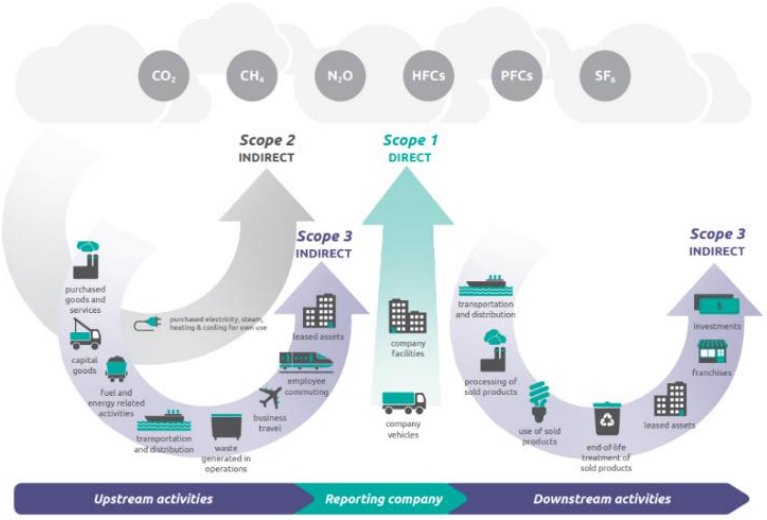


Figure 18: Visual representation of the scopes

9.3 DIFFERENTIATION OF SCOPES

This chapter looks in more detail at the different scopes that were mentioned in the previous chapter. Namely, these scopes determine which variables are included in the calculation tool. All Information collected here was found on the official Greenhouse gas Protocol (GHG) Website: www.ghgprotocol.org (World Resources Institute, 2011)

9.3.1 SCOPE 1 – DIRECT EMISSIONS

Direct emissions from owned or controlled sources by the corporation are included in scope 1 emissions. This covers emissions from fleet vehicles as well as combustion products from owned or controlled boilers and furnaces, on-site energy sources such natural gas and fuel, refrigerants, and fuels (e. g. cars, trucks, helicopters). Process emissions emitted during industrial operations and on-site manufacturing are included in scope 1 emissions (e.g., factory fumes, chemicals).

Scope 1, Stationary Combustion: This section offers instructions on how to calculate Scope 1 direct GHG emissions from stationary combustion. Devices that burn solid, liquid, or gaseous fuel commonly create power, steam, or heat for dairy processing, and are classified as stationary fuel combustion emission sources. (2022, ClimatePartner)

Scope 1, Fugitive Emissions: Fugitive emissions from refrigeration and air conditioning are caused by leaks, use throughout the equipment's operational life, and disposal after the equipment's useful life is ended. Due to the high GWP (Global Warming Potential) of these GHGs, refrigerant gas leaks are a relatively minor yet important source of GHG emissions. (2022, ClimatePartner)

Scope 1, Mobile Combustion Emissions: This section explains how to account for and calculate Scope 1 direct GHG emissions from mobile sources that are owned or leased and fall within the company's inventory boundaries, including both on- and off-road vehicles. (2022, ClimatePartner)

In Summary Scope 1 includes emissions from:

- Incineration of irretrievable fossil raw materials
- Chemical processing
- Incineration of waste
- Leakage from closed systems
- Release of trapped greenhouse gases

9.3.2 SCOPE 2 EMISSIONS – INDIRECT EMISSIONS

According to the GHG Protocol (Greenhouse Gas Protocol, 2022), Scope 2 emissions account for at least one-third of the world's total emissions of greenhouse gases. Because of this, evaluating and monitoring Scope 2 emissions offers a considerable opportunity for emissions reduction.

Indirect greenhouse gas emissions from energy purchased or obtained, such as electricity, steam, heat, or cooling, produced off-site and consumed by the business are included in scope 2 emissions. Indirect emissions include, for instance, electricity that is purchased from the utility company and is produced off-site.

However, if the business, for instance, is an industrial facility that produces all of its own or controlled energy on-site, those greenhouse gas emissions are categorized as direct Scope 1 emissions. The same holds true for businesses that manage their own producing facilities and sell all of their power into the local grid, such as electrical utilities or suppliers. These generation plants' greenhouse gas emissions are included under Scope 1 emissions.

In conclusion, Scope 2 only includes indirect emissions related to the production of energy that was purchased or obtained. However, Scope 3 tracks additional upstream emissions linked to the creation and processing of upstream fuels, as well as the transmission or distribution of energy within a grid.

9.3.3 SCOPE 3 – INDIRECT VALUE CHAIN EMISSIONS

All indirect emissions that take place along a reporting company's value chain are included in scope 3. The US Environmental Protection Agency (EPA) defines Scope 3 emissions as "the result of activities from assets not owned or controlled by the reporting organization, but that the organization5 indirectly impacts in its value chain" (EPA, 2022) in order to clearly distinguish between Scope 2 and Scope 3 categories. Even though the reporting corporation has no control over these emissions, they may still make up the majority of their inventory of greenhouse gas emissions.

The GHG Protocol splits the Scope 3 emissions into Upstream and Downstream emissions and classes them into 15 different categories based on the financial transactions of the reporting entity.

Upstream emissions:

Upstream emissions encompass the indirect greenhouse gas emissions within the company's value chain related to purchased or acquired goods (tangible products) and services (intangible products) and generated from cradle to gate. These emissions are classified into eight categories:

1. Purchased goods and services
2. Capital goods
3. Fuel & energy-related activities
4. Upstream Transportation and Distribution
5. Waste generated in operations
6. Business travel
7. Employee commuting
8. Upstream leased assets

Downstream emissions:

Downstream emissions include the indirect greenhouse emissions within the company's value chain related to sold goods and services and emitted after they leave the company's ownership or control. Downstream emissions fall under seven different categories:

1. Downstream transportation and distribution
2. Processing of sold products
3. Use of sold products
4. End-of-life treatment of sold Products
5. Downstream leased assets
6. Franchises
7. Investments

Scope 3 is not part of the project and is therefore not discussed further in this report.

9.4 WHAT TOOLS ALREADY EXIST?

There are already some tools out there that can help companies in their sustainable journey. In this chapter, these tools will be described.

9.4.1 IDEMAT

Idemat is an app that is designed by students from the Technical University of Delft in the Netherlands. This app helps product designers by making their new product designs as sustainable as possible. The app allows an insight into what impact the choice for different materials has on the environment. It calculates the carbon footprint of the product and provides suggestions for what type of different materials can be used to make the product more sustainable. It also keeps the cost of the product into account. This app can be of great value when a company is designing an new product or want to analyse an already existing product with regard to sustainability. (Idemat, 2015)

9.4.2 CARBONFOOTPRINT.COM

Sustain for Future provided the project group with the calculator that can be found on carbonfoorprint.com. (Carbon Footprint, 2022) This is a website that small a medium enterprises can use for calculating their carbon footprint. This website will provide also data on which the calculations are based. This calculator This data is used as a bases for the calculation tool that the project group is developing. This will be described more elaborate later on in this report.

The calculator works the way S4F would like it to work. That is why this calculator can be seen as an important source for the calculator that the project group will create.

9.5 RESEARCH DEIGN PRINCIPLES

Before the designing, research about design principles has been done. The goal of the research was to define a framework for the visual design of the app to increase its usability. In literature, many guidelines and principles can be found. A widely used principle is the Gestalt principle. The Gestalt principle consists of multiple guidelines to improve visual screen design. D.Chang et al (2002) conducted research on the topic and found that the visual screen design industry uses a limited quantity of these principles. Therefore, they distilled the most relevant Gestalt laws from the Gestalt literature. After that, the 11 remaining laws were verified on a redesign of an educational tool. Users had been asked whether the usability of the tool had improved. The user evaluation indicates that the distilled laws are beneficial for visual design.

The Gestalt laws are made to present elements to achieve an effective visual result. Through the years the Gestalt laws are used as a foundation for visual design. In this section, a description of the 11 maintained laws will follow.

Law of balance/symmetry

Balance in a design is achieved by putting the same weight on both sides of the screen. Imbalance can be used to draw the user's attention to the heavier part of the design. In Figure 20 it can be seen that the first picture is in balance. The second image shows disbalance. The left row has more weight to it in comparison to the right row.

Figure 19 Example 'Law of balance/symmetry (n.a., Law of Continuation)'

Law of Continuation

Continuation is an automatic process happening in the human brain. In Figure 21, different manners of decomposing an element, can be seen. Even though image c is an option to parse an element, the brain tends to use strategy b. This is what the law continuation implies.

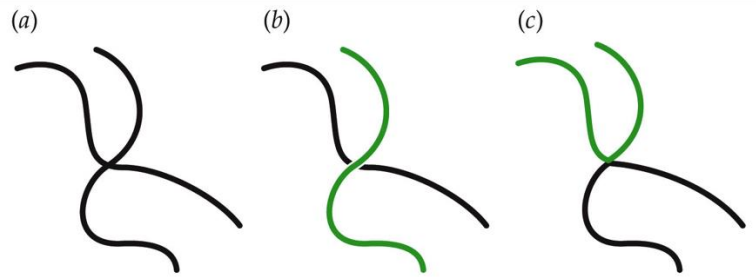


Figure 20 Example 'Law of Continuation' (n.a.).

Law of closure

The law of Closure states that the brain will group and melt elements together to create a complete picture. The mind tends to fill in gabs to make a complete image. In Figure 22, it can be seen how to brain fills in the gabs and creates a complete circle or square.

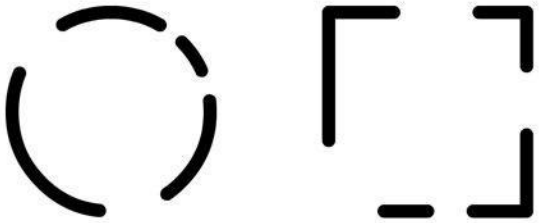


Figure 21 Example 'Law of Closure' (n.a.).

Law of figure-ground

The brain distinguishes the foreground and the background. Different back-or foregrounds can lead to a different perception. Figure 23 displays how changing the background changes the perception of an image, thus the meaning of the image changes form two people to a vase or candle.

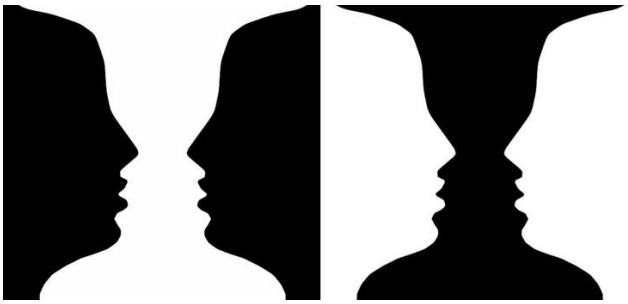


Figure 22 Example 'Law of Figure-Ground' (n.a.) .

Law of Focal Point

The focal point is the element that attracts the user's attention. If the user must come to action, the key element for this action should be the focal point. This can be achieved by changing the shape of the focal point in relation to the other elements. In figure 24 the attention is drawn to the circle, because its appearance differs from its surroundings.

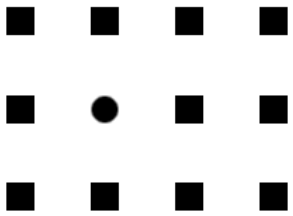


Figure 23 Example 'Law of Focal Point' (n.a.).

Law of isomorphic Correspondence

Meaning of icons and elements are drawn from the user's experience and associations. Figure 25 can be perceived either as a row of trees or as piano keys. This depends on the user's experience and associations.

Figure 24 'Law of isomorphic Correspondence' (n.a.).

Law of proximity

Elements placed close to each other are perceived as a group. Users will mentally group these elements to integral parts. Parts closer to each other are seen as related. Parts further apart, are perceived as unrelated. In Figure 26 one can see how the distance between different elements makes them become an integral part.

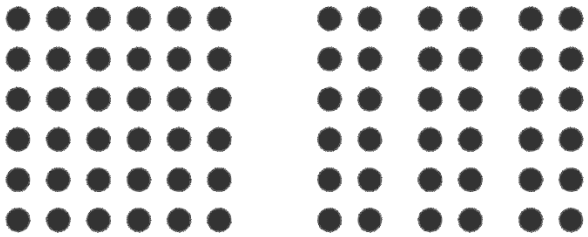


Figure 25 Example 'Law of proximity' (n.a.).

Law of Similarity

Within a group, elements with the same appearance can be seen as a separate group. This can catch the user's attention. The example in Figure 27, indicates how the brain groups elements together with the same appearance.

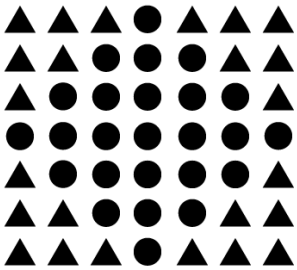


Figure 26 Example 'Law of Similarity' (n.a.).

Law of simplicity

To understand the meaning of separate parts of an icon, the brain simplifies them into smaller elements. Speeding up this process of simplifying, can improve the usability. Stripping down icons from decorations without losing its essence, might accelerate this process. An example of this can be seen in Figure 28.

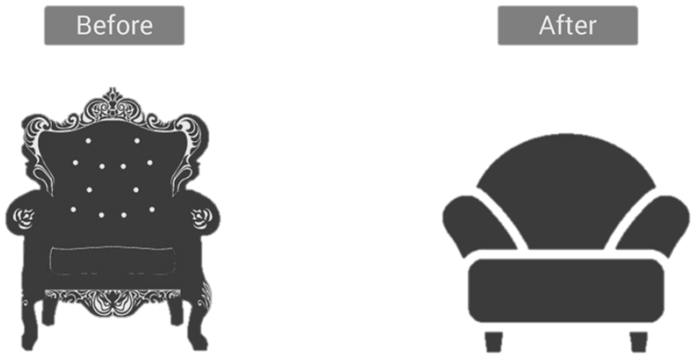


Figure 27 Example 'Law of simplicity' (n.a.).

Law of unity/Harmony

Elements that look like they belong together, are seen as related to the user. Inversely, unrelated units should look like they do not belong together. This can be achieved by varying the distance between groups of components. See figure 10. On the right, there is more space between the elements. This makes it two separate groups of elements.

Figure 28 Example 'Law of unity' (n.a.).

Another tool to improve the interface of a website is the 10 heuristics by Jakob Nielsen. 'They are called "heuristics" because they are more in the nature of rules of thumb than specific usability guidelines' (J.Nielsen, 1994). Heuristics evaluation is a method conduct by usually a group of evaluators from 3 to 5. Each evaluator conducts the evaluation individually. The 10 Heuristics are rated with a from 0 to 4. After the solo assessment, the findings will be discussed. The result of the assessment is a list of usability problems. From here, the webapp can be improved (C.Rusu, 2011).

1. **‘Visibility of system status**

The system should keep users informed about what is going on at any time, through appropriate feedback within reasonable time.

2. **Match between system and the real world**

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. **User control and freedom**

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. **Consistency and standards**

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. **Error prevention**

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. **Recognition rather than recall**

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. **Flexibility and efficiency of use**

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. **Aesthetic and minimalist design**

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. **Help users recognize, diagnose, and recover from errors**

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large' (J.Nielsen, 1994).

10 DELIVERABLE 2 - EXECUTION

This chapter will describe the making of the calculation tool. The project group started off with a excel version the calculation tool. The end goal of the project is to design the tool in Microsoft power apps. By making the prototype in excel first, the team can transfer certain principles from the excel version to the power app.

10.1 EXCEL VERSION

As described in chapter 9.3, the tool will include scope 1 and 2. In the beginning, the focus was thus on creating a calculator that calculated the emissions of cars. The chapter down below describes the making of the Car calculator.

10.1.1 CAR EMISSIONS CALCULATOR

The goal of this calculator is calculating the yearly CO_2 emissions of company cars. This way, the customer can calculate exactly how much CO_2 a certain company car emits. This is part of scope 1 as described In chapter 8. This calculator will use the exact data of specific cars, making the calculation very accurate. To be able to do this, a large database is used in which almost all models can be found. A screenshot of a part of this database can be seen in Figure 29 down below.

Brand	Model	Engine	Transmission	Fuel	Vehicle Class	Cylinders	Fuel Consumption City (L/100	Fuel Consumption Hwy (L/100 km)	Fuel Consumption Comb (L/100 km)	Fuel Consumption C (mpg)	CO2 Emissions(g/
ACURA	TL AWD	3,70	AS6	Premium Gasoline	MID-SIZE	6	12,8	9	11,1	25	255
ACURA	TL AWD	3,70	M6	Premium Gasoline	MID-SIZE	6	13,4	9,5	11,6	24	267
ACURA	MDX 4WD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,7	9,1	11,1	25	255
ACURA	MDX SH-AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,7	9,1	11,1	25	255
ACURA	MDX SH-AWD	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,7	9,1	11,1	25	254
ACURA	MDX SH-AWD	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,6	9	11	26	259
ACURA	MDX SH-AWD	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,6	9	11	26	259
ACURA	MDX SH-AWD	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9	10,8	26	252
ACURA	MDX SH-AWD	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,3	9,2	10,9	26	254
ACURA	MDX SH-AWD A-SPEC	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9,5	11	26	258
ACURA	MDX SH-AWD A-SPEC	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9,5	11	26	258
ACURA	MDX SH-AWD ELITE	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9,1	10,7	26	251
ACURA	MDX SH-AWD ELITE	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9	10,7	26	251
ACURA	MDX SH-AWD ELITE	3,50	AS9	Premium Gasoline	SUV - SMALL	6	12,2	9	10,7	26	251
ACURA	NSX	3,50	AM9	Premium Gasoline	TWO-SEATER	6	11,1	10,8	11	26	261
ACURA	NSX	3,50	AM9	Premium Gasoline	TWO-SEATER	6	11,1	10,8	11	26	261
ACURA	NSX	3,50	AM9	Premium Gasoline	TWO-SEATER	6	11,1	10,8	11	26	261
ACURA	RDX AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,1	8,7	10,6	27	244
ACURA	RDX AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,1	8,7	10,6	27	244
ACURA	RDX AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,4	8,6	10,7	26	249
ACURA	RDX AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,4	8,7	10,7	26	250
ACURA	RDX AWD	3,50	AS6	Premium Gasoline	SUV - SMALL	6	12,4	8,7	10,7	26	250

Figure 29: Car database

As can been seen, the different models and the corresponding CO_2 emissions per km are listed in the table. The calculator will be based on the data contained in this excel list. This database has been provided by sustain for future.

Before starting to build the calculator, thought was given to its layout. Ideally, the customer can choose a car and then enter the annual km driven. Following this data, the calculator needs be able to calculate annual CO_2 emissions in tonnes. After brainstorming together, the decision was made, to work with cascading drop-down menus. This means that the customer can select a car in a menu and then choose from various models supplied by that manufacturer. After choosing the model, the customer must also choose the type of engine, transmission and fuel. In this way, the calculator knows which exact car the customer drives and can then link a CO_2 value to it. This looks as following in the Excel (Figure 29).

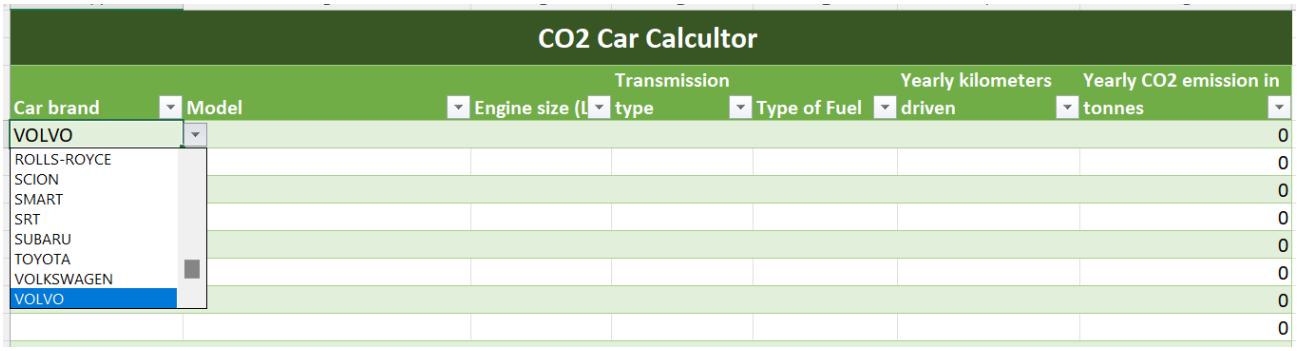


Figure 31: Car Emission Calculator in Excel

Figure 31 displays what the calculator looks like in excel. a particular car can be chosen by using the 5 dropdown menus. The annual km driven can then be entered and the emissions calculated.

CO2 Car Calcultor

Car brand	Model	Engine size (L)	Transmission type	Type of Fuel	Yearly kilometers driven	Yearly CO2 emission in tonnes
VOLVO	V60 T5	2	AS8	Z	40000	7,88
AUDI	Q5	3,00	AS8	Z	25000	6,45
BMW	428i COUPE	2,00	M6	Z	32000	6,4
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
Total					97000	20,73

Figure 30: Car Emission Calculator in Excel

Figure 30 illustrates how the calculator works if the customer fills in more cars. The calculator can be extended to as many cars as the customer needs. The total CO_2 emissions in tonnes can be found in the bottom right corner.

As can be seen in Figure 32, there is now a Z under fuel type. A choice of Z, X, D, E, N can be made here. These letters are an abbreviation for the following fuel types. In the final version, the fully written out names will be selectable in the app.

X	Regular Gasoline
Z	Premium Gasonline
D	Diesel
E	E85
N	Natural gas

Figure 32: Fuel abbreviations

10.1.2 THE FORMULAS BEHIND THE TOOL

These dependent drop down menus are not a standard option in excel. For this, the project team has downloaded an extension that enables this. This extension is called KuTools for excel. (KuTools, 2021). The extension package can be downloaded trough this link: https://nl.extendoffice.com/download/kutools-for-excel.html
The tool makes it easy to connect different databases and make them dependent on each other. Because of this tool, the drop down menu only displays the models that actually belong to a particular brand. This principal also applies to the other choices that come next.

Once the customer has chosen the relevant car using the dropdown menus, it is up to the calculator to multiply the correct CO_2 value by the annual mileage. The formula used for this is displayed in Figure 33 below.

```
=ALS.NB(X.ZOEKEN(1;(Tabel1[Brand]='Carbon Calculation Tool'!A4)*(Tabel1[Model]='Carbon Calculation Tool'!B4)*(Tabel1[Engine Size(L)]='Carbon Calculation Tool'!C4)*
(Tabel1[Transmission]='Carbon Calculation Tool'!D4)*(Tabel1[Fuel Type]='Carbon Calculation Tool'!E4);Tabel1[CO2 Emissions(g/km)])*F4/1000/1000;0)
```

Figure 33: Code for the car calculator

The formula uses an XLookup function that compares the choices from the dropdown menu with the data from the database. At the end of the formula, it says to read the CO_2 value following the previous comparisons. Finally, the value found is multiplied by the kilometres entered (F4) and divided twice by 1000 to convert the grams to tonnes. To avoid beauty errors, an IF.NA function has also been used to ensure that no error appears when the table is not filled in.

10.1.3 BUILDING EMISSION CALCULATOR

Besides calculating emissions from cars, emissions from buildings are also part of scope 1. Sustain for future has recommended the following website for this purpose: https://www.carbonfootprint.com/businesscalculator.aspx (Carbon Footprint, 2022) This webpage contains a calculator for buildings where the database on which the calculations are based is also public. The explanation for the calculation is provided at the bottom of the page when using the calculator on this website, as seen Figure 34. This data can be used to create a personal database.

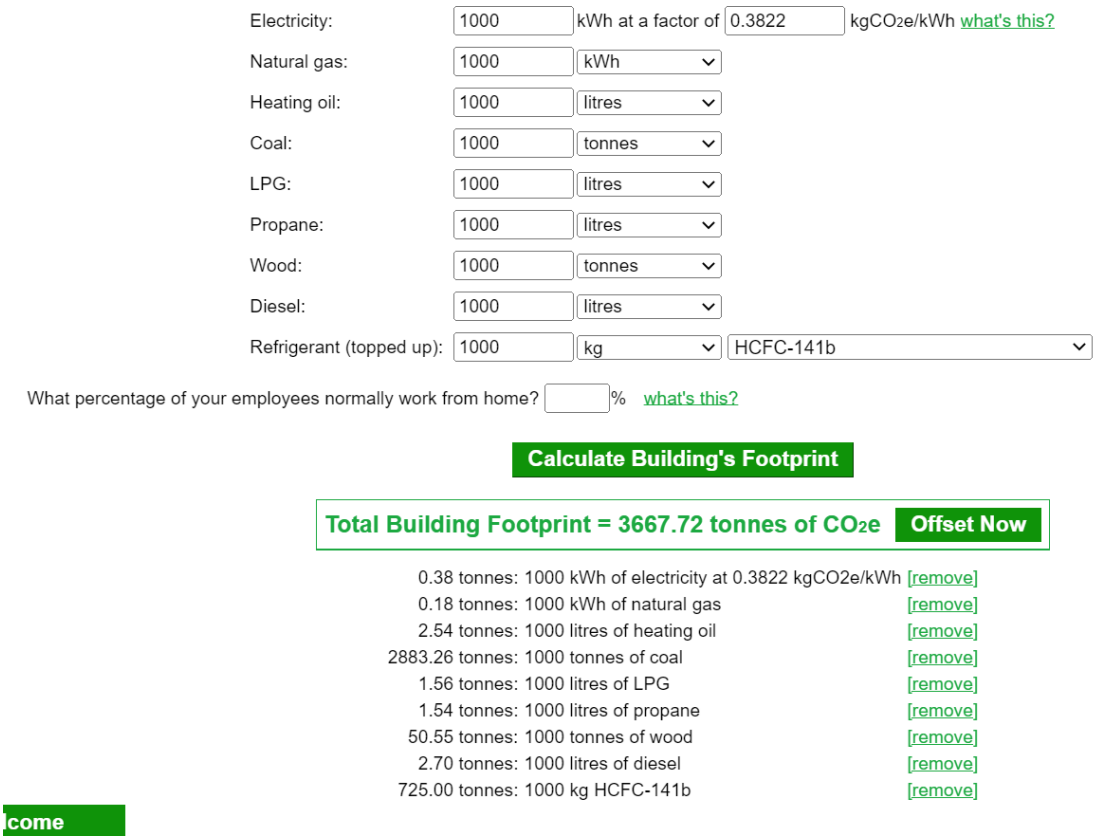


Figure 34: Building Emission calculator on the Web

This data was used to build a proprietary database to then recreate the calculator. Besides the various fuels such as diesel and electricity, refrigerants are also included in the calculation. Refrigerants are a working fluid used in the refrigeration cycle of air condition systems and heat pumps. Besides the eight standard energy sources, there are also 95 refrigerants taken into account by making this tool. Figure 35 displays the data base that the project group made.

Building footprint base data							
type of energy	Amount	Unit	Tonnes of CO2 emission	Type of Refrigerant	Amount	Unit	Tonnes of CO2 emission
Elektricity	1000	KWH	0,3822	Carbon dioxide	1	KG	0,001
Natural Gas	1000	KWH	0,18	Carbon tetrachloride	1	KG	1,4
Heating Oil	1000	Litres	2,54	CFC-11/R11 = trichlorofluoromethane	1	KG	4,75
Coal	1000	KG	2,88	CFC-113	1	KG	6,13
LPG	1000	Litres	1,56	CFC-114	1	KG	10
Propane	1000	Litres	1,54	CFC-115	1	KG	7,37
Wood	1000	KG	0,05	CFC-12/R12 = dichlorodifluoromethane	1	KG	10,9
Diesel	1000	Litres	2,7	CFC-13	1	KG	14,4
				Dimethylether	1	KG	0,001

Figure 35: Building footprint database

As can be seen in Figure 35, the default data for the eight energy sources is expressed per unit 1000. This gave the calculator complete numbers to work with in further calculations. The column on the right displays relevant data for the all refrigerants. The figure only reveals part of it because this table goes up to 95 different refrigerants. Unit 1 was chosen here. If unit 1000 was chosen, this would produce large numbers that are difficult to work with.

When the database was set, the project group started working on the calculator for the carbon footprint of a certain building. In contrast to the car calculator, this was easier since there was a clear example that needed to be rebuild. Figure 36 demonstrates the calculator that was made in excel. After the figure, it is explained how the calculator was made.

CO2 Building Calculator			
type of energy	Yearly Amoun	Unit	Tonnes of CO2 emissio
Electricity	6000	KWH	2,2932
Natural Gas	2000	KWH	0,36
Heating Oil	3000	Litres	7,62
Coal	1000	KG	2,88
LPG	800	Litres	1,248
Propane	500	Litres	0,77
Wood	3500	KG	0,175
Diesel	10000	Litres	27
HCFC-124	10	KG	6,1
Total CO2 emmision in tonnes			48,4462

Figure 36: CO_2 Building Calculator

As can been seen in the figure, this calculator has more or less the same layout as the one on the internet. In left-column, the different energy sources are stated. In the column next to it, the customer can fill in the amount that their company uses per year. This can also be changed to month or week if those are the customers wishes. The column next to that states the unit in which the amount is. Lastly, the calculator calculates the tonnes of CO_2 emission that belongs to the certain amount of usage. for this, the calculator logically uses the data from the previously created database. In figure 26, random numbers were entered to demonstrate the use of the calculator. The formula that is used to calculate the CO_2 emission can be seen in Figure 37.

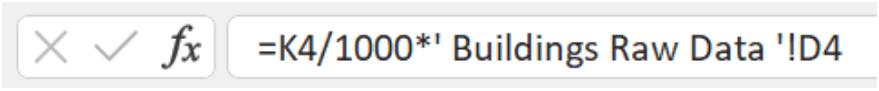


Figure 37: Formula for Building Calculator

The formula is straightforward. First off, the entered data by the customer (K4) is divided by a 1000 because the data in the database is per 1000. This way, the customer can enter any specific number and the calculator will return the right number. Next up, the calculator multiplies this number with the data that was provided in the database. This way, the CO_2 emissions are calculated.

Since there are 95 different refrigerants in the calculator, a dropdown menu had to be created for this. This allows the customer to select the relevant refrigerants and then calculate the corresponding CO_2 emissions (Figure 38).

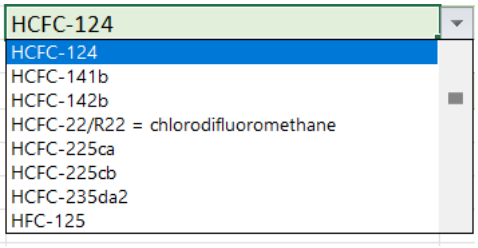


Figure 38: refrigerant Dropdown Menu

Because the customer can choose a specific refrigerant, the formula for calculating the emissions is a less straight forward (Figure 39).

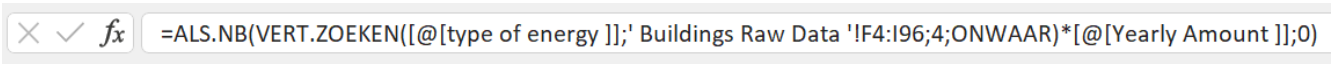


Figure 39: Formula for calculating refrigerant emission

The vertical lookup formula first reads the specified data from the dropdown menu. Then the formula compares this data with the data from the database. Finally, the formula reads the corresponding CO_2 value that corresponds to the specified value. This value is multiplied by the annual consumption that is specified. This is not divided by 1000 as was done in the previous formula. This is not necessary because the CO_2 emissions are listed per 1 in the source file.

In the current situation, there is room for only 1 refrigerant in the excel tool. This can of course be copied and expanded. In the final app, the number of refrigerants to be filled in will be able to be infinite. This is an important point to take into account when the project group is designing this.

10.2 POWER APP VERSION

Creating the excel version served as a steppingstone for the actual version in Microsoft PowerApps. The goal of the project is to eventually create a user-friendly version in an app form. This chapter describes the process of creating this app.

Note: not all calculator were first build in excel. This decision was made to save time in order to deliver a completely working app at the end of the semester.

10.2.1 MICROSOFT POWER APPS.

Power Apps was introduced the public preview of PowerApps in April 2016 and is a collection of apps, services, connectors, and a data platform that offers a quick development environment for creating unique apps for the various company's requirements. Users can create unique business apps with Power Apps that connect to data housed in the Microsoft dataverse underpinning data platform or in a variety of online and on-premises data sources (such as SharePoint, Microsoft 365, Dynamics 365, SQL Server, ...) (Microsoft, 2022)

Power Apps-created applications offer robust business logic and workflow features to convert manual business processes into digital, automated ones. Additionally, Power Apps-created apps have a responsive design and can function flawlessly on mobile devices and in browsers (phone or tablet). Power Apps "democratizes" the process of constructing unique, feature-rich business apps by allowing consumers to do it without writing any code. (Darshan, 2016)

The project team decided to employ Microsoft power apps to develop a useful tool as a result of these advantages, which include ease of use and variety in both interface and functional aspects. The group was also motivated to look at this technology, because S4F already had some prior experience with it.

The team also discovered some inconveniences while utilizing this program as it was being used. For instance, the app can only be used by one person at a time. As a result, the project team was unable to work on the tool simultaneously, which slowed down development. Additionally, there is no "development mode," which prevents the app's administrator from having complete control over it and from knowing precisely who made what changes to it. Furthermore, there is no mechanism to save data between sessions, therefore the user must always export the data or save it on a different server. The group also experienced some minor discomfort when they realized that a drop-down menu can only contain 2.000 rows of excel data and that 15.000 rows of excel is the limit to examine. As a result, the data used had limitations.

Even though there were constraints, the program was well appreciated by the group because there was always a method to overcome them. The fact that the program may be used without prior knowledge of coding and other related concepts, as well as the fact that it is free, is sufficient for the team's acceptance.

10.2.2 BUILDING THE APP

Disclaimer: There will be some Dutch language at the beginning of the descriptions of the calculators. The team's laptop's factory default settings are responsible for this. Later, the language was switched to English instead.

This chapter will describe the making of the Carbon Calculator in Microsoft Power Apps step by step. The working and making of every different calculator will be described. A deliberate choice was made to write this chapter while creating the app. Thus, the screenshots of the app in this chapter are also not the actual final product. The required formulas and functions do work as intended in this chapter. The next chapter will describe the design of the app. This way, the progression and steps made during the process are clearly visible to the reader of this report. First, the car specific calculator will be described.

As none of the group members had any experience with Microsoft power apps, many YouTube tutorials were watched to understand how the program works. Credit for this must be given to Shane Young of the eponymous YouTube channel Shane Young. Shane uploaded a number of instructional videos on YouTube explaining all the functions of the program. This helped the project group immensely in building the application. (Shane Young, 2022)

10.2.3 CAR SPECIFIC CALCULATOR

This calculator was also made in the excel version as can be read in chapter 10.1. The core ideas behind the calculator, which was developed there as an earlier one, will be applied to the app. In this manner, it took less time to understand how the particular calculations were performed. As this excel file could not be directly imported, it was necessary to create a completely new software.

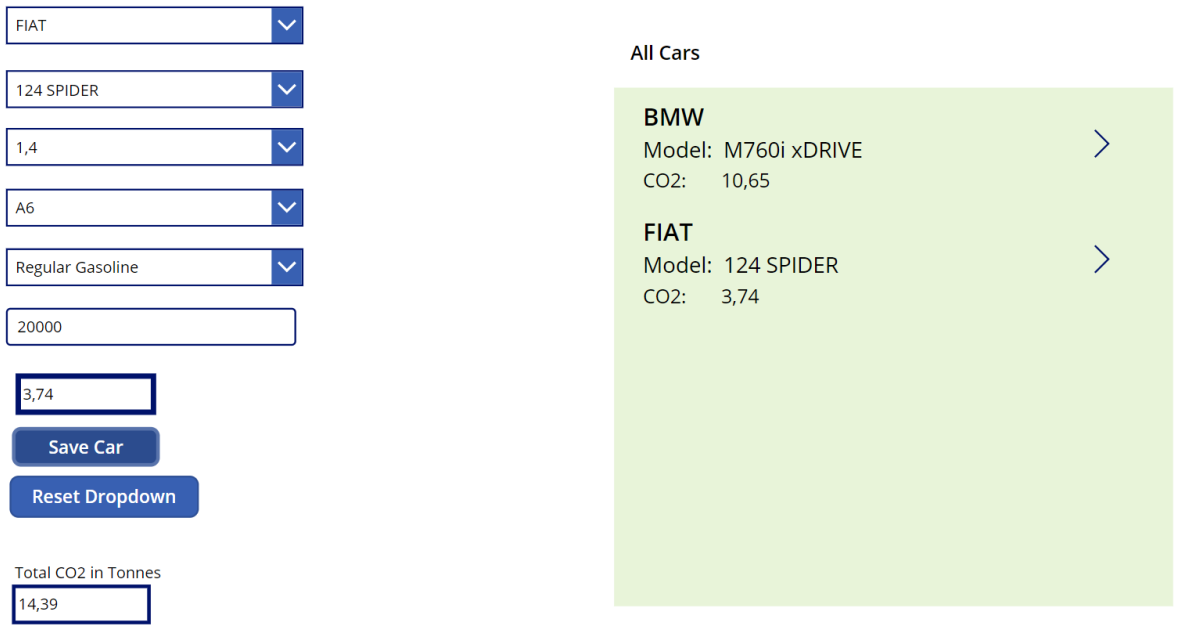


Figure 40: Car Calculator work in progress

In the beginning there was a focus on making all the data and formulas working properly, as can be seen in Figure 40. This is a screenshot of the app that was made during the process of designing the app. The layout and user interface are not final. On the other hand, the calculations in this screenshot work as intended. An explanation of how this was made follows now.

First off the neccerasy data that the calculatuons will be based on had to be imported in to the app.

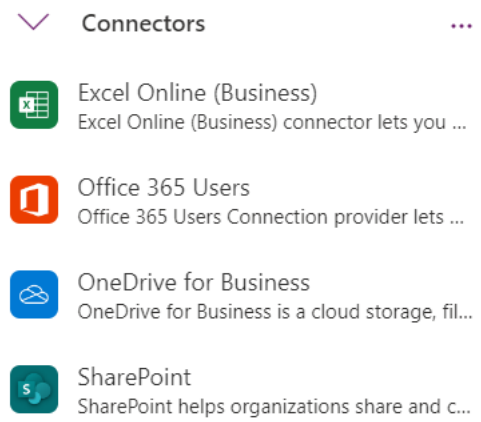


Figure 41: Connectors in Power Apps

Using the connector function that can be seen in Figure 41, the group was able to connect excel files to the Power App. Research has been done on retrieving data from online source files. This way, the app would be more editable as changes in the source file would then be reflected in the app. This makes the editability of the app better. Novia's accounts did not allow this which meant working with local excel files instead of online files. That is why these are now imported locally into the app. On the other hand, this makes the app easily transferable to another admin. This is helpful if another EPS group may finish the app. In short: The app can now be directly handed to another person and is no longer dependant on one of the team members local laptops or drives.

The software displays the excel files that will serve as its foundation when they are imported, as shown in Figure 42. Certain calculations can be based on data from the Excel files once they have been loaded into the Power App.

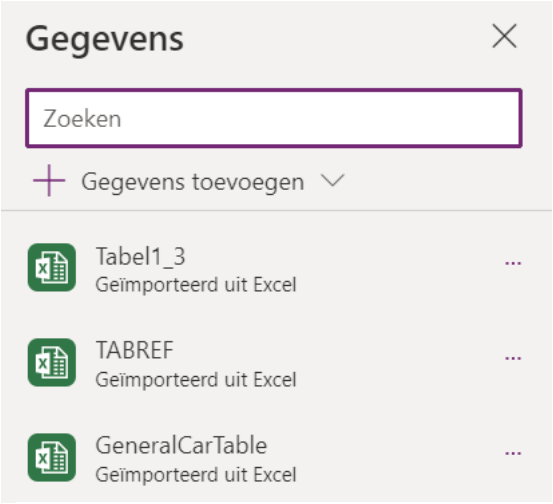


Figure 42 Imported excel files

Drop down Menus

First off, it is important that the user of the app can select a specific car. This way the calculator knows which CO_2 emission is linked to the specific car. This was made possible by importing the car database into the app as described on the previous page. The project group chose the dropdown menus to select the specific car. The usability study revealed that this method is the most practical for selecting a certain car. The following formula was used to make those dropdown menus:

Figure 43 Distinct Formula for dropdown menu

The Distinct Formal (Figure 43) makes it possible to create a dropdown menu based on the data in a certain excel file. In this case the imported excel file is called ‘’Tabel1_3’’. The formula tells to make a dropdown menu out of the data in the column “brand” in the earlier mentioned Table. This results in a dropdown menu where the user of the app can choose out of all car brands that exists in the database.

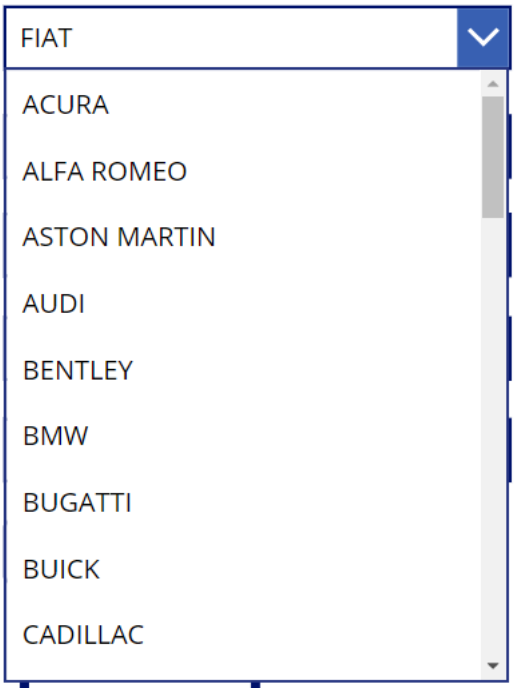


Figure 44 Dropdown menu Brands

Making the dropdown menu that Figure 44 displays was rather straight forward. The following dropdown menus are a little more complex because they depend on a choice that was made prior. Cascading dropdown menus are used to limit the options available for selection from subsequent dropdown menus to those that make sense and are practical rather than all the variables that are included in the data collection. When a BMW is selected in the first drop-down menu for instance, the following page will only offer BMW-made vehicles, not for example, Audi vehicles.

The formula that was used for the cascading dropdown menus can be seen in Figure 45 down below.

```
Distinct(Filter(Tabel1_3;Brand = DrpBrand.Selected.Result);Model)
```

Figure 45: Cascading Dropdown Menu Formula

The distinct function is used again but this time there is also a filter function included. This filter function makes sure that it only offer the possible option based on the earlier choices.

```
Distinct(Filter(Tabel1_3;Engine = DrpSize.Selected.Result && Model = DrpModel.Selected.Result);
Transmission)
```

Figure 46: Cascading Dropdown Menu Formula 2

Figure 46 displays that there can be as many filters included as possible. This way the dropdown menu can list specific data based on the choices that are made earlier on.

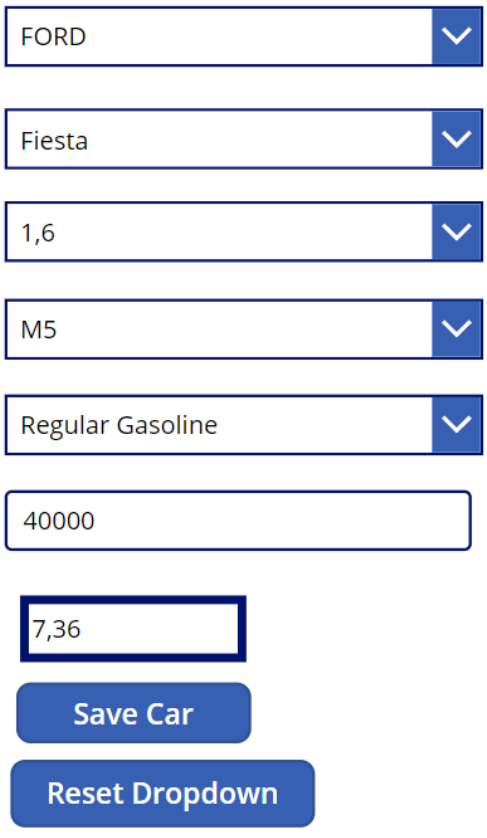


Figure 47: Example of a car calculation

Figure 47 illustrates an example of a car someone chose. In this case it is a Ford Fiesta with a 1,6 Litre engine and a manual 5 gear gearbox. The car uses Regular Gasoline and this person drove 40.000KM with the car last year. Figure 47 demonstrates that the car produced 7,36 tonnes of CO_2 in this particular year. The following formula ensures that this is calculated correctly.

```
(LookUp(Tabel1_3;Brand = DrpBrand.Selected.Result && Model = DrpModel.Selected.Result && Engine =
DrpSize.Selected.Result && Transmission = DrpTrans.Selected.Result && Fuel = DrpGas.Selected.Result;'CO2
Emissions(g/km)'))*YearlyKM/1000/1000
```

Figure 48: Lookup Formula for CO_2 Calculation

The formulas (Figure 48) are essentially the same as those in the Excel trial version. The formula is called a lookup formula. This means that the formula is going to look up a certain datapoint based on the information that is written in to the formula. In this case, the formula is told that it looks into table1_3 which is the car database. Next, the formula looks into the column brand and compare the data in this column with the selected result in the dropdown menu. After this, it does the same for the model choice. The formula looks into the model column and compares this again with the selected result in the dropdown menu. This process repeat itself five times for all the dropdown menu's. After the customer used all five dropdown menu's, the formula knows exactly which car the customer drives. This also means that the formula can search for the matching CO_2 value, because that is the essence of this lookup formula. After the formula found the matching CO_2 value, it multiplies it with the yearly kilometres. Finally it divides the value by 1000 two times to convert the value that is in grams to a value that is in tonnes. Tonnes is the more usual unit to measure CO_2. To conclude this formula, the CO_2 emission in tonnes of a certain car can been seen in Figure 47.

The consumer naturally wants to be able to enter multiple cars after that. The save and reset buttons were created for this purpose. The save button ensures that the data entered is saved locally in the app. This saved data is called a collection in the app. Using a gallery function, the saved data in the collection can also be displayed again in the app itself. But before describing this gallery, the function behind the save button will be described.

```
Collect(MyItems;{Brand: DrpBrand.Selected.Result; Model:DrpModel.Selected.Result;
Engine:DrpSize.Selected.Result; Transmission:DrpTrans.Selected.Result; Fuel:DrpGas.Selected.Result;
YearlyKM:YearlyKM.Text; CO2inTonnes:CO2TON.Text})
```

Figure 49: Save Function Formula

The function in Figure 49 is called collect. By writing this formula, the corresponding collection in which the data will be stored is created automatically. This is why the column names also need to be named in the formula. Thus, the formula knows where in the collection to store the data. First off, the collection is named, in this case the name of the collection is ''MyItems''. Thereafter, the formula starts describing what type of data needs to be stored in which column. For example: The formula starts with ''Brand''. This is the name of the column in the collection. Then the formula states the data that needs to be stored, in this case the selected result of the dropdown menu where the brand of the car can be selected. As can been seen in Figure 49, this pattern repeats itself for the rest of the formula. Now all data is saved in the collection when the save button is clicked. The collection can be seen in Figure 51, this collection is not visible for the user of the app.

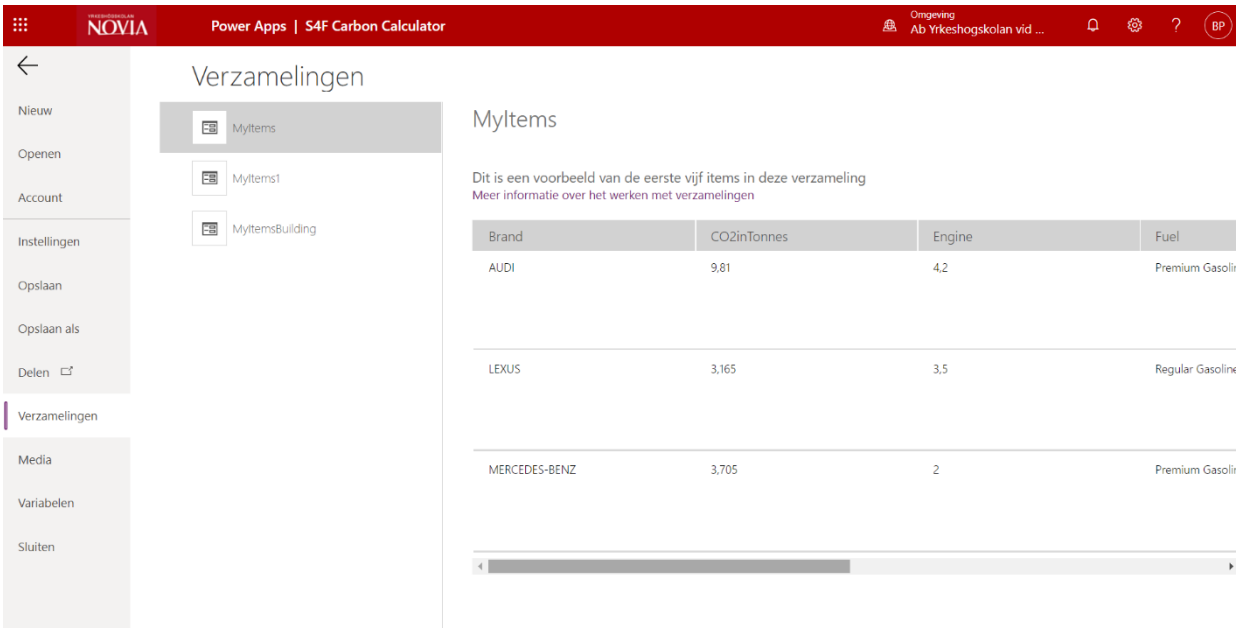


Figure 51: Collection in Microsoft Power Apps

To let the customer know that the car is stored correctly, the project group also wants to provide the customer insight into the stored vehicles. This can also be useful if, for example, the customer wants to make further adjustments to a vehicle or delete a vehicle. To achieve this, a gallery has been added that displays the stored data from the collection. The gallery can be seen in Figure 50 down below.

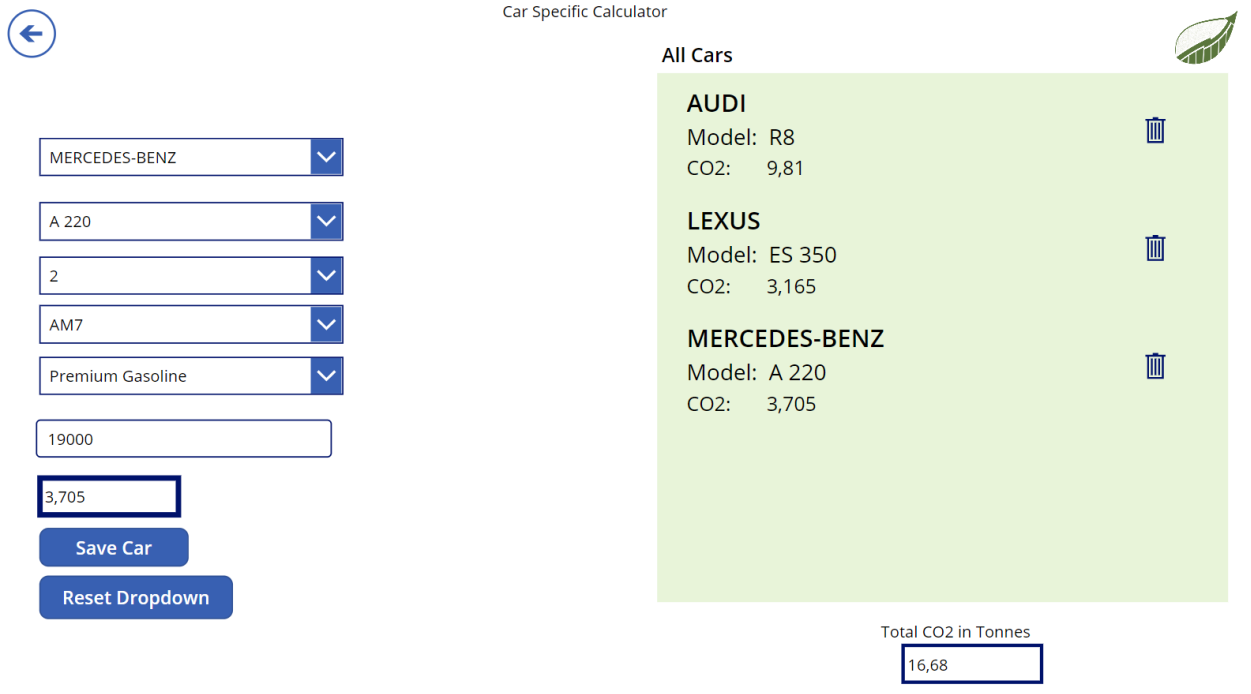


Figure 50: Gallery in Microsoft Power Apps

The gallery can be inserted by selecting vertical gallery at the top of the ribbon. It can then be selected what data the gallery displays. In this case, the ''myitems'' collection was chosen for this purpose, as it stores the vehicles' data. When the save button is pressed, the gallery immediately displays what has been saved because this is just a mirror of the collection. It was decided not to list all the specified data in the gallery, but only a summary of the specified data. In this case, that is the brand, model and associated emissions as can be seen in Figure 50.
When the user of the app accidently added a car, the trash figure can be used to delete a car from the collection. This function is linked to the collection and not only the gallery. This entirely removes the car from the app.

A field at the bottom of the page provides the overall CO_2 emissions from all the specified cars. The function that makes this field work properly can be seen in Figure 52.

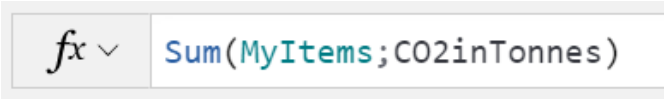


Figure 52: Function for total CO_2 in car calculator

The function makes a sum of all the items that are listed in the collection that is named ‘’My Items’’ below the column ‘’CO2inTonnes’’.

Lastly, the reset button has to be explained. This function is straight forward as can be seen in Figure 53 down below.

Figure 53: Reset formula

The formula resets the yearly kilometres and the upper dropdown menu: Drop down brand. Because these dropdown menus are linked to each other, they will all reset if only the first one is included in the reset function. By default, dropdown menus are reset to the first value in the underlying database. This can be set to an empty dropdown in the following way (Figure 54):

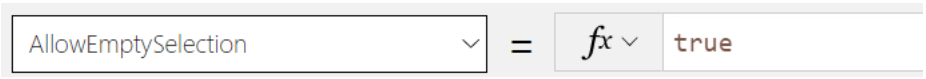


Figure 54: Making empty dropdown possible

By selecting ‘’AllowEmptySelection” in the top ribbon and thereafter typing ‘’true’’ in the formula bar, an empty selection is possible. This looks more clean in the opinion of the project group. In the final version, text will be added which described the content of the drop down menus.

Figure 55 illustrates what happens when the user of the app presses the reset button. As said before, now it is unclear what needs to be filled in in the different dropdowns. This is an attention point for the later final version

Figure 55: Empty drop down menus

This was the description for building the car calculator. As mentioned earlier, this was just the description of how the formulas work. The appearance of the app is not finished here. In order for the reader of the report to follow the progress of the build, the project team deliberately explains this. The formatting of the app is still to be done at this point.

This calculator above is described in detail. Many of the same principles and formulas recur in the other calculators. Therefore, the other calculators will not be explained in as much detail. There will be frequent references back to the car calculator when the same type of formulas are used.

10.2.4 GENERAL CAR CALCULATOR

In some cases, the user of the app wants a more general approach. For example, if the user of the app does not know what sort of cars the employees drive or the customer simply does not need a very specific calculation. In this case, the app also includes a general car calculator which will calculate the emissions of cars in a more general way. The making of this calculator will be described in this chapter.

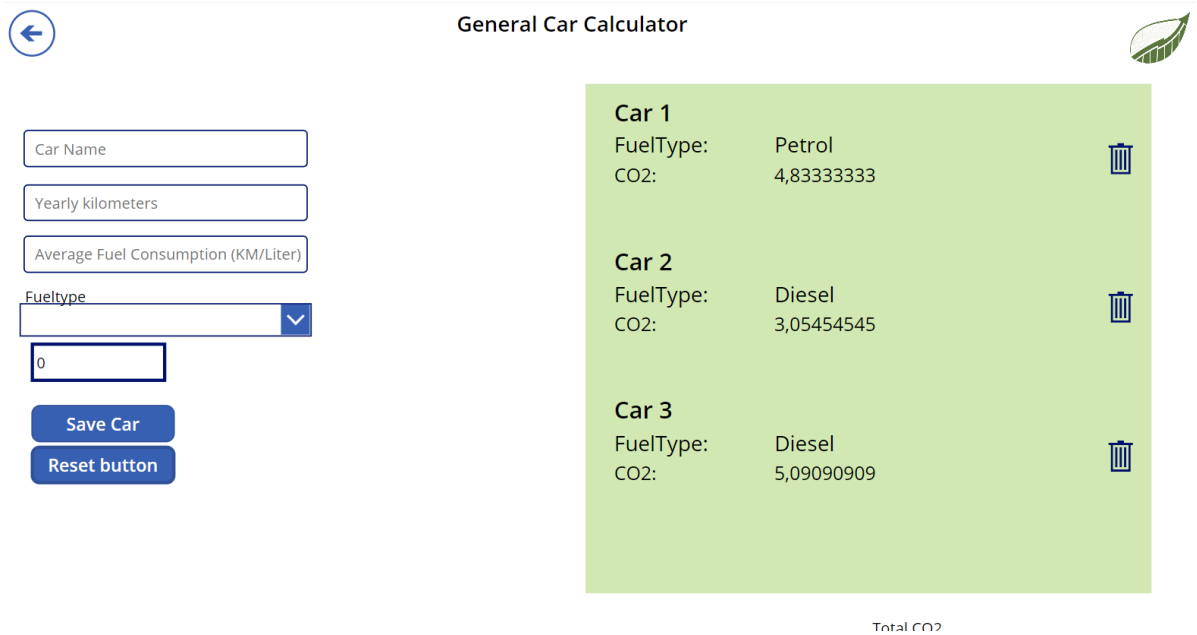


Figure 56: General Car Calculator

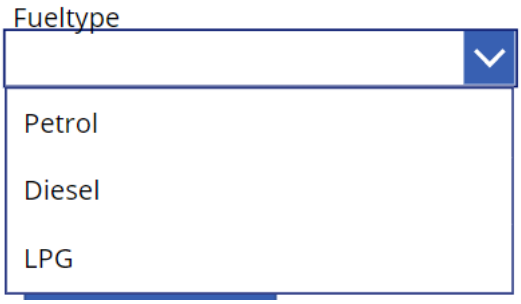
The general layout of this calculator can be seen in Figure 56. The user of the app can name the car. After that, the yearly kilometres needs to be entered. Thereafter the fuel economy needs to entered in the KM/Litre format. Lastly, the fuel type can be selected. This is all the information the calculator needs to calculate the CO_2 emission in tonnes. Figure 56 illustrates how this calculator also utilizes a gallery function to display a summary of the entered data.

An Excel database is linked to this calculator. Calculations are based on data from this database. This database was provided by Sustain4Future. The database contains general approximations for emissions from diesel, petrol and LPG cars. The database can be seen in Figure 57 down below.

Fuelsort	Emission per liter
Petrol	2,9
Diesel	2,8
LPG	1,9

Figure 57: General Car database

This database, which displays the emissions that are emitted when utilizing each of the three fuel alternatives, is rather uncomplicated.



The Drop Down menu looks as following (Figure 58):

The user of the app can select the relevant fuel type for the car.

Figure 58: Fuel Dropdown

When all the fields are entered by the user off the app, the calculator can calculate the CO_2 emission in tonnes. The formula that makes this work is the following (Figure 59):

```
LookUp(GeneralCarTable;Fuelsort = GenDrpFuel.Selected.Result;Emission1)*(GENYEARLYKM/GENFUELCONS)/1000
```

Figure 59: Formula for general car calculator

The formula uses the LoopUp formula. The database in Excel that can be seen in Figure 57 is called ''generalCarTable''. The formula refers to this database and compares the given values in the dropdown to the data in the excel file. Thereafter the formula search for the corresponding CO_2 value. For example, for diesel it is 2,8. Next up, in case of diesel, this 2,8 is multiplied by the number resulting from the division of annual kilometres and fuel consumption. The final step is to divide the number by 1000 to convert it to tonnes, the correct unit.

```
Collect(MyItems1;{CarName:Carnamelabel.Text;YearlyKilometers: GENYEARLYKM.Text; FuelConsumption: GENFUELCONS.Text;
FuelType:GenDrpFuel.Selected.Result;CO2inTONNES:GenCO2inTON.Text})
```

Figure 60: Formula for saving a car in general calculator

Figure 60 illustrates the formula that is used for saving a car and storing it in the collection. For this calculator, a separate collection is created. The collection is called ''MyItems1" as can be seen in Figure 60. As a result, the project group can add an gallery and lists the results that the user of the app entered.

To conclude the description of this calculator, this calculator has also the option to reset all fields. This works the same as described in the first calculator. This also applies for the sum of the total CO_2 of all the cars that are entered.

10.2.5 BUILDING CALCULATOR

To calculate the carbon footprint of a building, this calculator can be used. This calculator is based on the Excel database that was displayed in Figure 35.

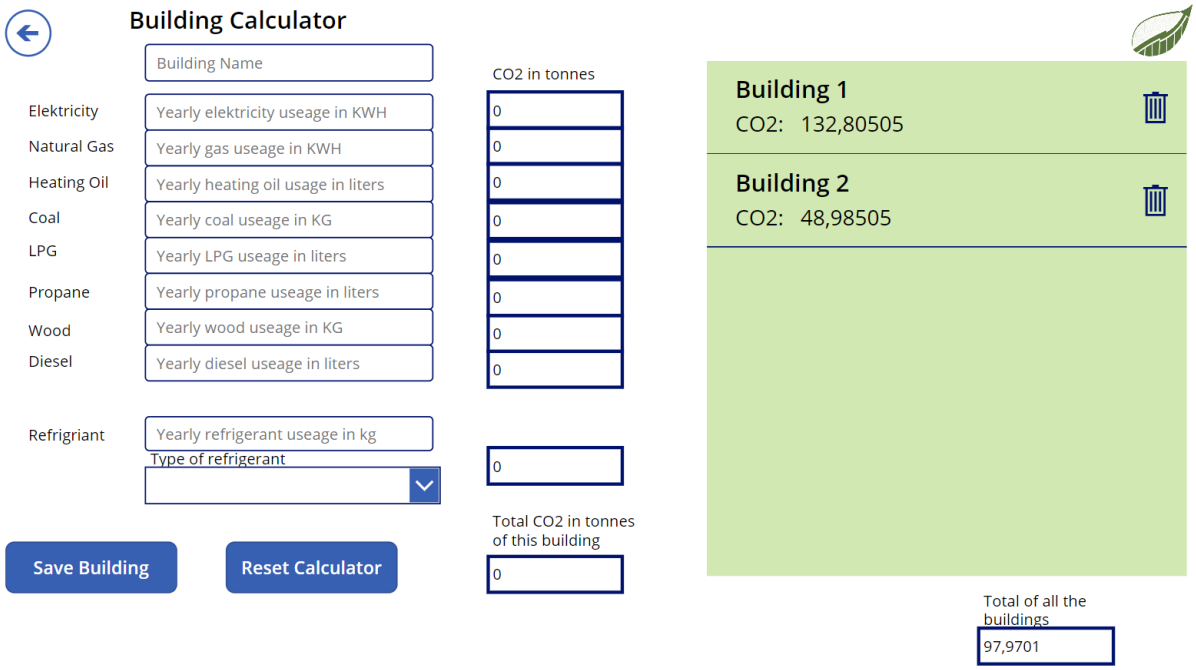


Figure 61: Building Calculator

The calculator has the same layout as the one that is described during the excel phase. The usage of the different resources can be entered in the unit that is stated inside the boxes. In the last dropdown a refrigerant can be selected. The drop down gets the data out the excel database.

To calculate the CO_2 emissions the following formulas are used (Figure 62):

```
fx  elek.Text/1000*0,3822
```

Figure 62: Building Formula Electricity

In this case, it was more convenient to put the CO_2 factors directly into the formula instead of making a link to a database. This was the case since there was no need to select an option from a drop-down menu because it was already known where the data would be entered. This means the calculator did not have to look for a value that is corresponding to the value in a certain dropdown menu. The formula (Figure 63) result. The CO_2 factor is different with every recourse. The formula down below is another example. As can be seen, the CO_2 factor is different in this case because the recourse is different.

```
fx  gas.Text/1000*0,18
```

Figure 63: Building Formula Gas

Not all recourse will be described separately. The formula's principal is the same every time, only the CO_2 factor will change depending on the recourse.

```
LookUp(TABREF;'Type of Refrigerant' = DrpRef.Selected.Result;'Tonnes of CO2 emission ')*ref
```

Figure 64: formula to calculate refrigerant

Figure 64 displays the formula that is used that calculates the CO_2 that is emitted by the refrigerant. It uses the Lookup function again. It searches in the table that is called ''TABREF'' which is the excel database that is linked to this calculator. The formula will simply compare the selected value in the dropdown to the data in the database. After that it will look for the corresponding CO_2 Value. Last up, the formula will multiply this value with the entered value in the box that is called: ''yearly refrigerant usage in kg''. In this case, there is no dividing by a 1000 like there was in previous formulas. This is due to the fact that the data in the database is already in the correct unit, thus there is no need to change it in the calculation.

When all fields are entered by the user of the app, the building can be saved to a collection as was the case in the previous calculator. The formula which makes this possible can be seen in Figure 65:

```
Collect(MyItemsBuilding;{BuildingName:'Building field'.Text;ElektricityCO2:'Outcome Elek'.Text; NaturalGasCO2:'Outcome
Gas'.Text; HeatingOilCO2:'Outcome Oil'.Text; CoalCO2:'Outcome Coal'.Text; LPGCO2:'Outcome LPG'.Text;
PropaneCO2:'Outcome prop'.Text; WoodCO2:'Outcome wood'.Text; DieselCO2:'Outcome Diesel'.Text;
Refrigeranttype:DrpRef.Selected.Result; RefrigerantCO2:'Oucome ref';TotalBuildingCO2:Total})
```

Figure 65: formula to save building

The formula creates an new collection which is called ''MyItemsBuidling'' in this case. The rest of the formula tells all the fields that are on this page to be stored in different columns in the collection. All the data on the page is stored in the collection by this formula.

To provide the user of the app an insight of what is in the collection, the project group added an gallery similar to the other calculators. This allows a summary of what is in the collection. The gallery can be seen in Figure 66.

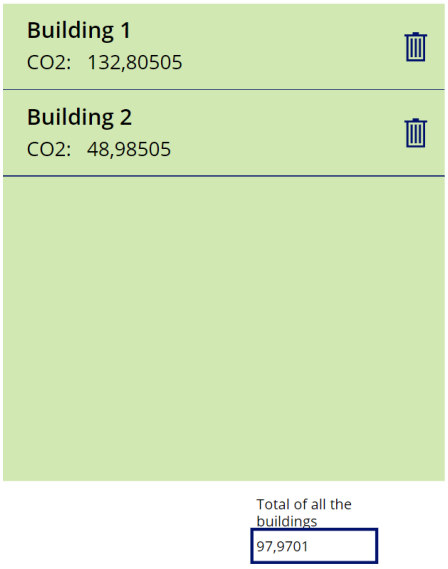


Figure 66: Building Gallery

Only the building's name and its associated CO_2 emission are included in the gallery. This way the user of the app knows that the building is added properly. Not all variables are included in the gallery. This would be too elaborate and will interfere with the clear interface of the app.

The reset button and fields that add up all CO_2 emission work the same as in the other calculators.

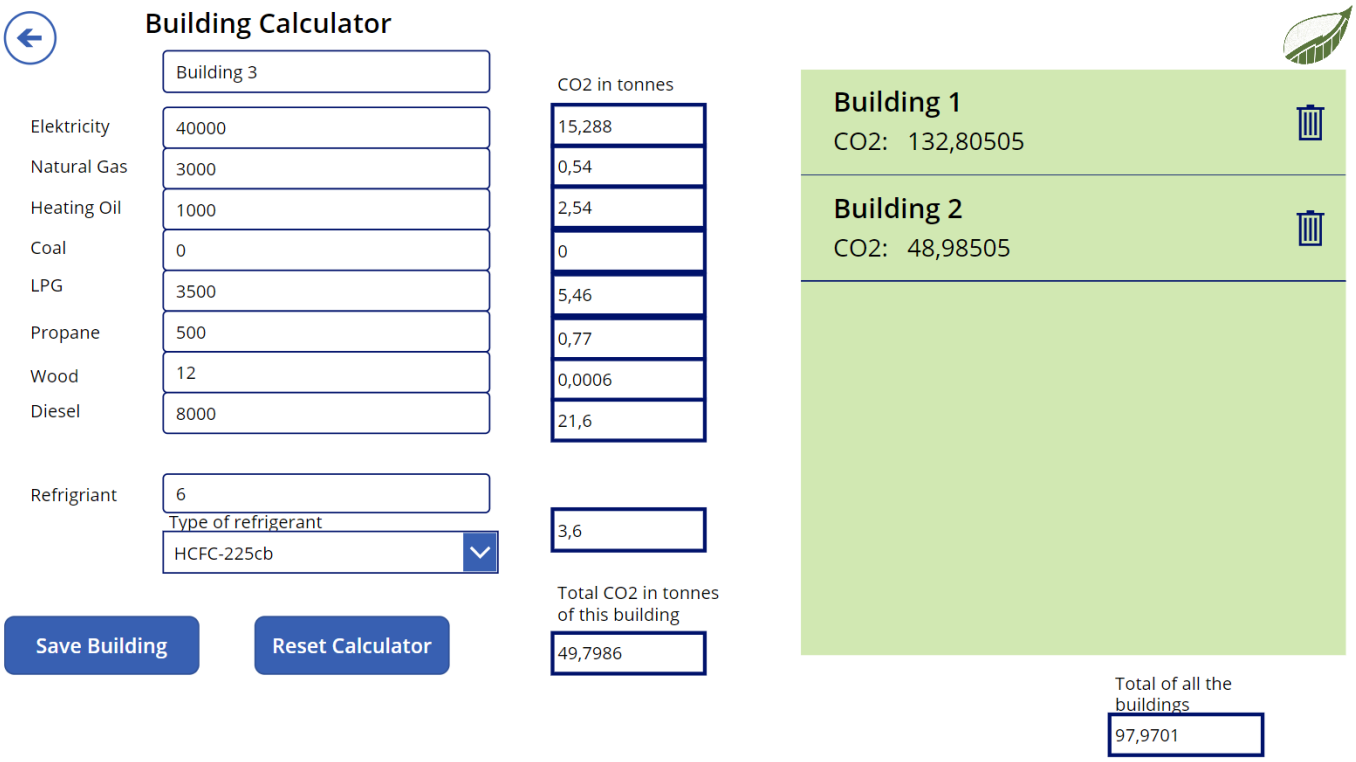


Figure 67: building calculator in use

Figure 67 illustrates the calculator while someone is using it. The project group deliberately choose for the sperate fields next to the field that needs to be entered by the user. Those fields display the CO_2 emission per recourse. This provides an insight in which is the biggest emitter. This can be helpful when a company wants to decrease their footprint. The tools helps by deciding on which part they can focus best.

10.2.6 PUBLIC TRANSPORT CALCULATOR

The public transport calculator was created to determine the emissions produced when utilizing public transportation. In this chapter, the making of this calculator is described.

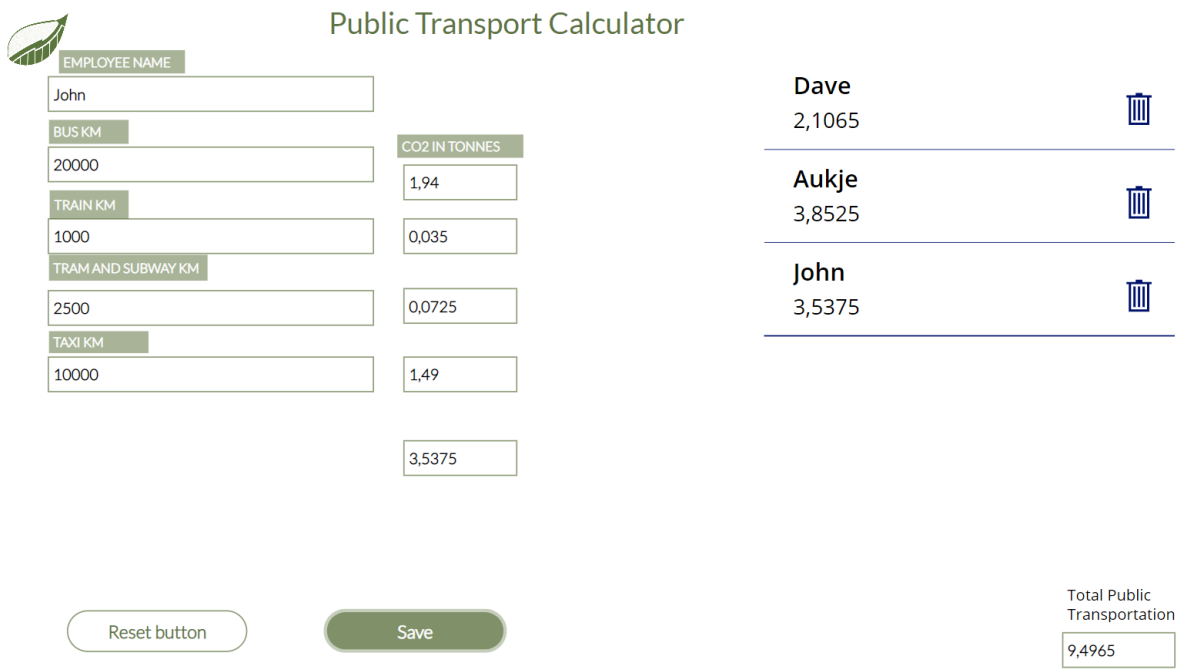


Figure 68: Public Transport Calculator Overview

Figure 68 provides an overview of this calculator. The layout is similar to the calculators that were described before. On the righthand side, the data that is entered on the lefthand side is gathered in a gallery. The formulas that enable the calculations are explained before going into more detail.

Figure 70: Calculation Formula

Figure 69: Calculation Formula 2

The formulas above display the calculations that are made to calculate the carbon emission. The calculations are straightforward. The given value that was entered by the user of the app is multiplied by a corresponding CO_2 factor. In the cases above are the factors 0,000097 and 0,000035 for calculating the emission of the busses and train kilometers. Similar computations are used for the Tram, Subway, and Taxi tool. For those fields, the only variations are the CO_2 factors.

```
Collect(PublicTransport;{PersonName:PERSONFIELD.Text;BusCo2:BUSCO2.Text;TrainCo2:TRAINCO2.Text;
TramSubwayCo2:TRAMCO2.Text;TaxiCo2:TAXICO2.Text;TotalPublicTransport:Totalpublic.Text});;
```

Figure 71: Collect Formula

Also in this calculator, the data is saved in a collection by using the formula in Figure 71. The collection is called: ''PublicTransport''. There are 6 columns in this collection: PersonName, BusCO2, TrainCO2, TramSubwayCO2, TaxiCO2 and lastly the TotalPublicTransport. In those columns, all the entered data by the user of the app is gathered.

The gallery on this page provides the obtained data that was returned to the app from the collection. This operates in the same manner to other calculators. The gallery only displays a summary of the data and not all data to keep it simple and clear for the user. This does not mean that the rest of the data entered is lost. All the specific data is stored in the collection and can be exported to excel later on.

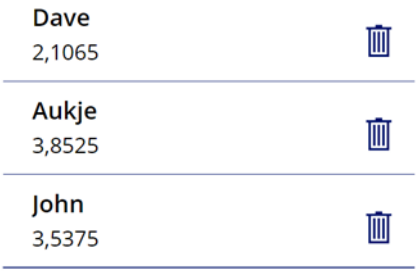


Figure 73 displays the gallery of the Public Calculation tool. As can be seen, there is an option to delete a certain data set from the gallery. This is made possible by the following formula. The formula can be seen in Figure 72. This formula does not only delete the data set form the gallery. The formula deletes the data set from the original database and since the gallery is just a display from the gallery, the dataset will also disappear here.

```
Remove(PublicTransport;ThisItem)
```

Figure 72: Delete formula

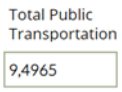


Figure 73: Gallery Public Transportation

10.2.7 PLANE CALCULATOR

The plane calculator was developed to measure the emissions that are produced when using a plane as a form of transportation. This chapter describes the making of this calculator.

Calculator principle

First off, the user of the app must be able to enter a certain flight to the database. In order to enter the flight's origin and destination, the calculator must include two text fields where this data can be entered. This way, the calculator will be able to calculate the distance between those airport. Then, this distance will be multiplied by a number of CO_2 factors. Essentially, this requires 2 databases. One that can calculate the distance between different airports and a database that contains information on aircraft emissions.

The Databases

The database down below contains data about distance between all major airports around the world. The origin and destination airports' ID codes are listed, along with the mileage between them. The calculator works flawlessly with the database. Despite the fact that this is an American-based database, the project team will use it as the foundation for the calculating tool. Due to the fact that the database is foreign, not all regional airports in Finland are included. However, this is the only database that is available for free and new datapoints with Finnish airports can be added later on. This will not change the design of the tool and the database is easy to update.
The database is origin from the American Bureau of transport Statistics. (US Bureau of Transportation Statistics, 2020)

	A	B	C	D	E
1	ORIGIN	ORIGIN_AIRPORT_SEQ_ID	DEST	DEST_AIRPORT_SEQ_ID	DISTANCE IN MILES
2	01A	1000101	A43	1005601	30
3	05A	1000501	FAI	1163002	191
4	06A	1000601	A30	1004301	16
5	06A	1000601	A43	1005601	18
6	06A	1000601	ADQ	1017004	14
7	06A	1000601	AOS	1032401	40
8	06A	1000601	DGB	1129901	30
9	06A	1000601	KPY	1278501	14
10	09A	1000901	ADQ	1017004	117
11	09A	1000901	DGB	1129901	91
12	09A	1000901	ENA	1155502	113

Figure 74: Airport Database

The database contains more than 450.000 rows with information about distance between airports.

The other database contains information about the CO_2 that is emitted by certain flights. This information is given by Sustain for Future. (S4F, 2022) The data is as following:

Short Flights (< 650 km)	317 g of CO2/km
Medium Flights (650 - 2400 km)	254 g of CO2/km
Long Flights (2400 - 4800 km)	225 g of CO2/km
Extended Flights (> 4800 km)	214 g of CO2/km

Figure 75: Database for Flight Emissions

As can be seen in the figure, longer flights emits less CO_2 per km in proportion to shorter flights. This needs to be taken into account when calculating the CO_2 emission for the flights.

Building the plane calculator

When designing the calculator a problem occurred in the beginning of the process. Microsoft PowerApps is only able to read 15.000 rows of data out of an excel database. The database that was mentioned before is therefore not suitable for this tool if excel is the database of choice. By using Microsoft Dataverse this problem could circumvented. Microsoft PowerApps is able to read larger files like this database. However, the project group does not have a license for this program. Moreover, by using Dataverse, the app would be less easily transferable to the client because the database is then linked to an account. By using excel files only, all the data is locally imported to the app and therefore easily transferable. Therefore, it was decided to simplify the database to one that has only 15.000 rows. This is still enough to cover most of the flights in Europe. This way, the database issue did not hamper the groups progress on the calculator. It should be noted that Sustain4Future can always expand the database on which the calculator is based in the future. This will not change the functions of the calculator. Later on, Sustain for Future can connect a Dataverse database to the app to make the plane calculator more versatile.

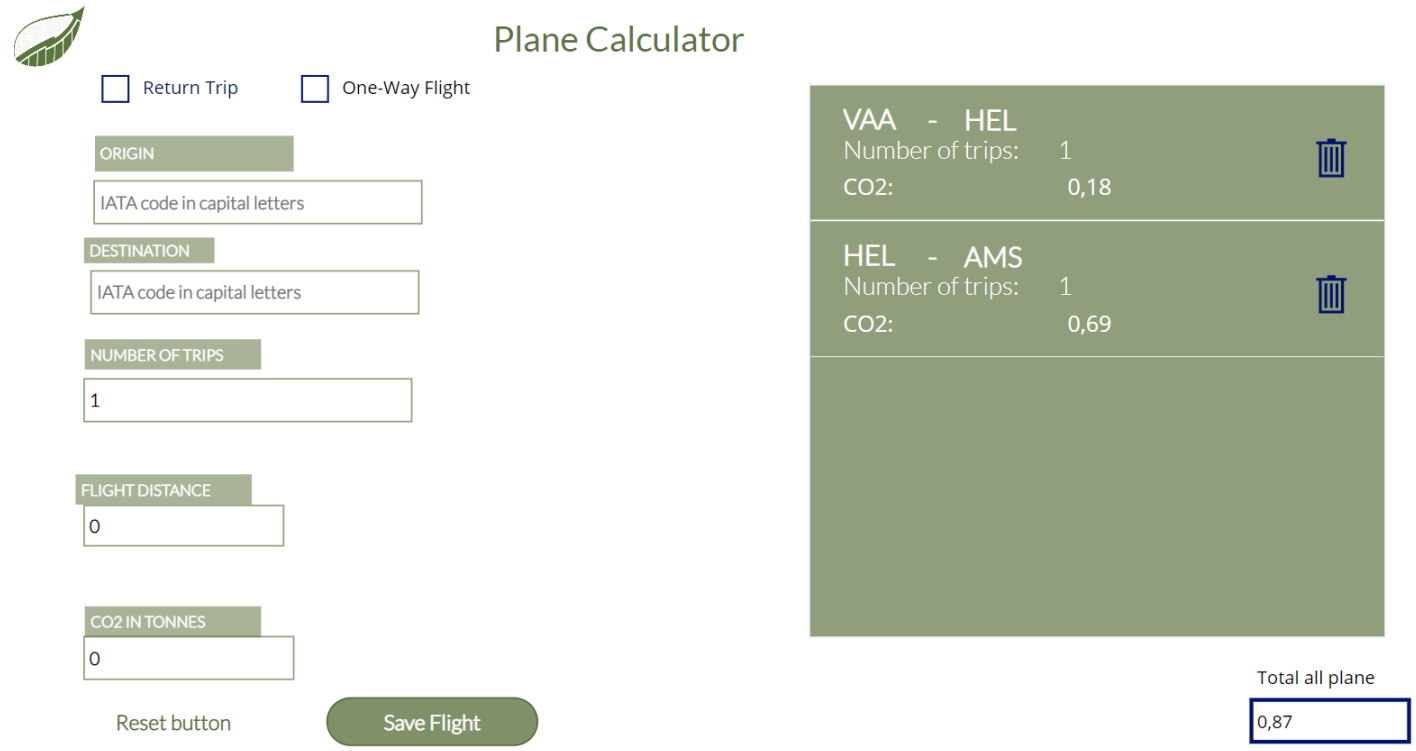


Figure 76: Plane Calculator Overview

Figure 77 displays an overview of the plane calculator. This screenshot was created after the calculations and formulas were successful but prior to the completion of the designing phase. As can been seen in the figure, the user of the app can enter the Origin and Destination of the journey. The user of the app can also choose if the flight is one way or a return trip. Lastly the number of trips can be entered. This can be helpful if the user of the app travels with more than one person. The calculator will calculate the tons of CO_2 that are emitted by the specific flight and will add this to a custom collection that is linked to the gallery which is displayed in the overview figure above.

Additionally, the unavailability of dropdown menus on this app page is demonstrated in figure. Ideally, searchable dropdown menus would give the user of the app a better experience as it would be easier to use and give the user of the app a conformation that the airport exists. Microsoft Power Apps has some disadvantages, it only supports up to 2000 rows in a dropdown. Therefore, a dropdown menu was not an option. The fullest database possibilities are utilized in this way by implementing a textbox.

First, there is an option to select if the flight is one way or if the flight is a round trip. There is no formula behind these boxes. Later, a formula will read if those boxes are selected but there is no formula inside of the boxes itself.

After that, the user of the app can enter the IATA (International Air Transport Association airport code) in three capital letters. Again, there is no formula behind the origin and destination textbox. This is also the case for the number of trips. The first formula will appear in the flight distance box.

This function is split up in to two boxes. For unknown reasons, the project group was not able to write the formulas in one box and run the one formula before the other one. By making one textbox invisible, the group made an easy workaround this problem. The two formulas can be seen in the figures down below:

```
(LookUp(AIRPORT1;ORIGN1 = ORGINFIELD.Text && DEST1 = DESFIELD.Text;DISTANCEMILES1)*1,609344)
```

Figure 77: Invisible formula

```
Round(If(ReturnCheck.Value = true;FLIGHTDISTANCEINVISIBLE.Text*2;FLIGHTDISTANCEINVISIBLE.Text*1)*Numberfield;2)
```

Figure 78: Formula in visible textbox

The first formula uses a lookup function that will find the corresponding distance in miles that belongs to the two airports that the user of the app entered in the boxes. When this data record is found, it will be multiplied by 1,609344 to convert the distance in miles into kilometers. The second formula will multiply the result of the first formula in case the return trip check box is selected. In the end it will multiply the distance by the number of trips that is entered by the user of the app. Those two formulas are now able to calculate the correct distance of the entered flight(s). When the flow distance is known, the calculator can use this distance to calculate the CO_2 emissions.

As can be seen in Figure 78, there is another formula besides the ones that are described before. It is the ''Round'' formula in the beginning of the figure. This formula makes sure that the given result by the formula is rounded to a number with only 2 decimals. More decimals are not necessary and will make the app look more chaotic.

The formula that calculates the CO_2 emissions in this calculator can be seen in Figure 79.

```
Round
(If(Value(FLIGHTDISTANCEFINAL.Text) <650;FLIGHTDISTANCEFINAL.Text*0,000317;
If(Value(FLIGHTDISTANCEFINAL.Text) <2400;FLIGHTDISTANCEFINAL.Text*0,000254;
If(Value(FLIGHTDISTANCEFINAL.Text) <4800;FLIGHTDISTANCEFINAL.Text*0,000225;
FLIGHTDISTANCEFINAL.Text*0,000214)))
;2)
```

Figure 79: CO2 planes formula

As can be seen, the formula uses the data form the database in figure X. By using an if statement, the formula is able to multiply different flights with different CO_2 factors. Flights that are less than 650 kilometers will be multiplied with the highest CO_2 factor as can be seen in the formula as well as in Figure 75.

Lastly, the calculator uses a reset and save button that is similar to the others ones in the other calculators. The save button will create a custom collection where the data that is saved will be stored. This data is displayed in the gallery.

10.2.8 HOME PAGE

This chapter describes the functions and formulas on the home page.

Overview

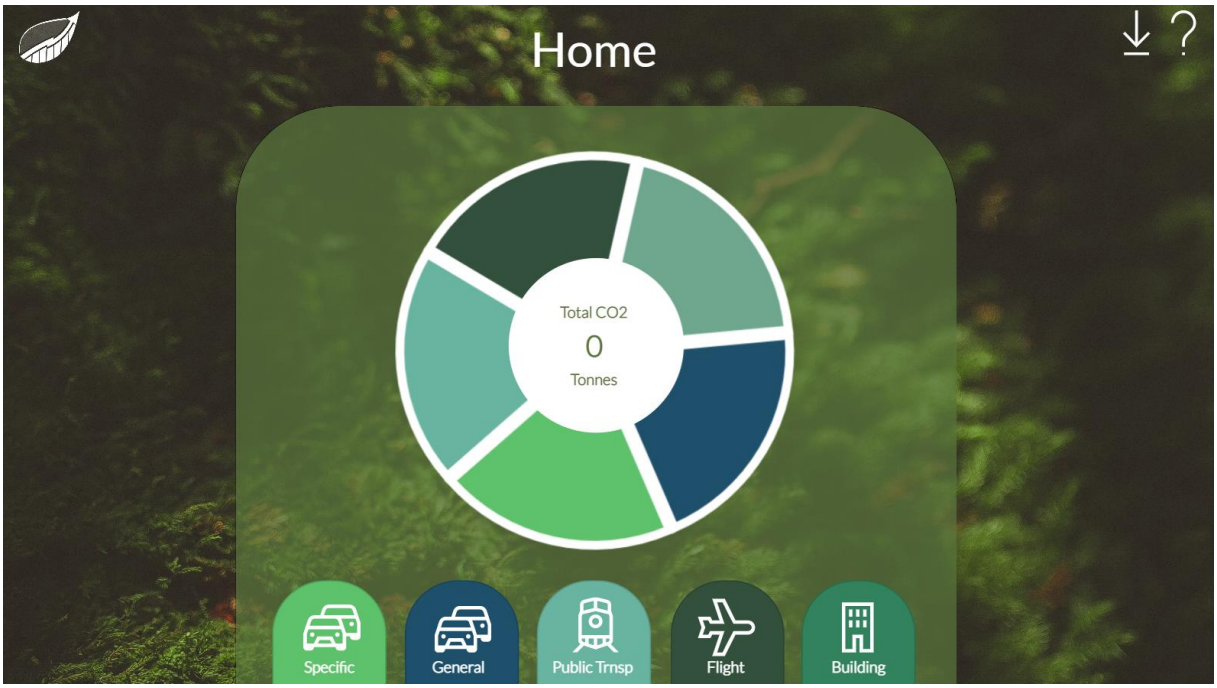


Figure 80: Home Page Overview

Figure 80 shows the home page of the application. The user of the application can access all of the calculators from this page. This can be done by clicking the icons on the bottom of the page. The pie chart in the middle of the page provides an overview of the entered data. The pie chart displays the emitted CO_2 in tonnes per section. Every time the user of the app returns to the home screen after using one of the calculators, this pie chart is updated.

The Pie chart

The pie chart on the homepage is based on a custom collection. This collection is a summary of the total CO_2 emissions per calculator. The pie chart displays this data in the form of a graph. To collect this data, the following formula is used.

```
Collect(MyItems;{Brand: DrpBrand.Selected.Result; Model:DrpModel.Selected.Result; Engine:DrpSize.Selected.Result;
Transmission:DrpTrans.Selected.Result; Fuel:DrpGas.Selected.Result; YearlyKM:YearlyKM.Text; CO2inTonnes:CO2TON.Text});;

ClearCollect(Summary1;
{Type:LabelBUILDING.Text;CO2inTonnes:'Total all buildings'.Text};
{Type:LabelGEN.Text;CO2inTonnes:'Total CO2 Car General'.Text};
{Type:LabelSPEC.Text;CO2inTonnes:'Total CO2 Specific'.Text};
{Type:LabelPUBLIC.Text;CO2inTonnes:'Total All Train'.Text};
{Type:LabelPLANE.Text;CO2inTonnes:'Total all plane'.Text})
```

Figure 81: Formula for collecting summary data

The first two rows of this screenshot are familiar. This formula was explained and used before. The second part of the formular makes sure that all data is gathered in a summary collection. The formula that is stated above originates from the save button on the specific car calculator page. Every calculator's total CO_2 emissions are saved in a collection called "Summary1" due to the clear collect function. The difference between a normal collect function and a clear collect function is the fact, that the clear collect function will clear the whole collection before it gathers new data. This means that the data is wiped and updated. By using this second clear collect function in every save button, the pie chart is updated whenever the user of the app uses a save button on any page.

Information Pop up

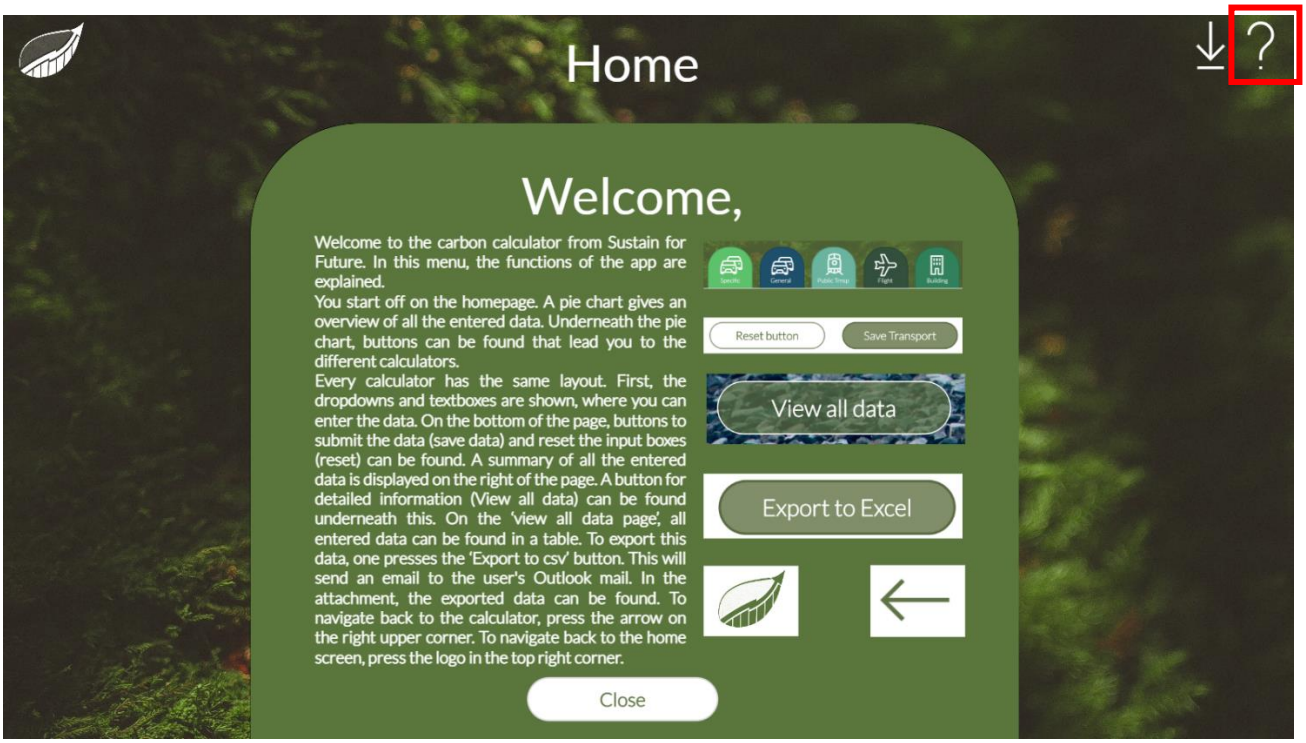


Figure 82: information Pop up

By pressing the question mark in the top right corner, this information pop up is coming into the screen. The purpose of this screen is to give the user of the app some information about the app including some brief instructions of how to use the app. The logo in the top left corner has no function in this screen.

10.2.9 EXPORT BUTTON

An export button is mandatory so data is usable outside the App. Ideally, the data is exported to excel so the user of the app can use this data in familiar program. This chapter will describe the making of this function in power apps.

This export function is not integrated in the basic tools of PowerApps. Still there was a possibility to create one with a few extra steps.

First off, a new flow had to be added in the flow menu of power apps. This flow will make it possible to generate a CSV table consisting off the data which is gathered within PowerApps. The flow is triggered by a button in the PowerApps. The function of the button will be described later on.

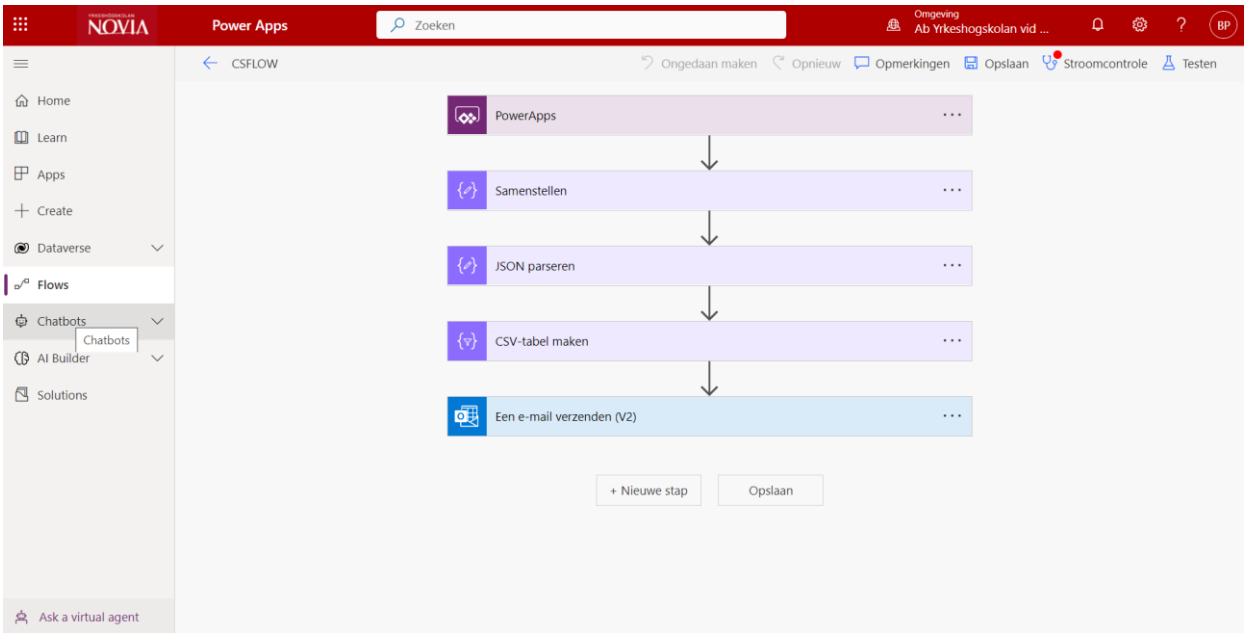


Figure 83: Power Apps Flow

Figure 83 displays the page where flows can be created. This flow enables the PowerApps to export the car specific calculator data. Every calculator has a different flow that makes it possible to export the data. The flows are similar so only one of the flows will be described since the functioning of the flows are the same. The figure x down below describes the input for the rest of the flow.

The flow is instructed to request the data from PowerApps by its first two steps. This can be seen in Figure 83. By linking the PowerApps to the compose (samenstellen) function in the second step of the flow, the flow is able to read the data from the PowerApps.

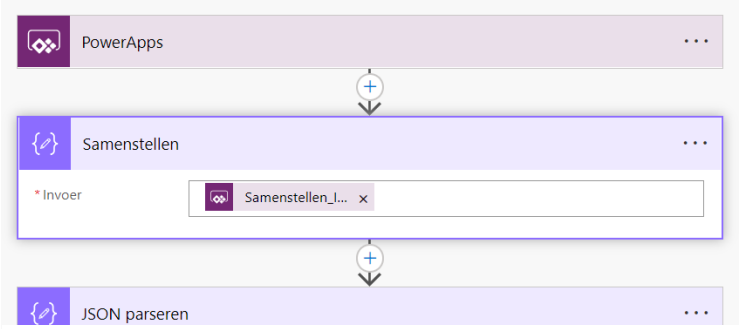


Figure 84: Ask for data in power flow

PowerApps is now able to export the data into collection in JSON format by making the first two steps of this flow. JSON data is impractical so this data has to be converted to data which is more suitable. This is conversion step is done in step 3 of the flow. This is called: parse JSON (JSON Parseren)

The flow can later format the JSON data into a CSV document by instructing it on how to parse the data. This parse is done by the code that can be seen of the next page. This is a format for the incoming data. This code was automatically generated by the PowerApps.

```
{
    "type": "array",
    "items": {
        "type": "object",
        "properties": {
            "Brand": {
                "type": "string"
            },
            "CO2inTonnes": {
                "type": "string"
            },
            "Engine": {
                "type": "number"
            },
            "Fuel": {
                "type": "string"
            },
            "Model": {
                "type": "string"
            },
            "Transmission": {
                "type": "string"
            },
            "YearlyKM": {
                "type": "string"
            }
        },
        "required": [
            "Brand",
            "CO2inTonnes",
            "Engine",
            "Fuel",
            "Model",
            "Transmission",
            "YearlyKM"
        ]
    }
}
```

After the JSON was parsed, a CSV table had to be created.

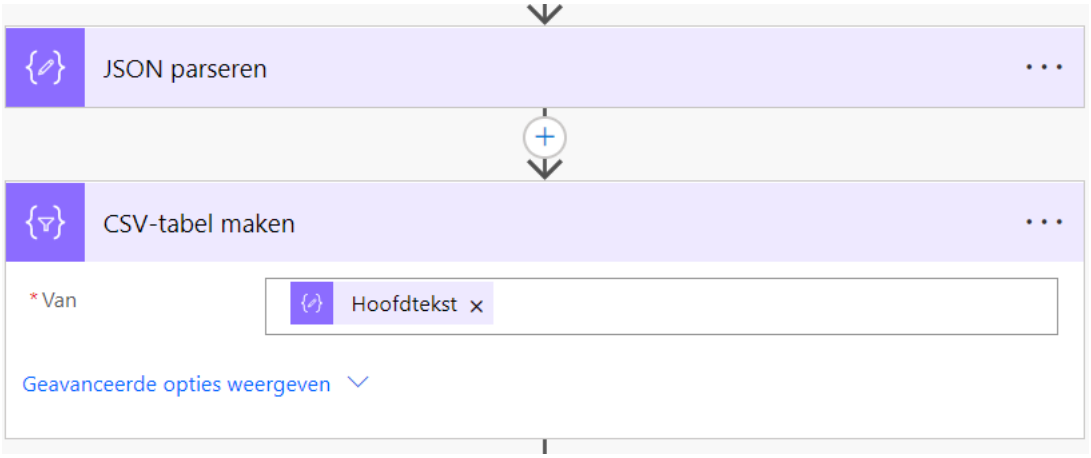


Figure 85: CSV table in flow

This function is displayed in the Figure 85. The input for this function is the parsed JSON data (hoofdtekst). The CSV table is then produced. Exporting this CSV file to the app's user is to effectively use this data.

Figure 86 displays how this is done. First, the email of the user is requested by this function. Now the flow knows where to send this file. This function is able to detect the email address of the user of the app. After that, an email is written to the receiver of this email. Lastly, The CSV file is added as attachment to this email.

The flow is now finished and is able to make a CSV file from the PowerApp data and send it to the email of the user. The flow only has to be triggered inside the PowerApp.

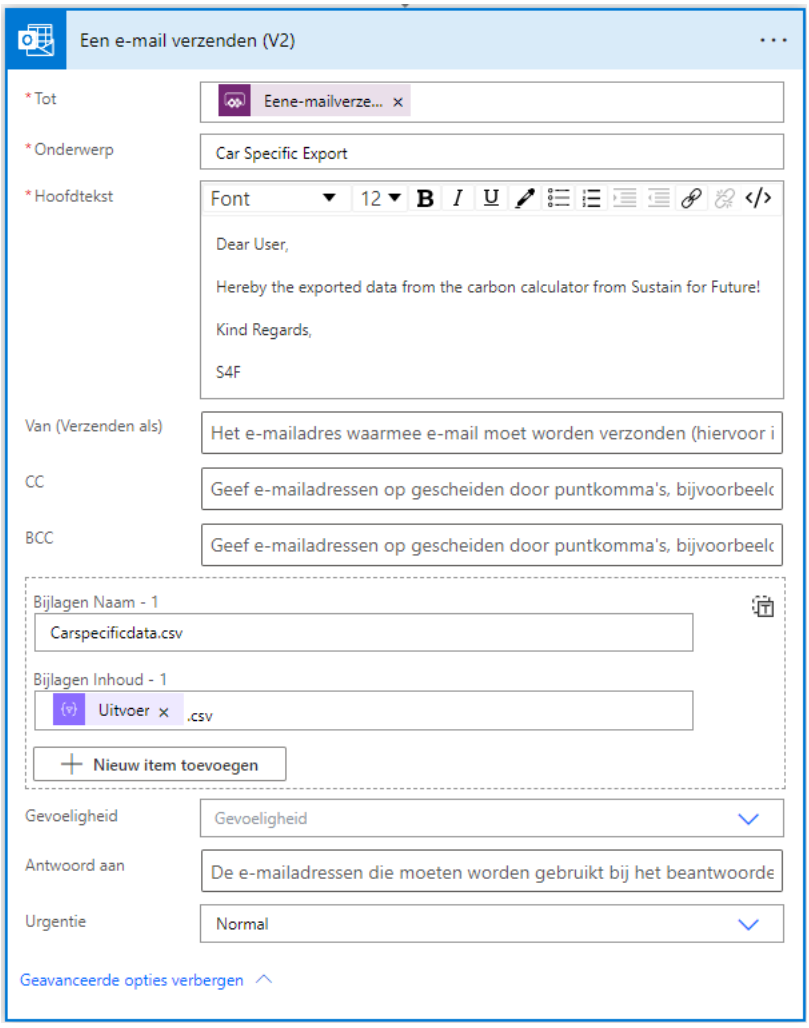


Figure 86: send email in flow

The flow is triggered by using the formula presented in Figure 87 down below. This formula is used for the export button and will run when the export button is pressed.

```
Set(VarFormattedJSON;JSON(MyItems;IndentFour));;
CSFLOW.Run(VarFormattedJSON;User().Email;User().Email);;
```

Figure 87: Code for triggering the flow

The first line in the code makes sure that the collection (MyItems) is saved in JSON format in the variable that is called (VarFormattedJSON). This is saved in the ‘’IndentFour’’ mode which means that the JSON is effortless to read compared to being exported in the standard JSON format. This function makes sure that the flow can deal with the data later on.

The second line in the formula is triggering the flow. The flow is called “CSFLOW”. This function triggers the flow and is referring to the set variable earlier on. In this variable, the data is stored as JSON. After that, the email of the user is requested by a ‘’User().Email” function. This will read the email of the user of the app and pass on this information to PowerApps.

The result

The result is an email to the user of the app that includes an attachment with the exported data. The data will be exported to CSV but can be opened in excel. To make the data more easy to read in excel. The user of the app has to follow a few steps.

	A	B	C	D	E	F	G	H
1	Brand,CO2inTonnes,Engine,Fuel,Model,Transmission,YearlyKM							
2	SMART,"6,28",0.9,Premium Gasoline,FORTWO COUPE,AM6,40000							
3	VOLVO,"14,52",3,Regular Gasoline,S80 AWD,AS6,55000							
4	ROLLS-ROYCE,"7,72",6.7,Premium Gasoline,Cullinan Black Badge,AS8,20000							
5	ASTON MARTIN,"16,6",6,Premium Gasoline,Rapide AMR,A8,50000							
6	NISSAN,"8,7",2.5,Regular Gasoline,Altima,AV,50000							
7	.csv							
8								
9								

Figure 88: Exported data in CSV format

As can be seen in Figure 88, the data is exported in a raw CSV format to the A column and is not easy to read for the user of the application. This data can be formatted better trough a excel function. This way, the data is easy to read and can be user different purposes.

By selecting the data tab in the top of the screen Figure 89, the data can be transferred. Select column A and use the Text to Columns tool.

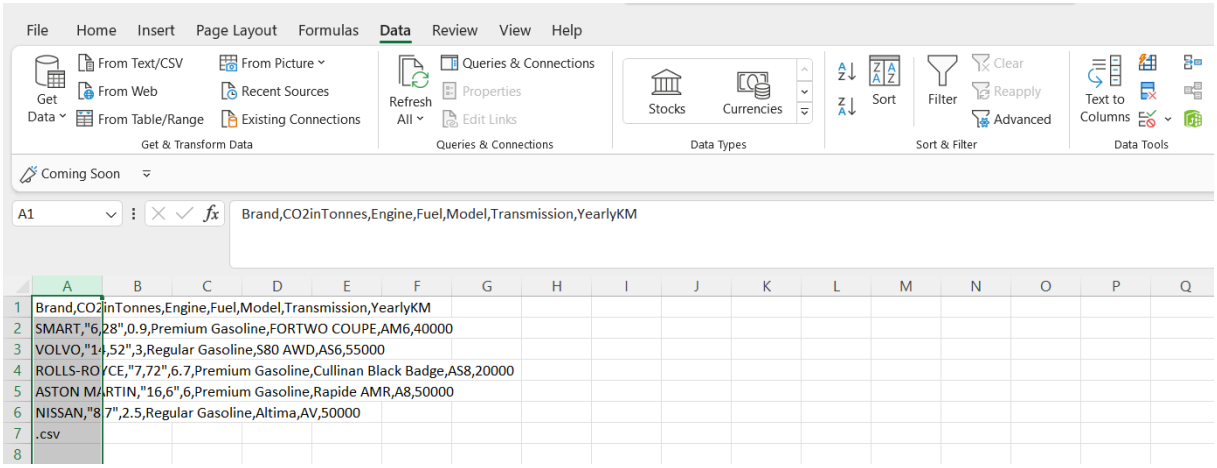


Figure 89: CSV to columns

The following screen will pop up Figure 90:

There is no need to change anything on this page. The user of the app can click on next page.

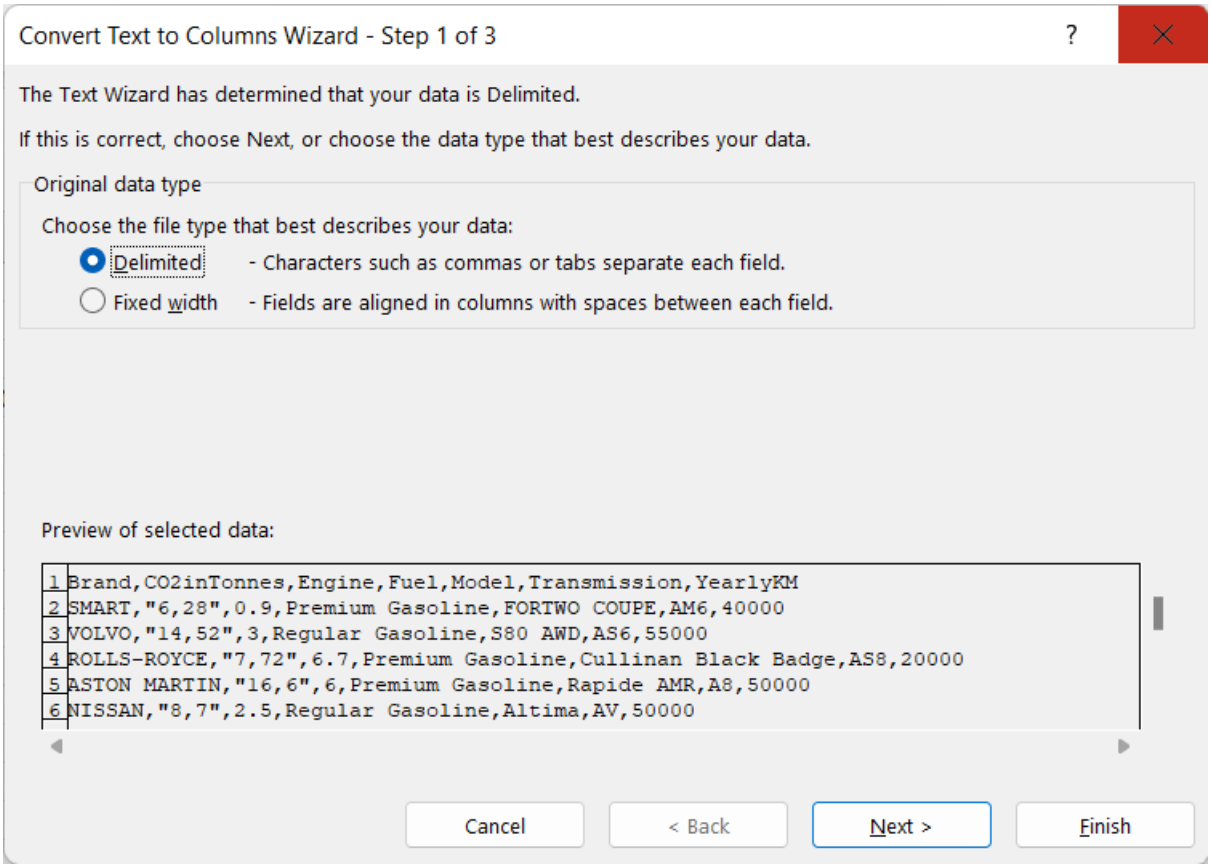


Figure 91: Pop-up 1

In the second screen Figure 92, the user has to select comma as a separator. After that, the user can continue to the next page.

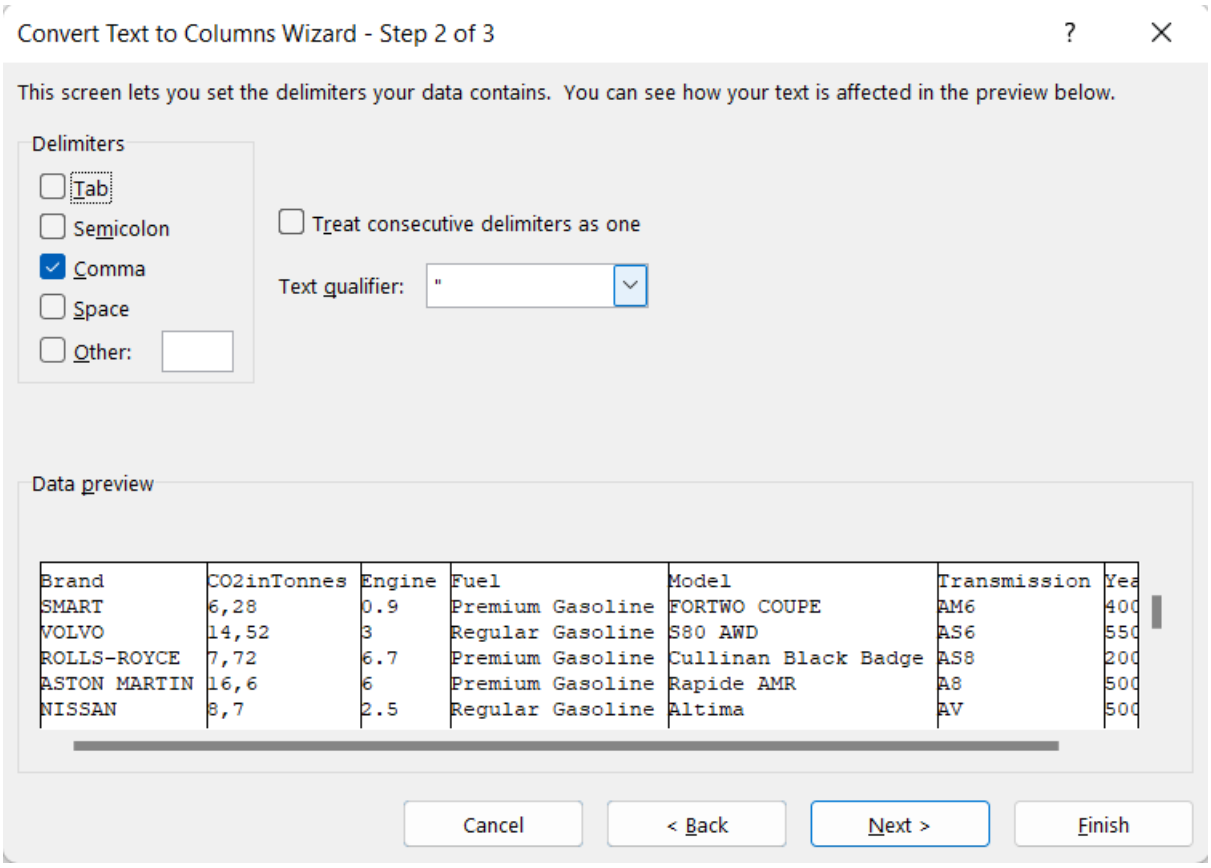


Figure 92: Pop-up 2

The last pop up Figure 93 displays how the data will look after the transformation. There is no need to change anything on this page and the user can continue. Now the data is transferred into columns.

The result can be seen in Figure 94.

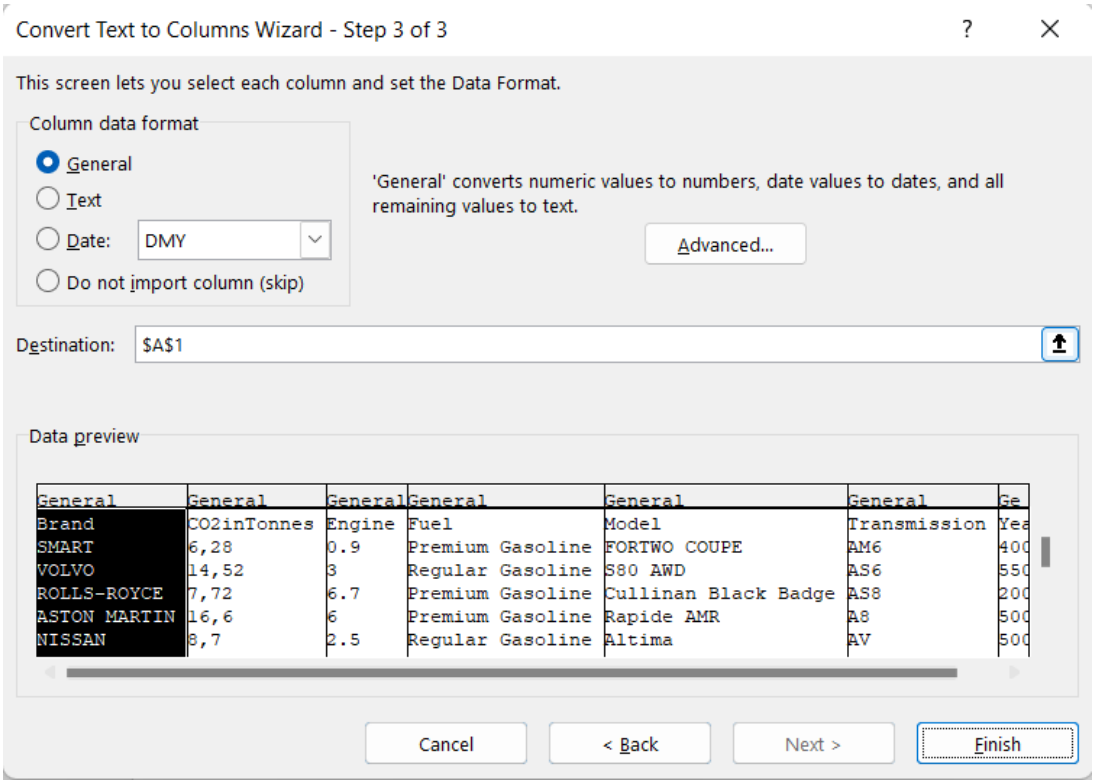


Figure 93: Pop-up 3

	A	B	C	D	E	F	G
1	Brand	CO2inTonr	Engine	Fuel	Model	Transmissi	YearlyKM
2	SMART	6,28	0.9	Premium G	FORTWO C	AM6	40000
3	VOLVO	14,52	3	Regular Ga	S80 AWD	AS6	55000
4	ROLLS-RO	7,72	6.7	Premium G	Cullinan Bl	AS8	20000
5	ASTON MA	16,6	6	Premium G	Rapide AM	A8	50000
6	NISSAN	8,7	2.5	Regular Ga	Altima	AV	50000

Figure 94: Final Data in columns

10.2.10 ALL DATA IN APP

To provide the user of the application an overview off all the entered data within in the app, a new page was created. This page can be entered by using a button at the bottom of the page on every calculator. (Figure 95)

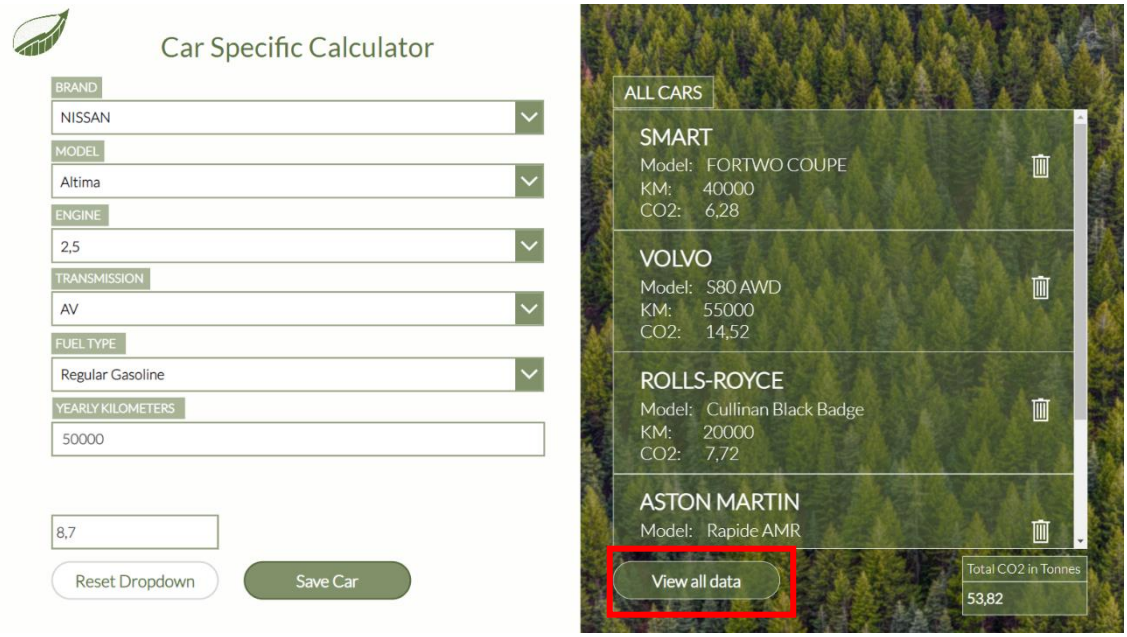


Figure 95: View all data button

When the button is pressed, the app will navigate to the following page. (Figure 96)

Figure 96: all data table

This table displays the data that is gathered in the corresponding calculator. The table is inserted by selecting table in the top menu. Then a data source can be chosen that the table has to display.

10.2.11 POP UPS

This chapter describes how the pop up functions in the app work.

Explanations on how the app works can be found by pressing the question mark. As can be seen in Figure 97, the question mark is placed at the right top corner of the screen. The pop-up that appears, can be seen in the in Figure 97 as well. A short description of the functions is given. Next to the text, the buttons that are described a that section of text are presented. By pressing the close button on the bottom, the pop-up is closed

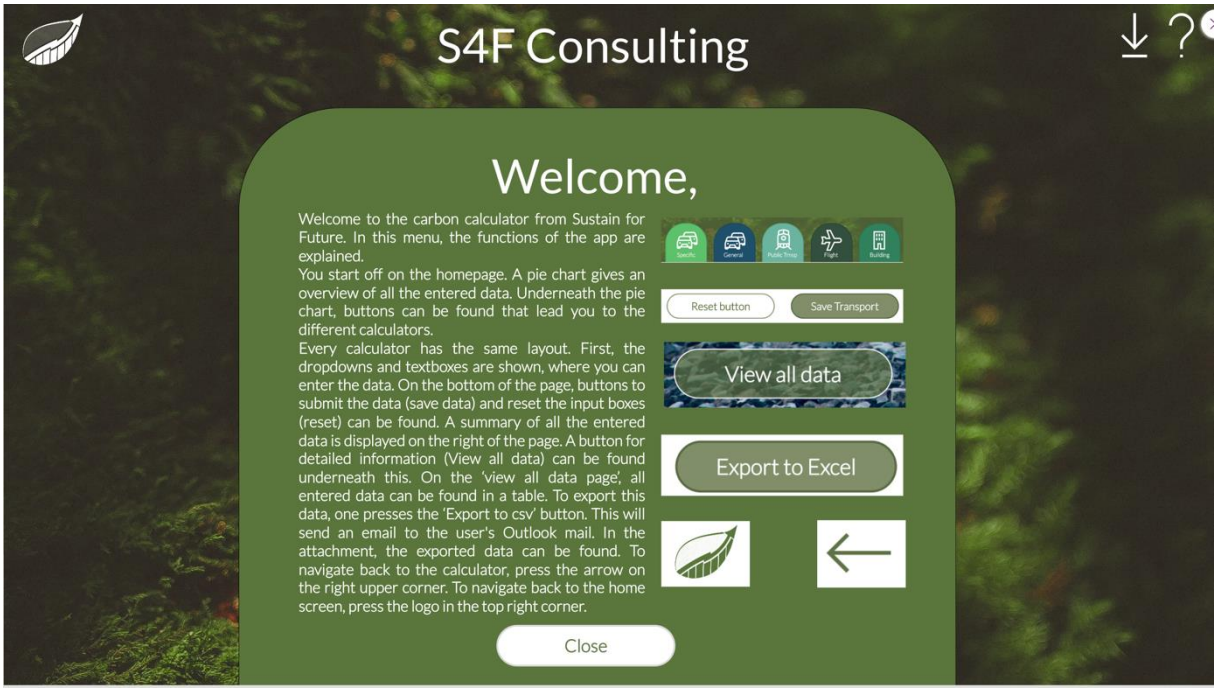


Figure 97 Popup on the home screen

The formula behind the pop-up is shown in Figure 99. The formula is set in the onselect property of the question mark icon. This function changes the pop-up variable to true when the button is pressed. When pressing the “Close” button, the pop-up closes. This formula is also set in the onselect property. The formula is shown in Figure 99. Now the pop-up variable is set to false.

All the elements in the pop-up are in group 5. Whether the pop-up is visible or not, can be set in the visible properties. Here the variable “popup” is set and given the value true. See Figure 100. Every time the question mark or the close button is pressed, the value of pop-up is changed.

Figure 100 Popup visibility

```
Set(popup;true)
```

Figure 99 Formula in the Onselect properties of the question mark

```
Set(popup;false)
```

Figure 99 Formula in the Onselect property of the close button

```
popup=true
```

When the user presses one of the export buttons (either in the form of an icon or button), a pop-up appears. Figure 101 displays the pop-up. The link in the pop-up leads the user to a webpage that

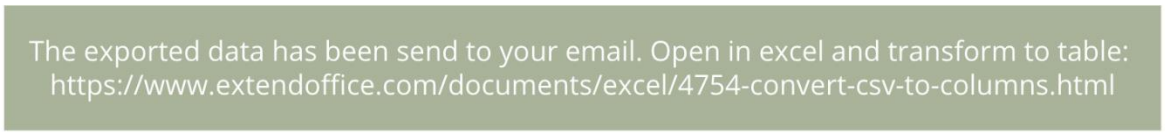


Figure 101 Popup export button

explains how to transform a CSV document to an Excel table.

This pop-up differs from the previous one, because it is time triggered. This mean that after a certain amount of time, the pop-up disappears. This is established by inserting a timer which set to be invisible. In the properties of the timer, the duration is set to 10000 ms (Figure 102). The Start is set to var_PopUpH.

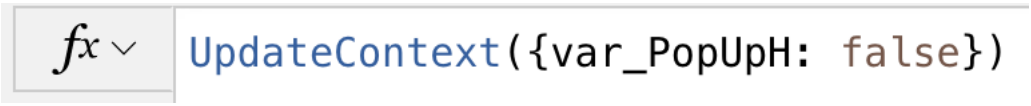


Figure 102 Duration of the timer

10.2.12 HOW TO UPDATE A DATABASE

As described before, the app uses several excel databases as a source for its calculations. Those databases can be changed at all times.

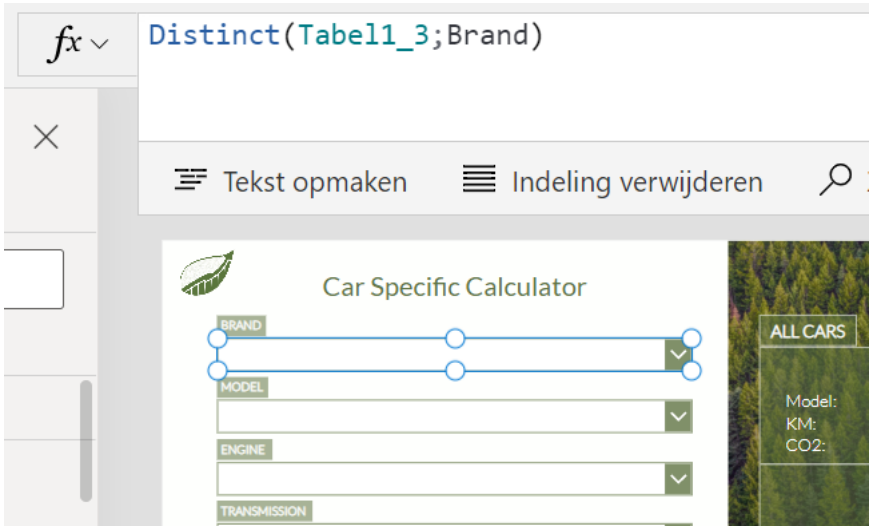


Figure 103: Link to excel table in formula

In Figure 103, a link to an excel database can be seen (Tabel1_3). This formula reads the data in the column that is called ''brand'' in the excel database. This data will be displayed in the drop down menu that also can be seen in the figure. If this database is updated later on, the new database has to be imported to PowerApps first. This step is explained in the description of the car specific calculator on Page 62. Once the new database is imported to the app, the old one can be deleted. The name of the new database must be inserted instead of the old one. If the name of the column is changed, it must also be changed. When the new name is inserted, the new database is the new source for the calculations.

11 USER INTERFACE OF THE APP.

Chapter 10 described the functions and formulas behind the power app. However, formatting is at least as important. A proper layout and interface can make the app more user-friendly for the customer. This chapter describes how the appearance of the app is determined and designed.

11.1 USABILITY TESTING

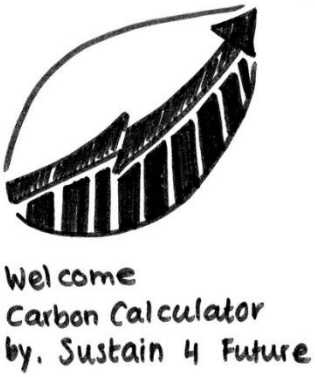
The first model of the web app was made on paper. The goal of this prototype is to test whether users understand how to use buttons and if the result of the buttons makes sense. First, the setup of the user test will be explained. Second, a brief explanation of the model and it is intended use.
Supplies

- Paper prototype
- 5 participants
- Paper to write notes
- Keyboard

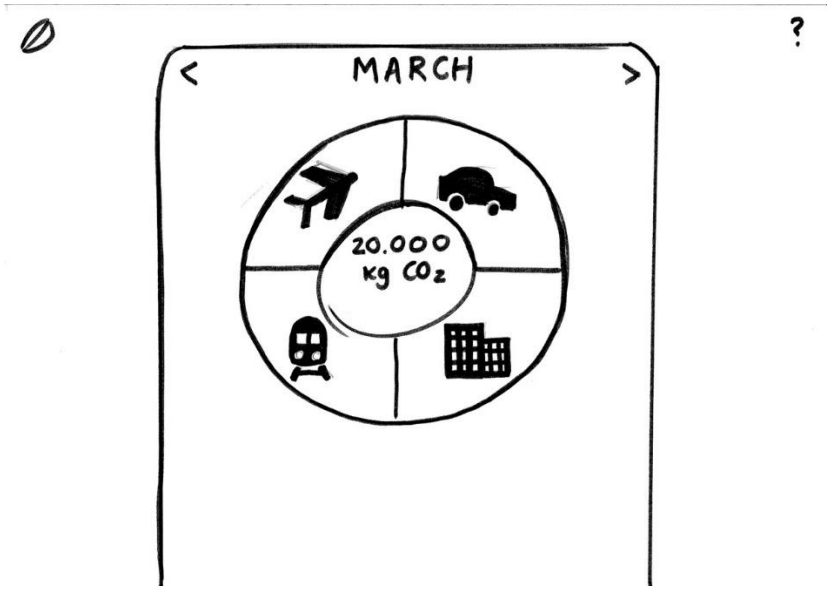
Operating procedure

1. The participant is set down at a desk. The supervisor gives a brief explanation on the context of the app. The explanation should contain the next topics:
    a. Carbon Calculator
    b. App for businesses
    c. Calculate in which department the company emits the most carbon.
2. Screen one is placed before the participant. The keyboard is used for the textboxes. The supervisor observes what the participant does. The question is whether the user thinks he/she needs to press the screen to continue or is it a time triggered transition?
3. When the home screen is shown, the observer askes the user to navigate through the app by asking the following questions:
    a. Can you add the Volkswagen passat 1,8 A6 Premium Gasoline to the data?
    b. Please, add the building named ‘Building A’ to the building calculator with the following specifics:
        i. Electricity: 100
        ii. Natural gas: 200
        iii. Heating oil: 300
        iv. Coal: 100
        v. LPG: 0
        vi. Propane: 100
        vii. Wood: 50
        viii. Diesel: 0
        ix. Refrigerant type: halon
        x. Refrigerant in kg
    c. Next, the user is asked to navigate to the home screen.
4. In the meantime, the observer makes notes on the eye-catching behaviour of the user. Notes should specifically be made when the user does not understand the system.

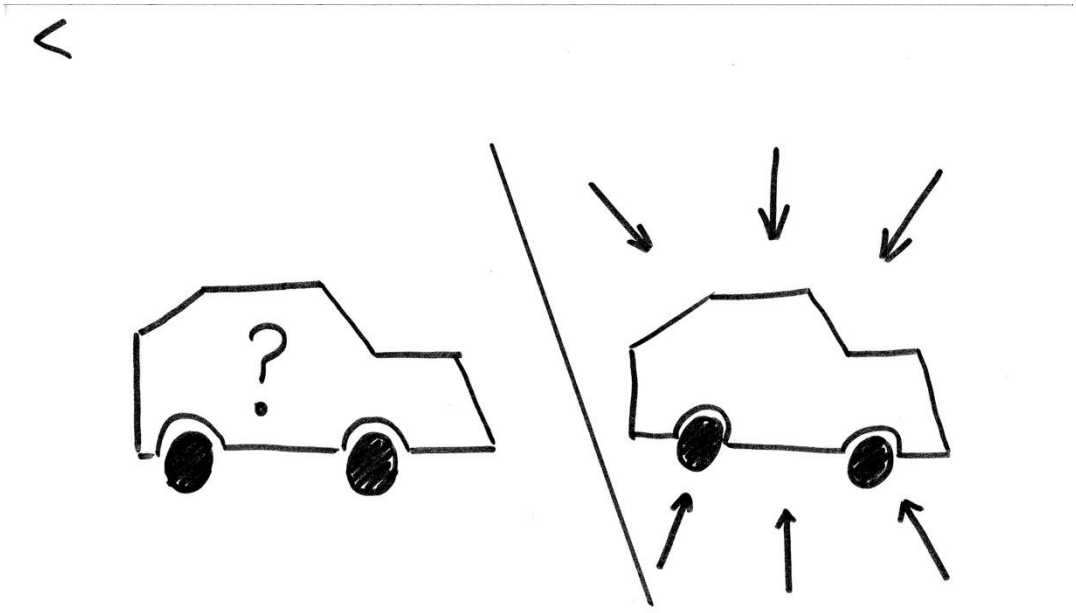
5. After the test, the participant is thanked for his/hers attendance. Data can be implemented in the next version of the app.



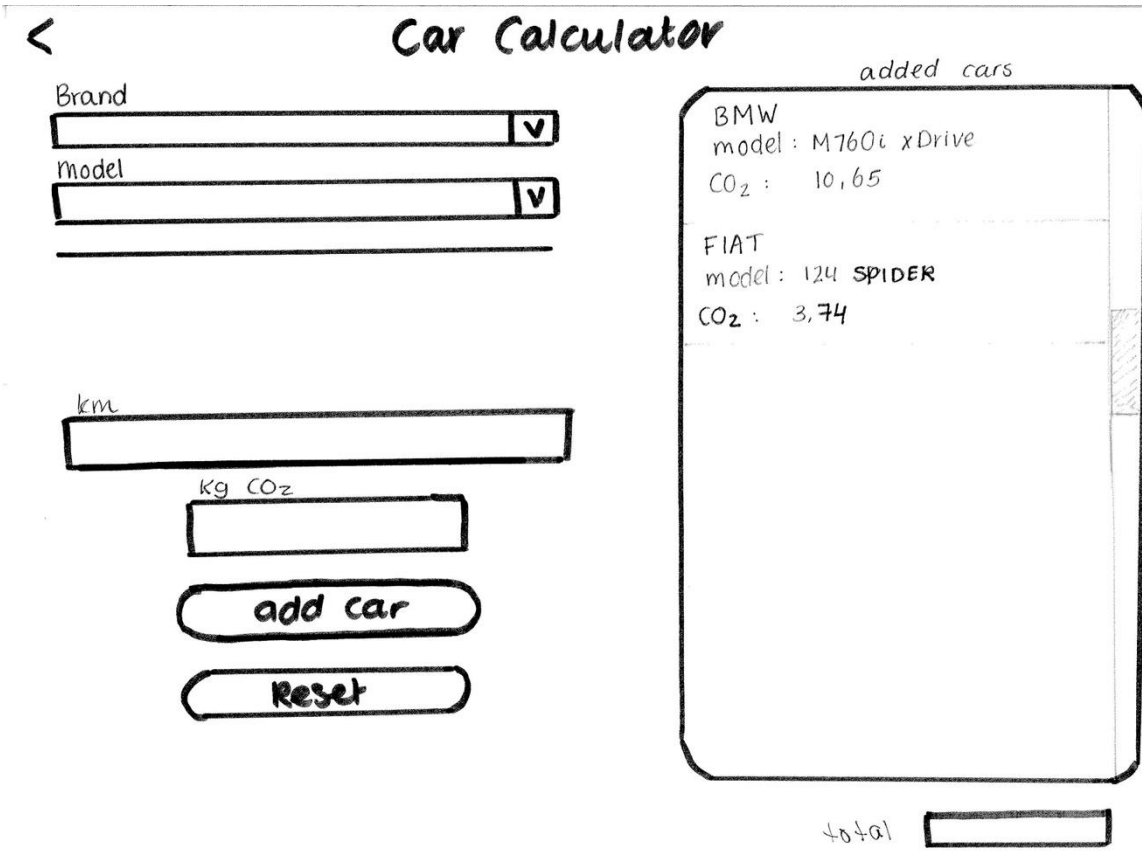
1 The first screen the users sees is the logo as a home screen. Either after a couple of seconds, this screen disappears. Or by tapping. This still has to be determined.



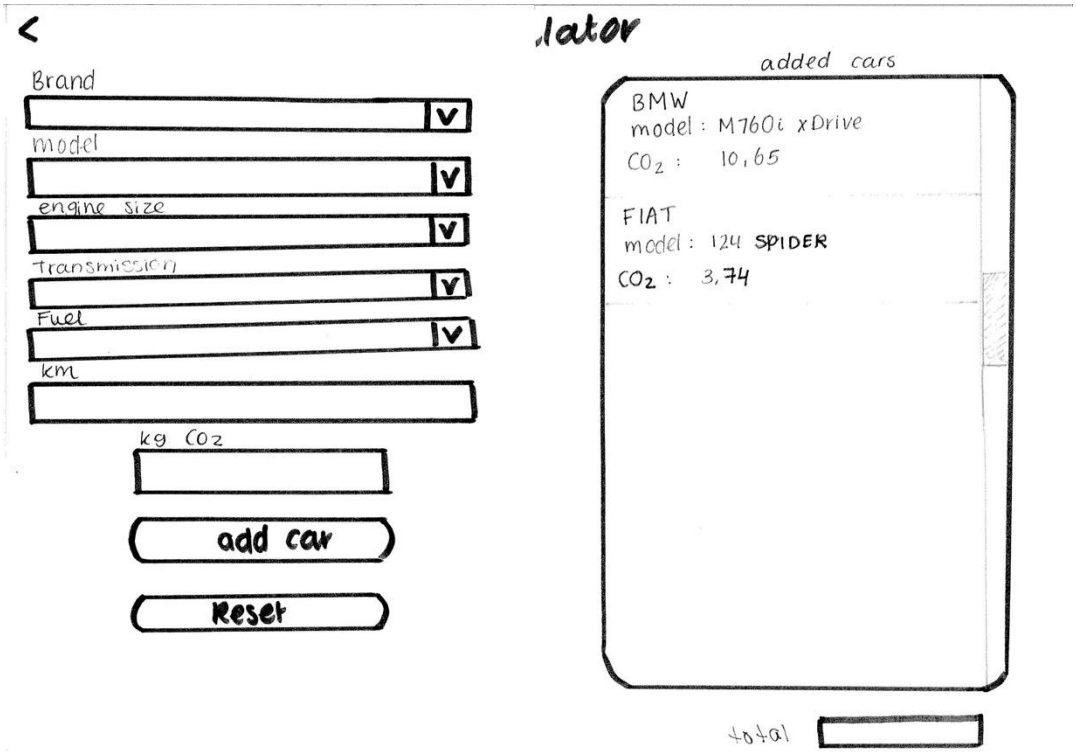
2 The second screen is a overview of all the data. The parts of the pie chart grow or shrink when the CO_2 contribution of this part grows or shrinks. The parts of the pie chart also operate as buttons to the various calculators. The pie chart is placed in a calander menu. This can either show the overview per month or per year. This also has to be determined.



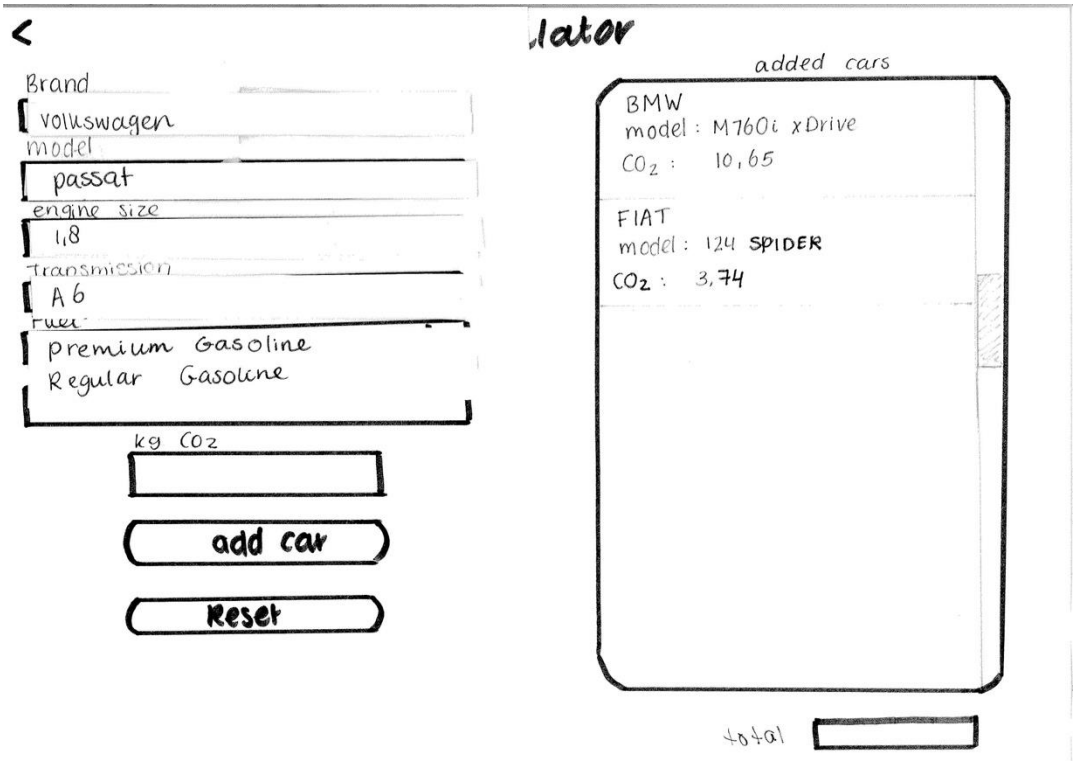
3 When an user presses the car part in the chart, he/she ends up on this screen. The user has to make a choise between a car specific calculator or a general car calculator.



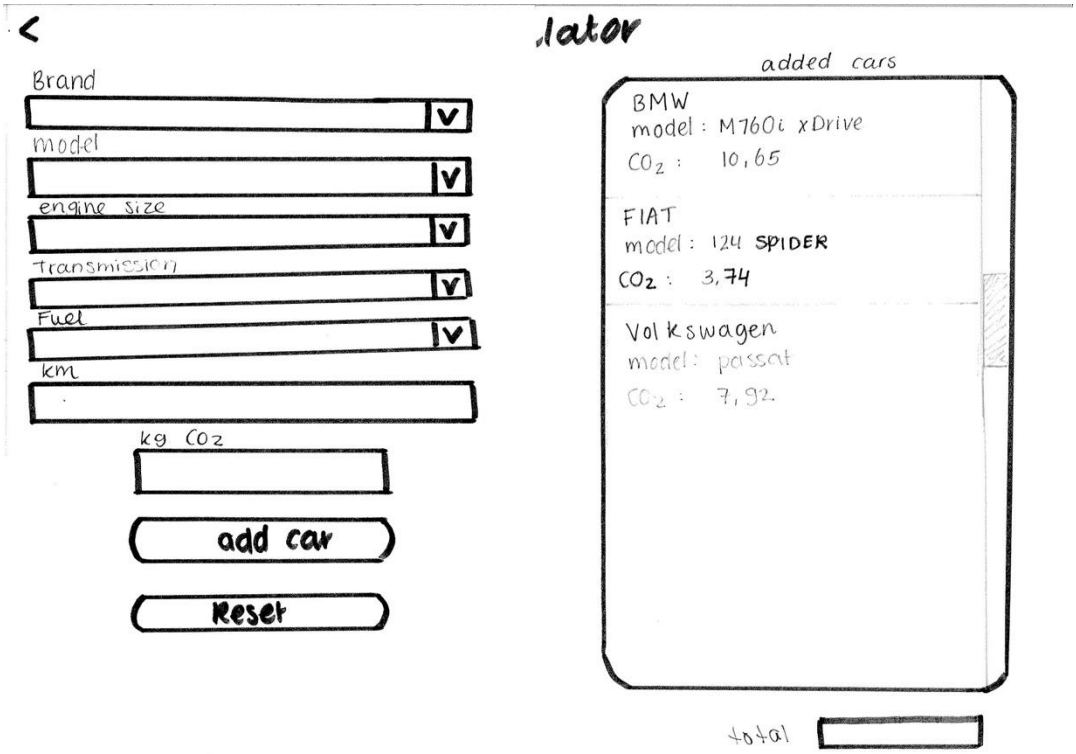
4 The car specific calculator is shown on this screen. Every calculator has the same template. On the left space to fill in the data is visible. On the other side a gallary is placed to save the enterd data. At the bottum right the sum of all emission of all the cars together is shown.



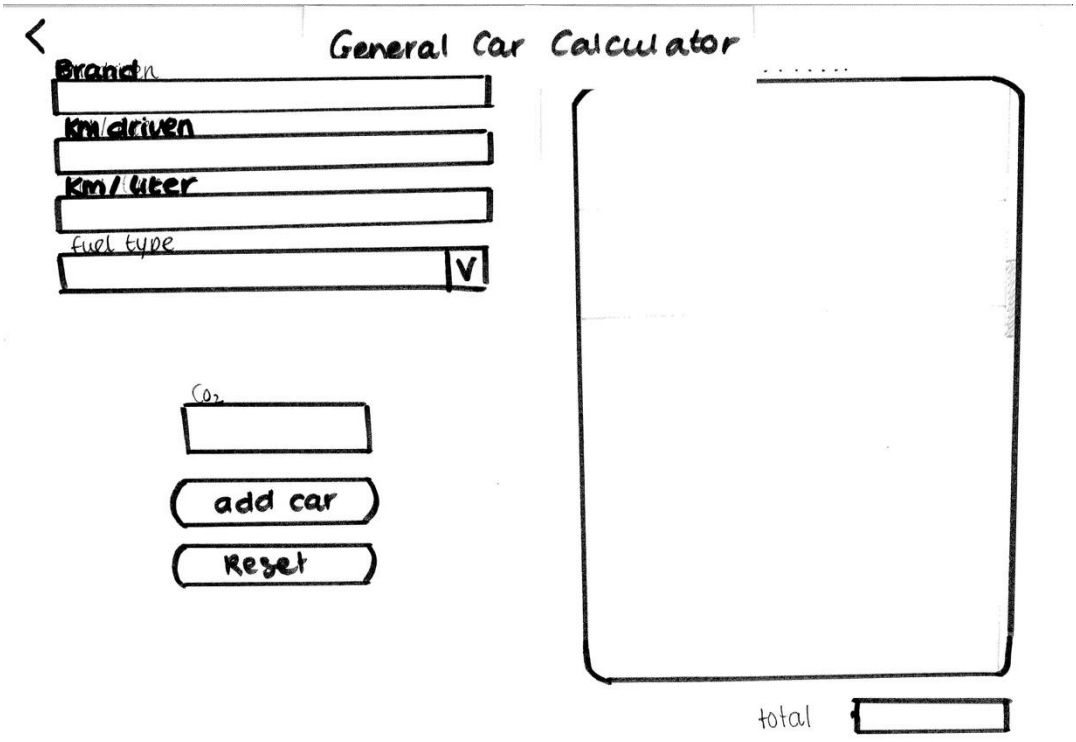
5 The added dropdown menus are only added if the next dorpdown has more than 1 option to choise from.



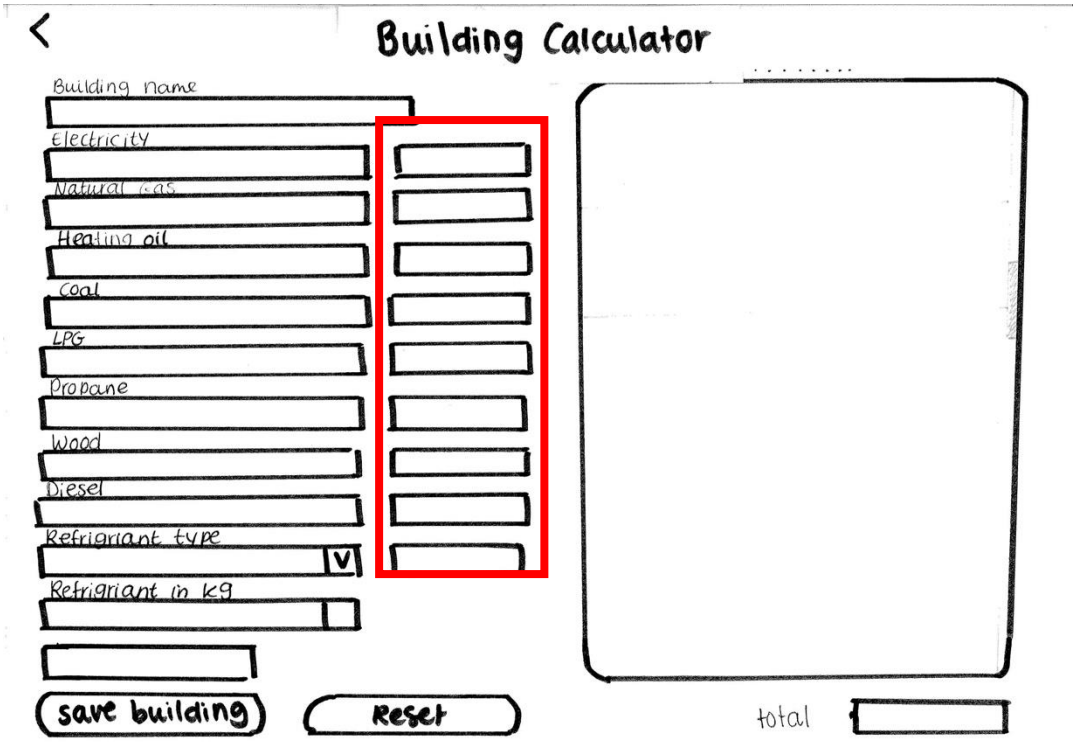
6 Here can be seen how the dropdown menus work.



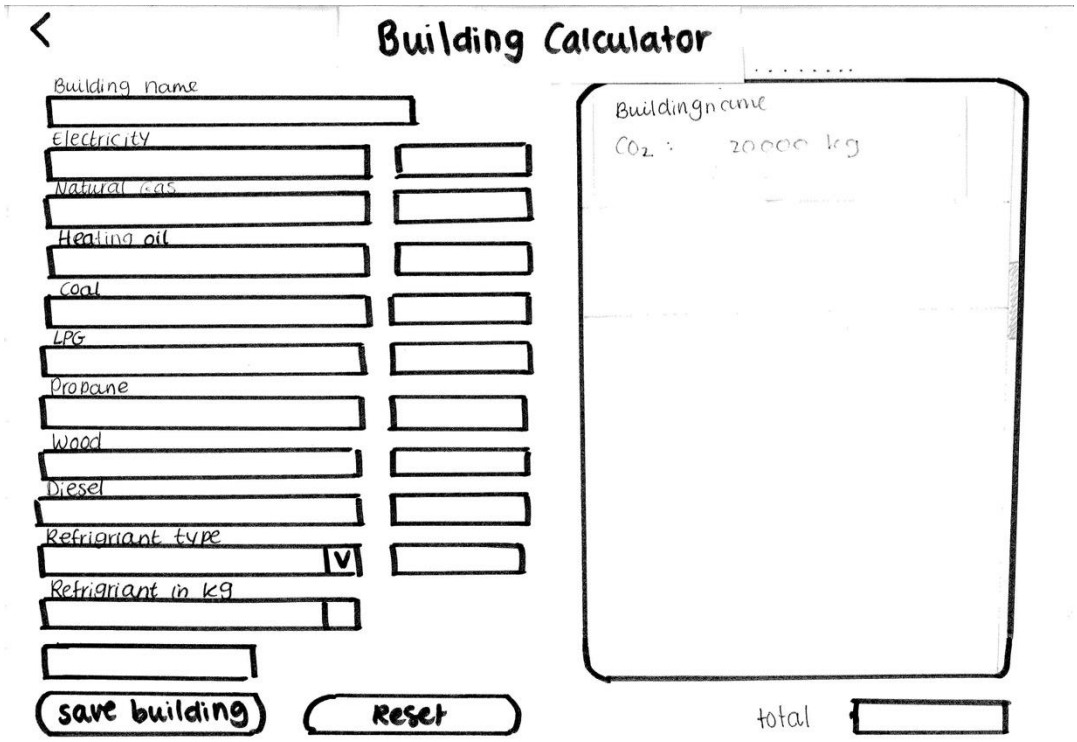
7 By pressing the add car button, the car is added to the gallery. By pressing the reset button all the data gets removed from the dropdown menus. This makes the data form ready for the next set of data.



8 When at step 3 the general car calculator is chosen, the user ends up with this screen. Instead of choosing a specific car, the user fills in the kilometers driven and the fuel consumption. After that the user choses fuel type and adds the car in the same way as the car specific calculator.



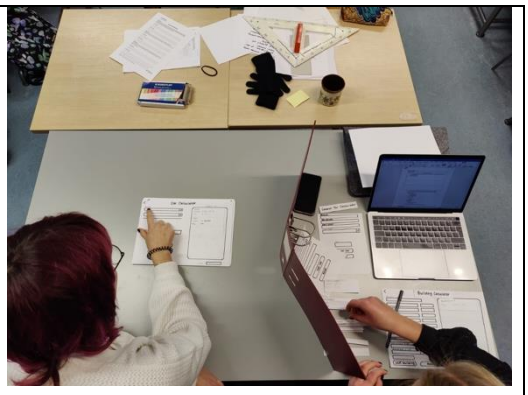
9 This calculator works the same way as the car calculator. This calculator consists of input boxes instead of dropdown menus. The buttons work in the same way. The biggest difference is the second column on the right part of the screen outlined in red. This will show the carbon emission per section.



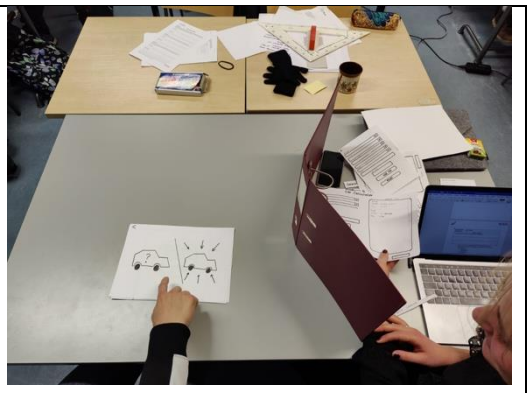
1 After pressing the save button, the building will be saved in the gallery.

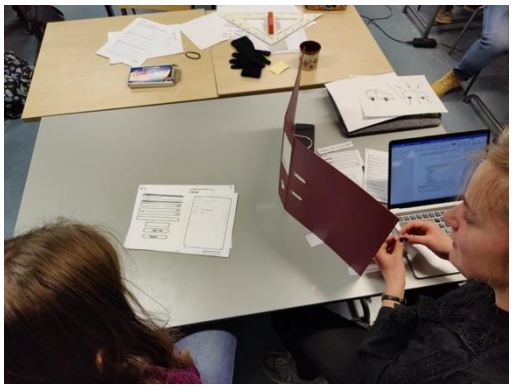
0

Name participant	Leah Ebert
Age participant	21
Notes per question	
1. Time triggered home screen if its an app on a tablet if its on a web app scroll down and it moves to a corner.	
2. Doesn't understand the choice between cars. Doesn't understand that it should reassemble dropdowns. Reset before add car because tends to press last button. Change colours of reset. Or next to each other add right and reset left. Clear difference between the buttons so there are no mistakes made. If I press go back, would the car be gone as well? Different back bottom for going to home page.	
3. Recognizes the dropdown. Second column is not quite clear because it is not live. If data is in the gallery. Can I edit it or need I to delete. Tree dots in the corner.	



Name participant	Chantal Tijhuis
Age participant	21
Notes per question	
1.Chantal thinks she has to press on the logo to continue.	
2. Dropdown menus are used as they are supposed to. Chantal needs a lot of time to find the add car button. Save car would make more sense to her. Add sound like you start with adding a new car. When typing data in the text boxes. She expects a keyboard to pop up.	
3. Colum 2 is again not clear. What should be in this column. If they are empty, people want to fill something in. Save building is clearer. Add car sounds like starting with a new car. Home page is easily found	





Name participant	Bryan Arents
Age participant	21
Notes per question	
1. Presses welcome to move on. Or somewhere on the screen.	
2. Unclear icons to choose between general and specific car calculator. Dropdowns are clear. KM per year add. Otherways unclear. Now it looks like i should fill in the mileage. The year the car is produced include? Add ca rand reset are clear.	
3. Text-boxes are clear. Save building. Colum in the middle is unclear. Title should make a difference.	

Name participant	Antonin Silvestre
Age participant	21
Notes per question	
1. Press the screen to go further	
2. Dropdowns were clear. Also add and reset were clear. In the beginning there was confusion about the tasks.	
3. Building calculator was clear. Text boxes were clear.	

Name participant	Tom Fransen
Age participant	20
Notes per question	
1. Time triggered or press the logo or press enter.	
2. Dropdowns are not clear. Starts typing instead of using the dropdowns.	
3.Dropdowns were used at the building calculator. How can I edit a car or delete? Reset and save car are clear.	

Results: Pressing the screen is the most used method to go to the next page from the logo page. Dropdown menus are confused by text-boxes in the car calculator in some cases. The screen before the car calculator is confusing. No one of the users instinctively can make the right choice between car specific calculator or general car calculator. 2 participants asked how they could change the data in a saved car or how to delete a car. The second column in the building calculator is not clear. Buttons are not clear in their meaning occasionally.

Conclusion: The conclusion is written in feedback points that need to be changed in the app:

- Navigation to the two car calculators.
- Transition to the home page from the logo screen should be by pressing the screen.
- In the gallery the option to change or delete data should be added.
- The difference between dropdowns and text-boxes should be clear.
- A title should be added to the second column of the building calculator.
- Looks and placement of the reset and save data should be determined.
- Add ‘per year’ at driven KM text-box in the car calculator.

11.2 THE DESIGN OF THE APP

Now that theoretical research on design has been done and the app has been tested through usability testing, work can begin on formatting the app. A prototype was created and can be seen in this chapter.

11.2.1 GENERAL DESIGN DESCRIPTION

The designs of all calculators are essentially the same. See Figure 104, Figure 105, Figure 106, Figure 107, Figure 108. This way it is clear to use for the customer and the customer can keep a clear overview at all time. The four screenshots down below display this format. On the left, the user of the app can enter the data. On the right, a summary of the entered data is given. Every calculator has a reset and save button on the bottom of the page. By pressing the leaf in the top left corner, the user can go back to the homepage.

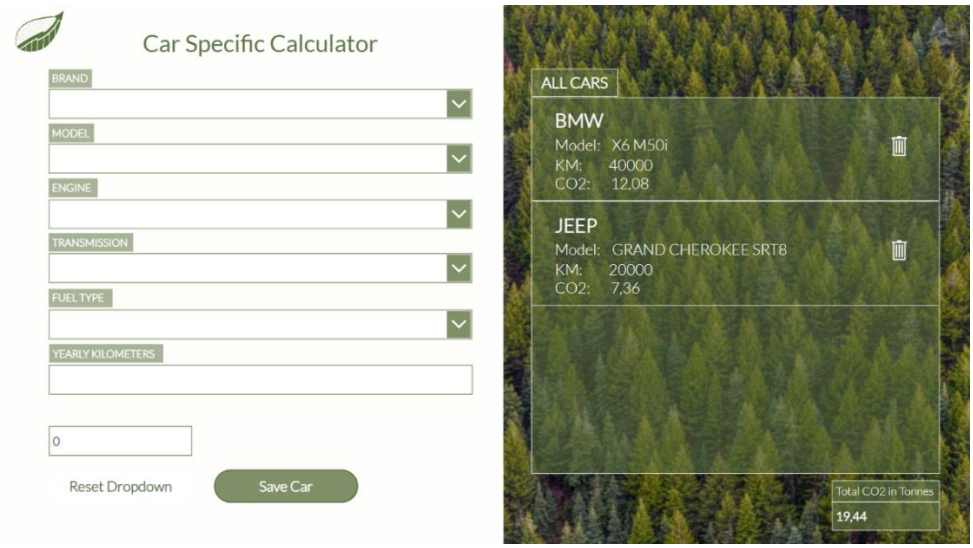


Figure 104 Car Specific Calculator

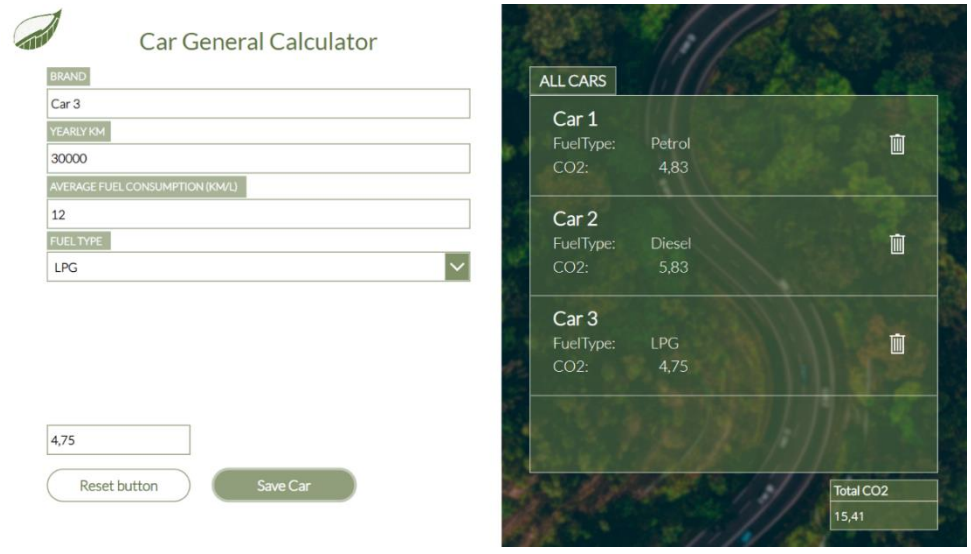


Figure 105 Car General Calculator

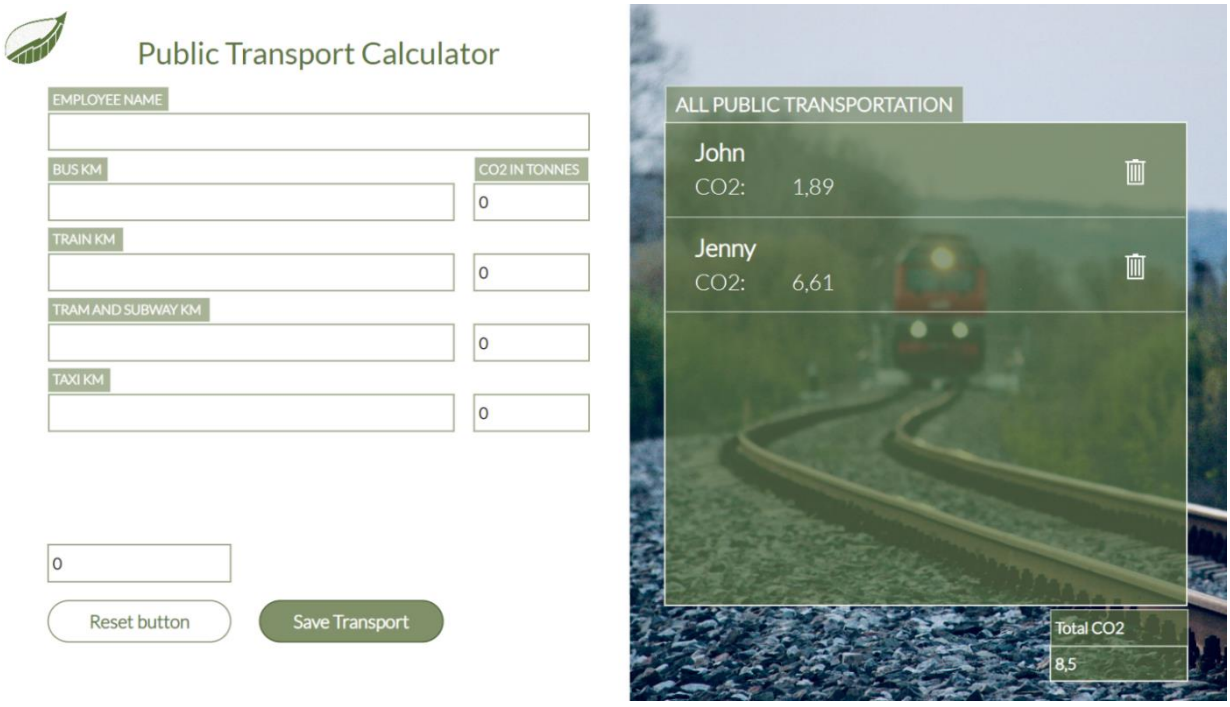


Figure 106: Public Transport Calculator

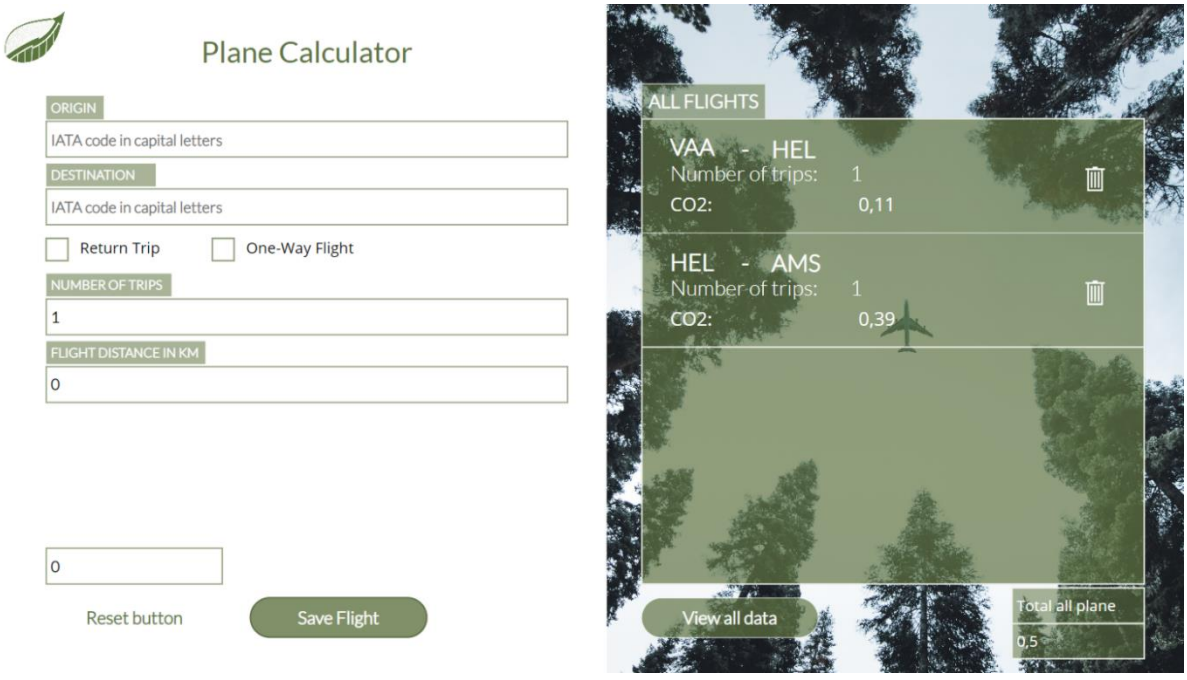


Figure 107 Plane Calculator

11.2.2 REFLECTION ON THE DESIGN PRINCIPALS OF GESTALT

In chapter 9.5 Research Deign Principles the principles of gestalt were described. Several of the principles were implemented in the design of the app. On basis of Figure 108 the implemented principles will be elaborated.

Balance can be seen in the division in the screen. Left and right are the same size. To prevent the user to press the reset button instead of the save button, the colour of the save button is the darkest colour on the screen. This is the principle of focal point. The focus of the user is drawn to the darker-coloured button. Another principle implemented is the principle of proximity. The distance between the text label and the textbox that belong together is smaller than the distance between the text label and the textbox that do not belong together. The user will unconsciously group the text label and the text box.

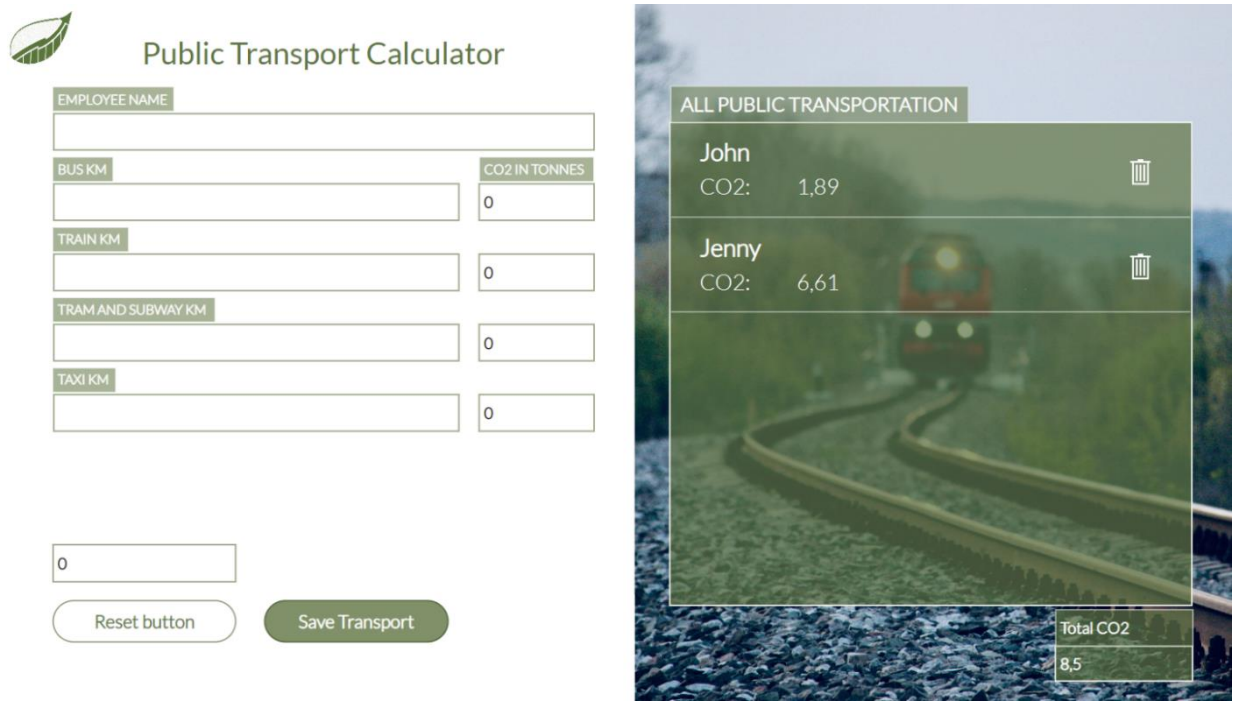


Figure 108 Public Transport Calculator

11.2.3 REFLECTION ON THE DESIGN PRINCIPALS BY NIELSEN

Earlier on in this report, the 10 heuristics by Jakob Nielsen were described. This section takes these heuristics in account and compares the design of the app with the heuristics. When needed, the design of the app will be changed if the design does not meet the standards of Nielsen.

1. ***'Visibility of system status***

The system should keep users informed about what is going on at any time, through appropriate feedback within reasonable time.

While designing the app, the project group always kept these 10 principals in mind. By designing the app properly at the beginning. Therefore, this first principal is already incorporated in the app. For example, the user of the app can see the interim score CO_2-wise while entering data in the app. See the red outlined part of Figure 109. The user of the app does not only get a CO_2 score in the end but also throughout the whole time. Moreover, in some cases like the building calculator and the public transport calculator. The different components, like bus and train, give separate values in real time about CO_2 Emissions. This way, the app user also knows which part of this calculator emits the most CO_2. Every time a user of the app goes back to the main page, the pie chart that displays a summary of the entered data is updated. Through these features, the group incorporated this principle into the app.

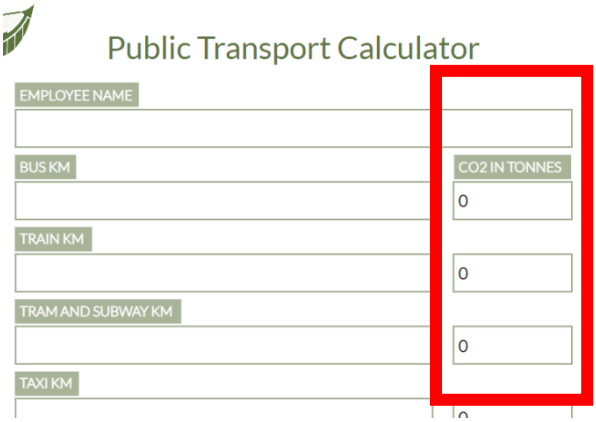


Figure 109 Live feedback about CO2 emissions

2. *Match between system and the real world*

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

By using accessible language and figures, the project group incorporated this design principal. See Figure 110. For example, by using figures on the homepage like cars, trains, and buildings. These are simple figures that every user associates with a car, train, and building. By using these figures, it is clear for the user of the app where to find the different calculators. To make it even more clear, text was added.

Figure 110 Figures on home page

On the other hand, there is also a space for improvement in this area. For example, the way a user can go home is through the home button in the form of the logo in the top left corner (Figure 111). This can create a problem because users don't recognize this icon as a home button. When this problem occurs, a user is stuck in a page and does not know how to navigate back. To solve this, the logo is changed to a button by changing the cursor when the user hovers over the logo. This indicates that the button is clickable.

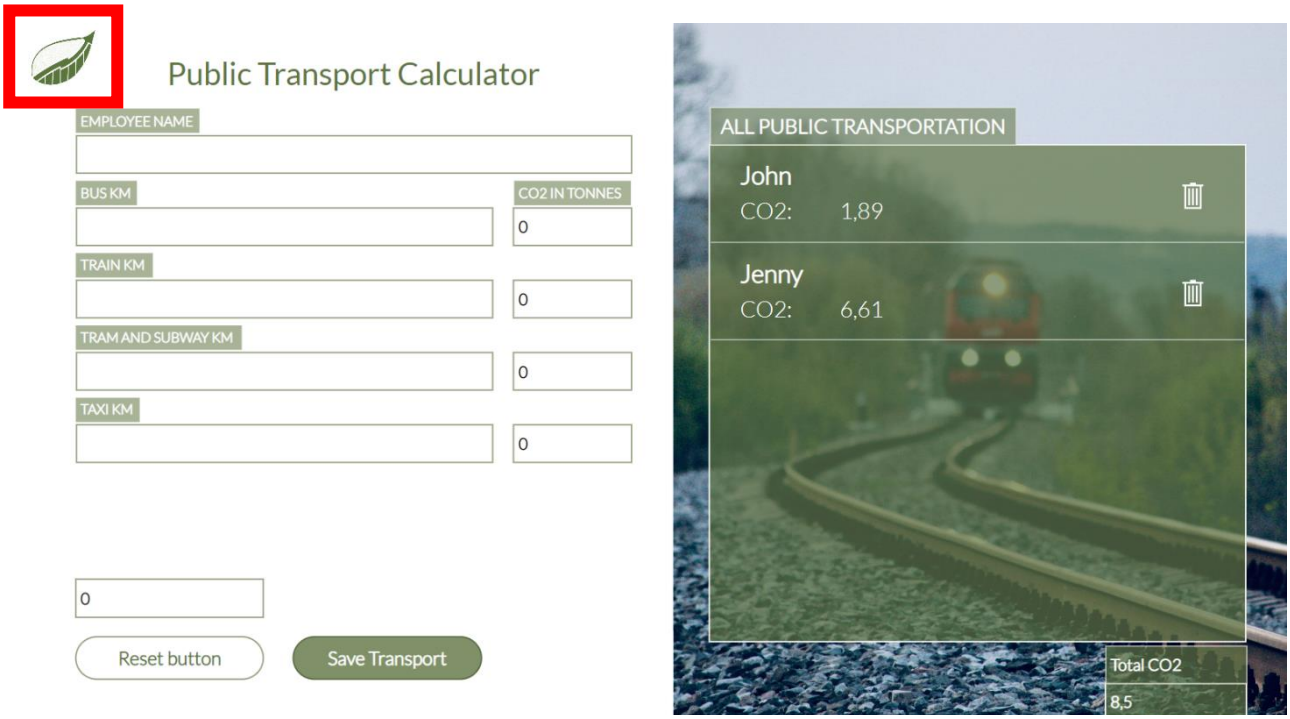


Figure 111 Home Page Button

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

By Incorporating the option to delete (Figure 112) an item, this designing principal is used in the application.

The project group can implement this principal even better by creating an extra button that gives the user of the app an option to edit a record as well. The edit button gives the app user even more control and freedom.

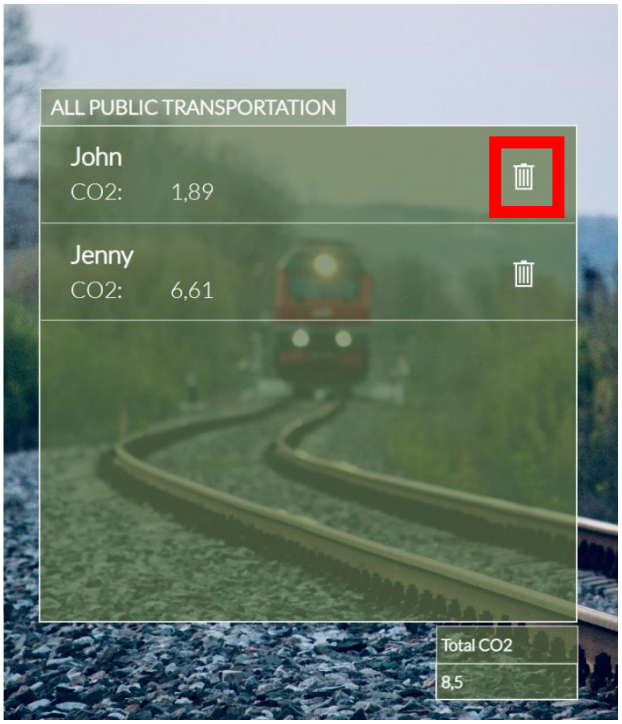


Figure 112 Delete option

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

Every page of the app is designed with the same layout, making it clear to the user where to submit their data and how the app functions. This is an example of consistency throughout the app. Every calculator has the same layout and home button in the same place. After every calculation, the user of the app can return to the homepage and go to a different calculator from there. This consistency and standards are a benefit for the usability of the app. Every calculator is set up in de following way. To the left the user can find the dropdown menus and textboxes to enter the data to calculate. Underneath this, the reset on the left and the save data button on the right can be found. To the left of the page, a gallery with the saved data can be found. Underneath with gallery a button on the left can be found which sends the user to a page were all the enter data in detail can be found. To the right of this button a text box with the total CO_2 emission of all the entered items is summed up. See Figure 112.

5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

In the plane calculator, the user needs to fill in the airport code in capitals. To prevent an error of not matching the filled-in value with the data in the database, a formula is implemented. The formula automatically turns the filled-in letters to capital letters.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

Because the app is straightforward, there is no further explanation necessary throughout the app. Every textbox has a field in which is stated, what kind of data the user of the app needs to enter. There is no need for the user of the app to remember information from previous pages. Every page is independent and can be used without additional information from a third party. The app makes use of universal elements. For example, other apps also use the icon of the trash can to indicate that items will be removed while pressing this button.

Another example of this is the shape of the buttons and dropdown menus. Well known apps, like Microsoft Excel and Google use the same layout to indicate a dropdown menu. Examples of Excel and Google can be seen in Figure 113.

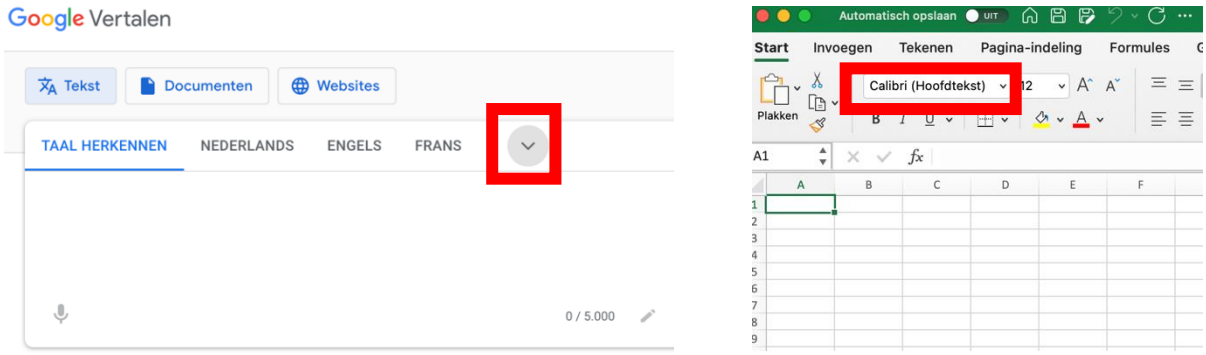


Figure 113 Examples of dropdown menus in well know apps

7. Flexibility and efficiency of use

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

The system is too small to implement this principle. Besides that, all the steps in the app are crucial for the user to use the app. There is no possibility to skip steps.

8. *Aesthetic and minimalist design*

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

The app is designed in a minimalistic way. The information presented on the pages is useful to the user. Cutting back on information will increase the chance of the user making a mistake. Although, there are ways to make the app even more minimalistic and simple. The life update fields about CO_2 emissions can be deleted to give the app even cleaner and more minimalistic look. Especially the building calculator has quite some CO_2 fields that make this page look a bit busy. See Figure 114. Nonetheless, the choice is made to keep these fields on the page. The project group believes that in this case, rule number 1: Visibility and system status overrules this principal. That is why the group choose to keep the user of the app updated about their emissions rather than keeping the design minimalistic.

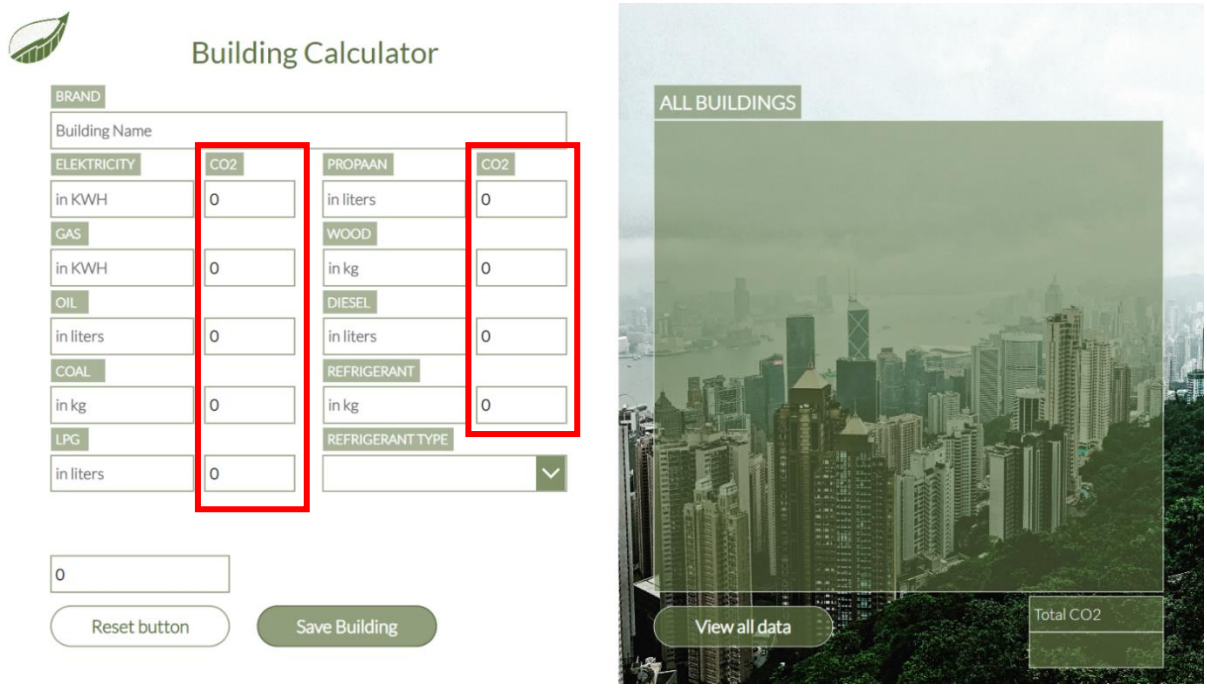


Figure 114 Building Calculator with a busy lay out

9. Help users recognize, diagnose, and recover from errors
Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

At this moment, the app does not contain any error messages. All calculators are straightforward, and the user of the app can only input data in one way. This way, errors will not occur. Although, there are some things that the user of the app can do wrong. For example, the airport codes need to be entered manually. The user of the app can make mistake here by not entering the data in capital letters. To prevent this, a function is implemented that changes all the text to capital letters. Still there is a chance that the user fills in an airport that does not exist. When this happens, the user gets an pop-up saying the entered value is not correct.

10. Help and documentation
Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large' (J.Nielsen, 1994).

On the homepage, the user can press the question mark button. This triggers a pop up to appear. The pop-up provides the user with a manual on how to use the app. See Figure 115.

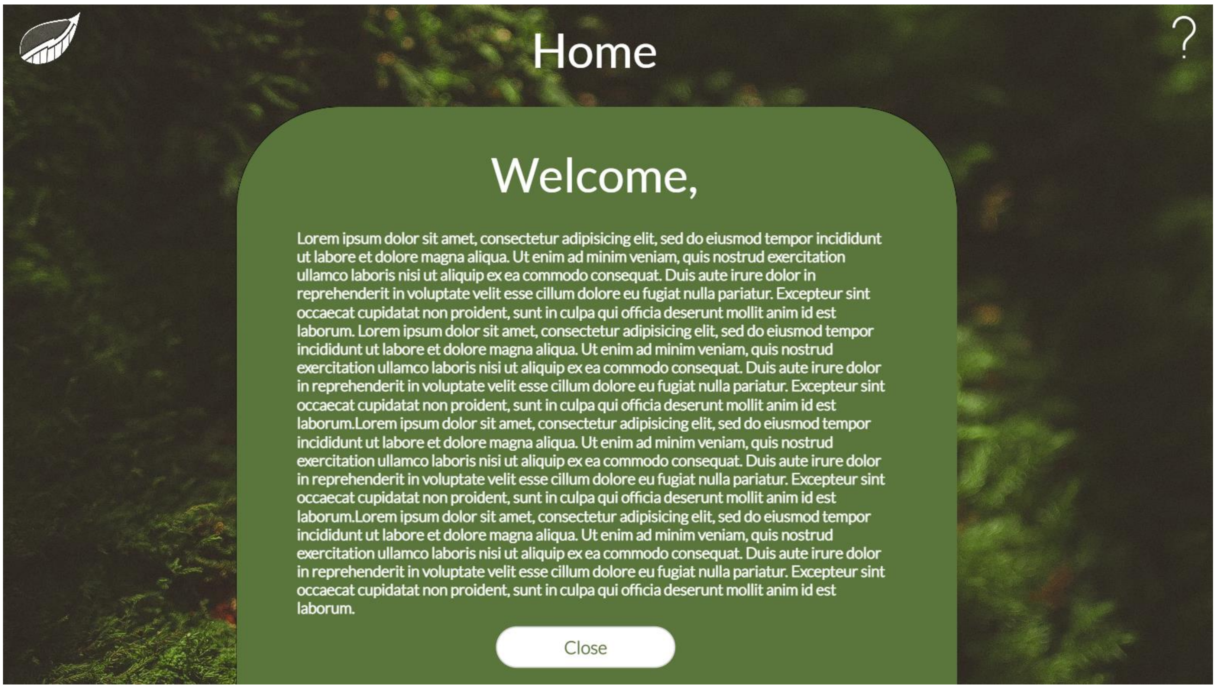


Figure 115 Question mark on homepage

12 CONCLUSION

The project goal was to develop tools on behalf of S4F that help companies in the Jakobstad region in their sustainable journey. It can be difficult for companies to get started with their sustainable journey. By carrying out this project, S4F wants to provide this service to these companies.

This goal was achieved, by implementing two sub-projects. First, developing two templates that help companies in reporting about their sustainability. Secondly, by developing an application that can calculate the CO_2 emissions that a company emits. Companies are now able to start their sustainable journey by measuring the starting point using the application. Information that is gathered by using this application can be documented using the templates that are developed. This means that the goal that was set at the beginning of the semester has been achieved.

We were able to assist S4F by providing them with their own tool to use for future consulting work, allowing them to stop paying for third party service.

The second goal of the project was to work successfully in an international team and ensuring that the project group can also grow on a personal level. Throughout the project, there was a successful collaboration. No major problems occurred and everybody got the chance to develop themselves on a personal level as well. For example on international collaboration skills as well as on project content such as programming skills.

12.1 RECOMMENDATIONS

The project group recommends to continue the development of the carbon calculator application. The project group made a solid base for the app. Although, there are possibilities to make the app even more user friendly. This can be done by placing the application in a web environment in which a company can create an account. This way, the company can return to this web environment using a personal login code. This way they can have insight into the entered data in the application and adjusting it at any time. This is not possible at the moment which means that the user of the application has to enter and export all data in one session. The data is not saved in the application afterwards.

The second suggestion the project team would like to propose is to increase the size of the present databases that serve as the foundation for calculators. In the current situation, not all airports are included in the database due to the excel limitations within PowerApps. When the app is placed in a web environment and can be connected to a server, the airport database should be expended. This also applies to the car database. That current database is a Canadian based database which means that not every European car is included. This is not optimal since the calculator is designed for Finish companies.

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APPENDIX 1: TIMETABLE

Date	Time	Hours	Content
5/9/22	10:30-13:00	2h30min	Project presentations
7/9/22	10:00-16:00	4h	Teambuilding
8/9/22	10:00-16:00	4h	Teambuilding
14/9/22	13:00-15:00	2h	Project work
15/9/22	14:00-14:20	20min	Meeting with S4F
19/9/22	12:30-16:00	3h30min	Project work
21/9/22	12:30-16:00	3h30min	Project work
22/9/22	13:00-15:30	2h30min	Project work
26/9/22	13:00-15:30	2h30min	Project work
27/9/22	13:00-14:00	1h	Meeting with S4F
4/10/22	11:30-15:00	3h30min	Project work
5/10/22	14:00-16:00	2h	Project work
6/10/22	12:30-16:00	3h30min	Project work meeting with S4F
7/10/22	13:00-15:00	2h	Project work
10/10/22	11:30-16:00	4h30min	Project work
11/10/22	10:00-15:00	5h	Project work
12/10/22	13:00-15:30	2h30min	Project work
13/10/22	12:30-15:30	3h	Project work
14/10/22	11:30-16:00	4h30min	Meeting + project work
17/10/22	13:00-16:00	3h	Project work
18/10/22	13:00-16:30	3h30min	Project work
19/10/22	13:00-15:00	2h	Project work
20/10/22	12:00-15:00	3h	Meeting + Project work
21/10/22	9:30-12:30	3	Meeting
24/10/22	12:30-16:00	3h30min	Meeting
25/10/22	08:00-14:00	6h	Midterm-Report
28/10/22	12:30-15:30	3h	Projectwork
31/10/22	12:30-15:00	2h30min	Project work

1/11/22	12:30-15:00	2h30min	Project work + Meeting
2/11/22	12:30-15:00	2h30min	Project work
3/11/22	10:00-15:00	5h	Project work
4/11/22	10:00-15:00	5h	Project work
07/11/22	10:00-15:00	5h	Project work
08/11/22	12:30-16:00	3h30min	Project work
9/11/12	14.00-16.30	2h30min	Project work
10/11/12	9:30-16:00	6h30min	Project work
11/11/22	10:00-16:00	6h	Project work
14/11/22	10:00-16:00	6h	Meeting
15/11/22	12:00-16:00	4h	Project work + Meeting
16/11/22	9:30-15:30	6h	Project work
17/11/22	10:00-15:30	5h30min	Project work
18/11/22	12:30-16:00	3h30min	Project work
21/11/22	10:00-16:00	6h	Project work
22/11/22	10:00-15:30	5h30min	Project work
23/11/22	10:00-15:30	5h30min	Project work
24/11/22	10:00-15:00	5h	Project work
25/11/22	10:00-14:30	4h30min	Project work + Meeting
28/11/22	10:00-16:30	6h30min	Project work
29/11/22	10:00-16:30	6h30min	Project work
30/11/22	10:00-17:00	7h	Project work + Meeting
01/12/22	10:00-17:00	7h	Project work
02/12/22	10:00-16:00	6h	Project work
05/12/22	10:00-16:30	6h30min	Project work

APPENDIX 2: MEETING NOTES

Meeting 1:

Thursday 15 September, 14.30 – 14.50

Location: Online Teams Meeting

Attendants:

S4F	(Project tutor)
Benjamin Poel	(Secretary)
Lydia de Groot	
Robin Symmank	

The goal of this meeting was to get to know each other. During the meeting the group also talked about Sustain 4 future consulting. The goal of the project is to design a tool that can be used by this company to determine the carbon footprint of local companies in the Jakobstad region.

The meeting only took 20 minutes. The scope of the project and the details will be discussed in the following meeting. S4F sends some materials to study. This way, the project group is well informed about the topic.

Meeting 2:

Wednesday 28 September, 13.00 – 14.00

Location: Online Teams meeting

Attendants: S4F (Project tutor)
Benjamin Poel
Lydia de Groot (Secretary)
Robin Symmank

Agenda

- Project objective
- Project scope
- Deliverables
- Project planning
- Weekly meetings

Notes:

Every consulting package consists of 3 levels. The basic level is meant for companies who start their sustainability journey. The second one contains a deeper analysis of the extent of sustainability of one's company. 2S4F offers two services: Climate expert service and sustainability expert service.

Deliverables and objectives on slide 11; Assessment tool, carbon footprint calculator and a template for reporting about sustainability. The team starts with the template and finishes this before the mid-term. With the following meeting, the next step regarding the other deliverables will be determined.

For the template, the Global Reporting Initiative will be used. This states all the regulations regarding sustainably.

2S4F wants to have its own tools because regulations change constantly. To use up-to-date tools, companies need to buy licenses regularly This can result in high rising costs. It is cheaper to own one's tools.

The team asked whether they could access some example tools to see what it should contain. S4F would look into it and provide a description of the content.

Also the scopes for this project were discussed. The scope is set on a prototype in Adobe XD or Excel.

Next meeting: 6-10-2022 12.30-13.30 on Teams

Weekly meetings: Once a week, for now, can be twice a week if necessary.

Meeting 3:

Thursday 6th of October 2022 – 12.30-13.30

Location: Online on Teams

Attendants: S4F (Project tutor)
Benjamin Poel
Lydia de Groot (Secretary)
Robin Symmank

Agenda:

- Taxonomy content regulations
- Separate or one big template?
- GRI specific sectors
- Planning next meeting
- Look ahead to deliverable 2

Notes:

The group showed the document with all the guidelines we found so far. We decided on making 3 separate templates: one for the EU guidelines, one for the GRI, and one for the Taxonomy guidelines. The taxonomy guidelines are still under construction. We will not spend too much time on this. The focus is on the EU and the GRI guidelines.

The GRI standards are divided into universal, sector-related, and topic-specific guidelines. The focus is on the universal guidelines and some of the sector-specific ones. We choose the sectors that are in Jakobstad.

The looks of the template should be as the following: Every topic gets a brief explanation. Below that, there should be bullet points with the required content of that paragraph.

Benjamin will email S4F the 2017 guidelines to see if they are up to date.

Next meeting: 14th of October. S4F will let us know at what time. The meeting will be in person.

Meeting 4:
Friday 14th of October 2022 – 12.00-12.25

Location: In person in the EPS classroom

Attendants: S4F (Project tutor)
Benjamin Poel
Lydia de Groot (Secretary)

Agenda:

- Discussing feedback on templates
- Discuss deliverable 2 – Calculation Tool
- Plan meeting for next week.

Notes:

Feedback on the templates: Scrolling through them roughly, the set-up is good. In the EU template: Companies usually experience difficulties with the KPIs. The examples are a good addition for clarity. At the beginning of next week, S4F will go through it in more detail and add some comments.

The topic-specific GRIs are not published yet. S4F is going to look at whether he has some older versions for us to work on.

In a meeting with Concordia, the topic of the calculators came up. Concordia seems more interested in a detailed calculator. Therefore, we shrink the project to 2 deliverables instead of 3. There are some standards for calculators. We will get into it at the next meeting. The calculator will focus on the carbon footprint of the company. The calculator should give inside into which factors influence the carbon footprint the most. For example, transport. Companies can deep dive into this topic after the first step of identifying what the critical areas are. Maybe later we can include a life cycle analysis of products. The calculator/tool will be subscription based on the website.

Before the next meeting, S4F will send us some information to read.

On the 25th of October, the team will present the mid-term report. S4F will attend this presentation online. During the meeting before the presentation, we go over the slides. The focus of the presentation should be on the vision of the next part of the project.

Next meeting: Thursday the 20th of October at 12.00 online.

Meeting 5:
Thursday 20th of October 2022 – 12.00-12.30

Location: Teams

Attendants: S4F (Project tutor)
Benjamin Poel
Lydia de Groot (Secretary)
Robin Symmank

Notes:

Feedback on PowerPoint: Well prepared and organized. In the PowerPoint, we use reporting examples from bigger companies. Including examples from the Jakobstad region and small to medium enterprises would be nice.

During the presentation, we should talk about what we did so far and what we are planning to do in the next part of the project. We should include our Gantt chart to show our intentions and planning for the next part. In this way, we also show our project management skills.

Car emission document excels: We can use the online calculator as an example. The excel sheet is a database that can be used to calculate the emission on companies' cars and the emission produced during commuting from home to work.

We start by making a calculator for the emission produced by the building and emissions produced by the cars the company uses.

Robin asked if there are databases for the building calculator. We can extract the factors from the online calculator tool. The factor in the building tap depends on the energy provider. If the factor is not known, we can use 0,0982.

The excel calculator can be used as an example as well. We can extract data from there as well.

Next meeting: the 1st of November at 13.00

Meeting 6:

Thursday 1st of November 2022 – 13.00-13.30

Location: Teams

Attendants: Biniam Tefera (Project tutor)
Benjamin Poel
Lydia de Groot (Secretary)
Robin Symmank

Notes:

Feedback on the report:

- Well organized and well written.
- Changes are in red in the document Biniam reviewed. He will send it to us.
- Deliverable 3 is still mentioned in the report sometimes.
- The company is called s4f instead of 2s4f.
- The date on page 6 is incorrect.
- Gantt is too small. Put it in the landscape.

Calculator:

- Good start. Works really well.
- In the next meeting, we will discuss how to expand the calculator.

The balance between UX and functionality:

- UX and function go hand in hand. Focus on getting the numbers right.

What is up next:

- Expand to company vehicles and employees' cars.
- Can be tricky because employees sometimes don't know what car they drive. So instead, we can use the amount of CO_2 per KM.
- This we can also do for trains and fuels. And later for planes.

Next meeting: the 15th of November at 13.00

Meeting 7:

Thursday 15th of November 2022 – 12.30-13.00

Location: Teams

Attendants: Biniam Tefera (project tutor)
Benjamin Poel
Lydia de Groot (secretary)
Robin Symmank

Notes:

The app looks good. Biniam would like an option to export all the data. Maybe an option where the user can download a report. Up top a summary chart and under that more detailed information.

The language of the formulas is Dutch right now. We expect this to change once opened on an English computer.

The plane- database is good for now. We can maybe later add more airports and flights within Finland. Biniam will ask his contacts for more information.

The Car-database is Canadian. Is this database inclusive enough? Biniam will investigate it.

The presentation is on the 15th of December.

Next meeting: the 25th of November at 11.30-12.00 in person.

Meeting 8:

Thursday 25th of November 2022 – 11.30

Location: Teams

Attendants: Biniam Tefera (project tutor)
Benjamin Poel
Lydia de Groot (secretary)
Robin Symmank

Notes:

Review of the app:

Car general calculator: view data does not work on this page. We fixed it real-time.

Plane calculator: Did we update the plane database? All the flights are in there from and to Helsinki. It would be useful if we include all the European airports. Another option is to make a general plane calculator. Benjamin: 'Option on the same page where you can enter only km instead of departure and destination. '

The option to multiply the trip is not calculated right. When you enter x10, expected is that the emission would also go times 10. This does not happen. We need to fix this. The calculator sees it as one large trip instead of 10 separate small trips.

Building calculator is good. In general, de app is very interactive.

How about the export button? Right now, we can export to csv. We would like it to make a better layout. We are still working on this.

The log-in screen has no function because we cannot save data permanently. When the user exits the session, the data will be lost. The login screen leads every user to the same app. There is no separate environment for every user.

The help screen still needs text.

We will send Biniam the first version of the final report for the next meeting.

At the beginning of the week, we will also send the most recent version of the app.

Next meeting: the 1st of December at 13.15 on Teams.

Meeting 9:

Thursday 1ste of December 2022

Location: Teams

Attendants: Biniam Tefera (project tutor)
Benjamin Poel
Lydia de Groot (secretary)
Robin Symmank

Notes:

Biniam will go to the report upcoming week.

Review of the app:

Export to excel doesn't work. But CSV is a more commonly used format. It is probably better to leave it in CSV so customers can open it in Google Sheets or other Excel programmes.

The word 'home' we will change to S4F consulting

Biniam noted that there are no diesel cars in de car-specific calculator. This is because there are not many diesels in the database.

We will add the registration number to the calculator. In this way, the company can still distinguish the same model of cars.

Plane: Add a double trip to the gallery. In the collection, it shows true or false for ARetrunTrip. We will change this to return-trip and a One-way trip.

For a later version, adding multiple destinations for one trip is useful.

The name of the columns. There are no spaces between the different words. This has to do with the flow. You have to define the column names as variables. PowerApps doesn't accept variables with spaces. We can look into an underscore instead of space.

In the report we will include a manual. We already described the app in detail. We will add a section on how to add a database.

For the save data we will write a recommendation. It can be done with SharePoint. Right now, we don't have access to SharePoint.

Log in: We will research this a bit more. This problem has also to do with the save data option. Biniam would like a login per consultant.

Next meeting: Thursday 13th of December 2022 on Teams.

APPENDIX 3: GRI TEMPLATE

Universal GRI Template 2021

Authors: Benjamin Poel
Lydia de Groot
Robin Symmank

Commissioned by Sustain for Future, S4F

12 Oct. 22

Version 1.0

Table of Contents

Introduction to the Template

With the following template, companies can give a precise report on the Universal GRI standards 2021. This template consists only of the Universal 102 and 103 standards as most of the required sector standards are not available yet. The Topic standards are not included here. The full set of the GRI Standards together with the complete set of GRI 101 are available on the www.globalreporting.org website. This template is based on the information that is provided by this website. (GRI, 2022)

The template is made in the context of a European Project Semester at Novia University of applied sciences on behalf of the company 'To sustain for Future'. The goal of the project was to make a clear overview of the guidelines to help small to medium enterprises in the Jakobstadt-region to set up these kinds of sustainability reports.

The structure of the document is as follows: The guidelines are divided into different chapters. The following chapters are covered: GRI 101 Foundation, GRI 102 Standard disclosers, and GRI 103 Management approach.

The use of the template is straightforward. Every chapter has its own description on how to fill in certain points. Companies should include every bullet point that is applicable to their company.

GRI 101 Foundation

A summary of the GRI 101, 102 and 103, will be given before the template as it provides an overview of the whole procedure.

Purpose of the GRI Standards

Through their activities and business relationships, organizations can have an effect on the economy, environment, and people, and in turn make negative or positive contributions to sustainable development. Sustainable development refers to 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs .The objective of sustainability reporting using the GRI Sustainability Reporting Standards (GRI Standards) is to provide transparency on how an organization contributes or aims to contribute to sustainable development.

The GRI Standards enable an organization to publicly disclose its most significant impacts on the economy, environment, and people, including impacts on their human rights and how the organization manages these impacts. This enhances transparency on the organization's impacts and increases organizational accountability.

The Standards contain disclosures that allow an organization to report information about its impacts consistently and credibly. This enhances the global comparability and quality of reported information on these impacts, which supports information users in making informed assessments and decisions about the organization's impacts and contribution to sustainable development.

Information reported using the GRI Standards can help users assess whether an organization meets the expectations set out in these instruments. It is important to note that the GRI Standards do not set allocations, thresholds, goals, targets, or any other benchmarks for good or poor performance.

Introduction of the GRI Standards 101

GRI 1: Foundation 2021 introduces the purpose and system of the GRI Sustainability Reporting Standards (GRI Standards) and explains key concepts for sustainability reporting. It also specifies the requirements and reporting principles that organizations must comply with to report in accordance with the GRI Standards. GRI 1 is the first Standard that organizations should consult to understand how to report using the GRI Standards.

Introduction of the GRI Standards 102

GRI 2: General Disclosures 2021 contains disclosures for organizations to provide information about their reporting practices; activities and workers; governance; strategy, policies, and practices; and stakeholder engagement. This information allows insight into the profile and scale of organizations and provides a context for understanding their impacts.

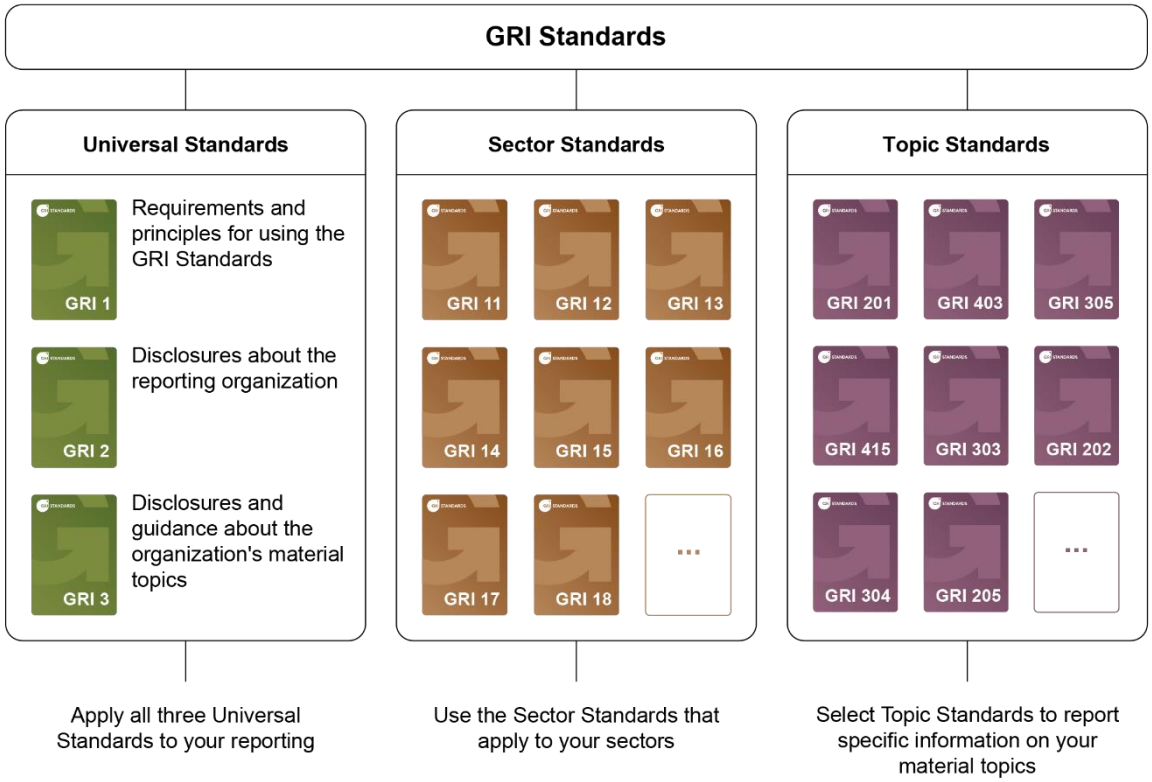
Introduction of the GRI standards 103

GRI 3: Material Topics 2021 provides step-by-step guidance for organizations on how to determine material topics. It also explains how the Sector Standards are used in this process. Material topics are topics that represent an organization's most significant impacts on the economy, environment, and people, including impacts on their human rights. GRI 3 also contains disclosures for organizations to report information about their process of determining material topics, their list of material topics, and how they manage each of their material topics.

System of GRI standards

The GRI Standards are structured as a system of interrelated standards that are organized into three series: GRI Universal Standards, GRI Sector Standards, and GRI Topic Standards (see Figure 1). The Universal Standards are used by all organizations when reporting in accordance with the GRI Standards. Organizations use the Sector Standards according to the sectors in which they operate, and the Topic Standards according to their list of material topics.

Figure 1



Using the GRI Standards

Requirements, guidance and defined terms

Requirements, guidance and defined terms. The following apply throughout the GRI Standards: An organization must comply with requirements to report in accordance with the GRI Standards.

Requirements may be accompanied by guidance. Guidance includes background information, explanations, and examples to help the organization better understand the requirements.

The organization is not required to comply with guidance. The Standards may also include recommendations. These are cases where a particular course of action is encouraged but not required. 6 GRI 1: Foundation 2021 The word 'should' indicates a recommendation, and the word 'can' indicates a possibility or option.

Effective date

All GRI Standards have an effective date. This is the date from when the information published by an organization must make use of a particular GRI Standard. All information published after the effective date of a Standard must make use of that Standard.

For example, GRI 1: Foundation 2021 has an effective date of 1 January 2023. This means that the organization must make use of GRI 1 for the information it publishes on or after 1 January 2023.

Effective dates are set keeping in mind that organizations may need time to adopt a new or revised Standard. Adoption of a Standard before its effective date is encouraged, as this allows the organization to report according to best practice

Reporting in accordance with the GRI Standards

Reporting in accordance with the GRI Standards enables an organization to provide a comprehensive picture of its most significant impacts on the economy, environment, and people, including impacts on their human rights, and how it manages these impacts.

This allows information users to make informed assessments and decisions about the organization's impacts and its contribution to sustainable development.

The organization must comply with all nine requirements in this section to report in accordance with the GRI Standards.

Overview of in accordance requirements:

Requirement 1:	Apply the reporting principles
Requirement 2:	Report the disclosures in GRI 2: General Disclosures 2021
Requirement 3:	Determine material topics
Requirement 4:	Report the disclosures in GRI 3: Material Topics 2021
Requirement 5:	Report disclosures from the GRI Topic Standards for each material topic[1]
Requirement 6:	Provide reasons for omission for disclosures and requirements that the organization can not comply with
Requirement 7:	Publish a GRI content index
Requirement 8:	Provide a statement of use
Requirement 9:	Notify GRI

[1] Notice that the topic specific standerds are not publiced yet.

GRI 102 Standard disclosures

Organizational profile

102-1 Report the name of the organization

102-2 Activities, brands, products , and services

- Report a description of the organization's activities
- Report the primary brands, products, and services, including an explanation of any products or services that are banned in certain markets.

102-3 Location of headquarters

- Report the location of the organization’s headquarters

102-4 Location of operation

- Report the number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report.

102-5 Ownership and legal form

- Report the nature of ownership and legal form.

102-6 Market served

- Report the markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries).

102-7 Scale of organization

Report the scale of the organization, including:

- Total number of employees
- Total number of operations
- Net sales (for private organizations) or net revenues (for public organizations)
- Total capitalization broken down in terms of debt and equity (for private sector and organizations
- Quantity of products or services provided

102-8 Information on employees and other workers

- Report the total number of employees by employment contract (permanent and temporary), by gender
- Report the total number of employees by employment contract (permanent and temporary), by region
- Report the total number of employees by employment type (full-time and part-time), by gender
- Report whether a significant portion of the organization's activities are performed by workers who are not employees, and a description of the nature and scale of work performed by workers who are not employees.
- Report any significant variations in employment numbers (such as seasonal variation in employment in tourism or agricultural industries)
- Report an explanation of how the data have been compiled, including any assumptions made

102-9 Supply chain

- Describe the organization's supply chain, including its main elements as they relate to the organization's activities, primary brands, products and services

102-10 Significant changes to the organization and its supply chain

Report any significant changes during the reporting period regarding the organization's Size, structure, ownership, or its supply chain, including:

- Changes in the location of, or changes in, operations, including facility openings, closings, and expansions
- Changes in the share capital structure and other capital formation, maintenance, and alteration operations (for private sector organizations)
- Changes in the location of suppliers, the structure of the supply chain, or in relationships with suppliers, including selection and termination

102-11 Precautionary principal or approach

- Report whether and how the precautionary approach or principle is addressed by organization

102-12 External initiatives

- List externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses

102-13 Membership of associations

List main memberships of associations (such as industry associations) and national or international advocacy organizations in which the organization:

• Holds a position on the governance body

• Participates in projects or committees

• Provides substantive funding beyond routine membership dues

• Views membership as strategic.

This refers primarily to memberships maintained at the organizational level

Strategy

102-14 Statement from senior decision-maker

- Provide a statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability.

102-15 Key impacts, risks and opportunities

- Provide a description of key impacts, risks and opportunities.

Ethnics and integrity

102-16 Values, principles, standards, and norms of behavior

- Describe the organization's values, principles, standards and norms of behaviour such as codes of conduct and codes of ethics.

102-17 Mechanisms for advice and concerns about ethics

Report the internal and external mechanisms for:

• seeking advice on ethical and lawful behaviour, and matters related to organizational integrity, such as helplines or advice lines.

• reporting concerns about unethical or unlawful behaviour, and matters related to organizational integrity, such as escalation through line management, whistleblowing mechanisms of hotlines.

Governance

102-18 Governance structure

- Report the governance structure of the organization, including committees of the highest governance body. Identify any committees responsible for decision-making on economic, environmental and social topics.

102-19 Delegating authority

- Report the process for delegating authority for economic, environmental and social topics from the highest governance body to the senior executives and other employees.

102-20 executive level responsibility for economic, environmental and social topics

- Report whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental and social topics, and whether the post holders report directly to the highest governance body.

102-21 Consulting stakeholders on economic, environmental, and social topics

- Report processes for consultation between stakeholders and the highest governance body on economic, environmental and social topics. If consultation is delegated, describe to whom and any feedback processes to the highest governance body

102-22 Composition of the highest governance body and its committees

Report the composition of the highest governance body and its committees by:

• Executive or non-executive

• Independence

• Tenure on the governance body

• Number of each individual's other significant positions and commitments, and the nature of the commitments

• Gender

• Membership of under-represented social groups

• Competencies relating to economic, environmental and social topics

• Stakeholder representation

102-23 Chair of the highest governance body

- Report whether the Chair of the highest governance body is also an executive officer (and, if so, his or her function within the organization's management and the reasons for this arrangement).

102-24 Nomination and selecting the highest governance body

Report the nomination and selection processes for the highest governance body and its committees, and the criteria used for nominating and selecting highest governance body members, including:

Whether and how diversity is considered

• Whether and how independence is considered

• Whether and how expertise and experience related to economic, environmental and social topics are considered

• Whether and how stakeholders (including shareholders) are involved

102-25 Conflict of interest

Report processes for the highest governance body to ensure conflicts of interest are avoided and managed. Report whether conflicts of interest are disclosed to stakeholders, including, as a minimum:

• Cross-board membership

• Cross-shareholding with suppliers and other stakeholders

• Existence of controlling shareholder

• Related party disclosures

102-26 Role of highest governance body in setting purpose, values, and strategy

- Report the highest governance body's and senior executives roles in the development, approval and updating of the organizations purpose, value or mission statements, strategies, policies and goals related to economic, environmental and social topics.

102-27 Collective knowledge of highest governance body

- Report the measures taken to develop and enhance the highest governance body's collective knowledge of economic, environmental and social topics.

102-28 Evaluating the highest governance body's performance

- Report the process for evaluation of the highest governance body's performance with respect to economic, environmental and social topics. Report whether such evaluation is independent or not, and its frequency. Report whether such evaluation is a self-assessment.
- Report actions taken in response to the highest governance body's performance with respect to economic, environmental and social topics, including as a minimum, changes in membership and organizational practices.

102-29 Identifying and managing economic, environmental, and social impacts

- Report the highest governance body's role in the identification and management of economic, environmental and social topics and their impacts, risks, and opportunities.

Include the highest governance body's role in the implementation of due diligence processes.

102-30 Effectiveness of risk management processes

- Report the highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental and social topics.

102-31 Review of economic, environmental, and social topics

- Report the frequency of the highest governance body's review of economic, environmental and social topics, and their impacts, risks, and opportunities.

102-32 Highest governance body's role in sustainability reporting

- Report the highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all material topics are covered.

102-33 Communicating critical concerns

- Report the process for communicating critical concerns to the highest governance body.

102-34 Nature and total number of critical concerns

- Report the nature and total number of critical concerns that were communicated to the highest governance body and the mechanism(s) used to address and resolve them.

102-35 Remuneration policies

- Report on the remuneration policies for the highest governance body and senior executives for the following types of remuneration:
    - Fixed pay and variable pay
        - Performance-based pay
        - Equity-based pay
        - Bonuses
        - Deferred or vested shares
    - Sign-on bonuses or recruitment incentive payments
    - Termination payments
    - Clawbacks
    - Retirement benefits, including the difference between benefit schemes and contribution rates for the highest governance body, senior executives, and all other employees
- Report how performance criteria in the remuneration policy relates to the highest governance body's and senior executives' economic, environmental and social topics.

102-36 Process for determining remuneration

- Report the process for determining remuneration. Report whether remuneration consultants are involved in determining remuneration and whether they are independent of management. Report any other relationships which the remuneration consultants have within the organization.

102-37 Stakeholders' involvement in remuneration

- Report how stakeholders' views are sought and taken into account regarding remuneration, including the results of votes on remuneration policies and proposals, if applicable.

102-38 Annual total compensation ratio

- Report the ratio of the total annual compensation for the organization's highest-paid individual in each country of significant operations to the median and annual total compensation for all employees (excluding the highest paid individual) in the same country.

102-39 Percentage increase in annual total compensation ratio

- Report the ratio of the percentage increase in total annual compensation for the organization's highest-paid individual in each country of significant operations to the median percentage increase in annual total compensation for all employees (excluding the highest paid individual) in the same country.

Stakeholder engagement

102-40 List of stakeholder groups

- Provide a list of stakeholder groups engaged by the organization.

102-41 Collective bargaining agreements

- Report the percentage of total employees covered by collective bargaining agreements.

102-42 Identifying and selecting stakeholders

- Report the basis for identification and selection of stakeholders with whom to engage.

102-43 Approach to stakeholder engagement

- Report the organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process.

102-44 Key topics and concerns raised

- Report any key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting. Report the stakeholder groups that raised each of the key topics and concerns.

Reporting Practice

102-45 entities included in the consolidated financial statements

- List all entities included in the organization's consolidated financial statements or equivalent documents
- Report whether any entity included in the organization's consolidated financial statements or equivalent documents is not covered by the report. The organization can report on this standard disclosure by referencing the information in publicly available consolidated financial statements or equivalent documents.

102-46 Defining report content and topic boundaries

- Explain the process for defining the report content and the topic Boundaries.
- Explain how the organization has implemented the Reporting Principles for defining report content.

102-47 List of material topics

- List all the material topics identified in the process for defining report content.

102-48 Restatement of information

- Report the effect of any restatements of information provided in previous reports, and the reasons for such restatements.

102-49 Changes in reporting

- Report significant changes from previous reporting periods in the list of material topics and topic Boundaries.

102-50 Reporting period

- Reporting period (such as fiscal or calendar year) for information provided.

102-51 Date of most recent report

- Date of most recent previous report (if any).

102-52 Reporting cycle

- Reporting cycle (such as annual, biannual).

102-53 Contact point for questions regarding the report

- Provide the contact point for questions regarding the report or its contents.

102-54 Claims of reporting in accordance with the GRI Standards

- Report the 'in accordance' option the organization has chosen.

102-55 GRI content index

- Report the GRI content index for the chosen option, which specifies each of the GRI Standards used and lists all disclosures included in the report.
- For each disclosure, the content index shall include:
    - the number of the disclosure (for disclosures covered by the GRI Standards);
    - the page number(s) or URL(s) where the information can be found, either within the report or in other published materials;
    - if applicable, and where permitted, the reason(s) for omission when a required disclosure cannot be made.

102-56 External insurance

- Report the organization's policy and current practice with regard to seeking external assurance for the report
- If the report has been externally assured:
    - Report the reference to the External Assurance Report, if the report has been externally assured. GRI recommends the use of external assurance but it is not a requirement to be 'in accordance' with the Guidelines
    - Report the relationship between the organization and the assurance providers
    - Report whether the highest governance body or senior executives are involved in seeking assurance for the organization's sustainability report

GRI103: Management Approach

103-1 Explanation of the material topic and its boundary

For each material topic, report the following information:

- An explanation of why the topic is material.
- The Boundary for the material topic, which includes a description of:
    - Where the impacts occur
    - The organization's involvement with the impacts
- Any specific limitation regarding the topic Boundary

103-2 The management approach and its components

For each material topic, report the following information:

• An explanation of how the organization manages the topic.

• A statement of the purpose of the management approach.

• Policies

• Commitments

• Goals and targets

• Responsibilities

• Grievance mechanisms

• Specific actions, such as processes, projects, programs and initiatives

For each material topic, report the following information:

• An explanation of how the organization evaluates the management approach, including:

• The mechanisms for evaluating the effectiveness of the management approach

• The results of the evaluation of the management approach

• Any related adjustments to the management approach

103-3 Evaluation of the management approach

For each material topic, report the following information:

• An explanation of how the organization evaluates the management approach, including:

• The mechanisms for evaluating the effectiveness of the management approach

• The results of the evaluation of the management approach

• Any related adjustments to the management approach

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Template for the EU non-financial reporting requirements

Authors: Benjamin Poel
Lydia de Groot
Robin Symmank

Commissioned by Sustain for Future, S4F

12 Oct. 22

Version 1.0

Table of Content

Introduction to the template

In this document, the EU-non financial reporting guidelines of 2017 (European Commission, 2017) and 2019 (European Commission, 2019) are described. The goal of the template is to make writing a sustainability report more accessible. The goal of the guidelines is to provide a high-quality, relevant, useful, and consistent report across all economic sectors. In this way, sustainable progress can be compared mutually.

The template is made in the context of a European Project Semester at Novia University of applied sciences on behalf of the company 'To sustain for Future'. The goal of the project was to make a clear overview of the guidelines to help small to medium enterprises in the Jakobstadt-region to set up these kinds of sustainability reports.

The structure of the document is as follows: The guidelines are divided into different chapters. The following chapters are covered: Business model, policy and due diligence, outcome, principal risks and their management, Key performance indicators, social and employee matters, respect for human rights, and some remaining topics. Each of these chapters is in its turn divided into paragraphs. The first paragraph will be general. Here can be described the general approach of the company towards the topic. The second paragraph describes the relationship between the topic and climate change. Lastly, one can deep dive into the topic of the chapter for further clarification. The last paragraph is optional.

The use of the template is straightforward. Every chapter has its own description of the content of the chapter. All key points should be included in the report.

Business model

A company's business model describes how it generates and preserves value through its products or services over the longer term. The business model provides context for the management report as a whole. A company should include the following points:

General

- their business environment
- their organisation and structure;
- the markets where they operate;
- their objectives and strategies; and
- main trends and factors that may affect their future development.

Examples:

- the main products it makes, and how they meet the needs of consumers/customers;
- how these products are made, and what makes its production approach competitive and sustainable;
- the characteristics of the market where it operates, and how it may evolve;

Since 2019, It is mandatory to include these point on climate change as well. The following points describe what is expected of a company:

Business model related to climate change

- Describe the impact of climate-related risks and opportunities on the company's business model, strategy and financial planning
- Describe the ways in which the company’s business model can impact the climate, both positively and negatively.
- Describe the resilience of the company’s business model and strategy, taking into consideration different climate-related
- scenarios over different time horizons, including at least a 2 °C or lower scenario and a greater than 2 °C scenario.

Further guidance

- Describe any changes in the company’s business model and strategy to address transition and physical risks and to take advantage of climate-related business opportunities.

- Describe the company's dependencies on natural capitals, such as water, land, ecosystems or biodiversity that are at risk because of climate change.
- Describe how any changes in the company's business model and strategy to address climate change mitigation and/or adaptation will change the company's human capital needs.
- Describe opportunities related to resource efficiency and cost savings, the adoption of low-emission energy sources, the development of new products and services, access to new markets, and building resilience along the value chain.
- Disclose how the company has selected scenarios.
- Describe how the company's activities contribute to climate change via GHG emissions, including from deforestation, forest degradation or land-use change.

Policies and due diligence

Companies should disclose material information that provides a fair view of their policies. They should consider disclosures on their approaches to key non-financial aspects, main objectives, and how they are planning to deliver on those objectives and implementing those plans.

A company should include the following parts:

General

- workplace's policies;
- health and safety information:
- contractual obligations negotiated with suppliers and sub-contractors;
- resources allocated to risk management, information, training, monitoring, auditing, cooperation with local authorities and social partners

Policies and Due Diligence related to climate change

- Describe any company policies related to climate, including any climate change mitigation or adaptation policy.
- Describe any climate-related targets the company has set as part of its policies, especially any GHG emissions targets,
- and how company targets relate to national and international targets and to the Paris Agreement in particular.
- Describe the board's oversight of climate-related risks and opportunities.
- Describe management's role in assessing and managing climate-related risks and opportunities and explain the rationale for the approach.

Further Guidance

- Describe the company's engagement with its value chain on climate-related issues, explaining how it engages with upstream and downstream partners to promote climate mitigation and/or adaptation.
- Explain how climate-related issues are integrated into the company's operational decision-making processes.
- Describe any public policy engagement on climate-related issues undertaken by the company, including membership of any relevant organisations or interest groups.
- Describe whether, how and at what levels (in particular board and management) the company has access to expertise on climate-related issues, either from its own internal capacity and/or from external sources.

- Describe any employee policies that are related to the climate, for example investments in skills necessary for the transition to low-carbon technologies, or measures to ensure employees can perform theirs tasks safely in a changing climate.
- Describe whether and how the company's remuneration policy takes account of climate-related performance, including performance against targets set.
- Disclose any energy-related targets the company has set as part of its policies
- Explain the reasoning behind the selection of any climate-related targets used by the company.
- In the case of land sector companies, describe any targets related to GHG "sinks" (GHG absorption)

Outcome

This chapter is linked to the previous chapter. This chapter should describe the outcome of those policies that are describe in chapter 4. This chapter may overlap with chapter 7 in which KPIs are also expected on emissions.

General

- actual carbon emissions, carbon intensity;
- use of hazardous chemicals or biocides;
- natural capital impacts and dependencies;
- comparison v targets, developments over time;
- mitigating effects of policies implemented;
- plans to reduce carbon emissions
- Describe the outcomes of the company's policy on climate change, including the performance of the company against the indicators used and targets set to manage climate-related risks and opportunities.
- Describe the development of GHG emissions against the targets set and the related risks over time.

Further Guidance

- Describe how the performance of the company with regard to climate influences its financial performance, where possible with reference to financial KPIs.

Principal risks and their management

Companies should disclose information on their principal risks and on how they are managed and mitigated. Those risks may relate to their operations, their products or services, their supply chain and business relationships, or to other aspects. This would include an appropriate perspective on short, medium and long-term principal risks. Companies are expected to explain how principal risks may affect their business model, operations, financial performance and the impact of their activities.

General

- malfunctioning products with possible effects on consumers' safety;
- policies implemented to address the issue;
- remediation measures addressing the needs of consumers already affected by those products.

Principal risks and their management related to climate change

- Describe the company's processes for identifying and assessing climate-related risks over the short, medium, and long term and disclose how the company defines short, medium, and long term
- Describe the principal climate-related risks the company has identified over the short, medium, and long term throughout the value chain, and any assumptions that have been made when identifying these risks. This description should include the principal risks resulting from any dependencies on natural capitals threatened by climate change, such as water, land, ecosystems or biodiversity.
- Describe processes for managing climate-related risks (if applicable how they make decisions to mitigate, transfer, accept, or control those risks), and how the company is managing the particular climate-related risks that it has identified.
- Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the company's overall risk management. An important aspect of this description is how the company determines the relative significance of climate-related risks in relation to other risks.

Further Guidance

- Describe any climate adaptation measures undertaken by the company as part of its risk management process.
- Give a detailed breakdown of principal climate-related risks by business activity.
- Give a detailed breakdown of principal climate-related risks by geographical location.
- Identify the locations that are critical to value chains, including operations, suppliers and markets.

- Describe how the company sets and applies limits to climate-related risks, including any triggers used to escalate issues to management attention.
- Describe the processes for prioritising climate-related risks, including any thresholds applied and indicate which risks across the value chain are considered most significant.
- Categorise the principal risks of climate change on the financial performance of the company according to whether they are transition risks (policy, legal, technological, market and reputational risks) or physical risks (acute and chronic risks).
- Disclose any risk mapping that includes climate-related issues.
- Provide definitions of risk terminology used or references to existing risk classification frameworks used.
- Describe the frequency of reviews and analyses with regard to risk identification and assessment.
- Describe the linkages between principal climate-related risks and financial KPIs.
- Disclose how scenarios and/or internal carbon pricing are used for risk management actions such as mitigation, transfer or adaptation.
- Disclose the financial impacts of extreme weather events, including possible indicators on days of business interruptions and associated costs, cost of repairs, fixed-asset impairment, value chain disruptions and lost revenues.
- Describe how the company's performance is affected by weather variability, in particular for companies sensitive to variability in temperature and precipitation

Key Performance Indicators

Non-financial key performance indicators that are relevant to the particular business. This chapter may overlap with chapter 5.

General

- A company may consider appropriate disclosures on metrics and targets used to assess and manage relevant environmental and climate-related matters.

Key performance indicators related to climate change

- GHG Emissions
    - direct GHG emissions;
    - indirect GHG emissions from the generation of acquired and consumed electricity, steam, heat, or cooling
    - all other indirect GHG emissions that occur in the value chain of the reporting company
    - GHG absolute emissions target.

The GHG Emissions calculations should be verified by a third party.

Examples of the four different GHG Emissions:

KPI	Unit of Measure	Example	Rationale	Alignment with Other Reporting Frameworks	EU Policy Reference
Direct GHG emissions from sources owned or controlled by the company (Scope 1)	Metric tons CO_2e [23]	270 900 tCO_2e	This KPI ensures companies are accurately measuring their carbon footprints from direct emissions.	TCFD Metrics and Targets, CDP Climate Change Questionnaire, GRI 305, CDSB Framework, SASB, EMAS	EU emissions trading system (ETS) 2030 climate & energy framework

KPI	Unit of Measure	Example	Rationale	Alignment with Other Reporting Frameworks	EU Policy Reference
Indirect GHG emissions from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as "electricity") (Scope 2)	Metric tons CO_2e	632 400 tCO_2e	This KPI ensure companies are measuring emissions from purchased or acquired electricity, steam, heat, and cooling.	TCFD Metrics and Targets, CDP Climate Change Questionnaire, GRI 305, CDSB Framework, EMAS	2030 climate & energy framework

KPI	Unit of Measure	Example	Rationale	Alignment with Other Reporting Frameworks	EU Policy Reference
GHG absolute emissions target	Metric tons CO_2e achieved or % reduction, from base year	20 % reduction in absolute emissions, equivalent to a 1 500 000 tCO_2e reduction by 2025 from 2018 base year	Target setting provides direction and structure to environmental strategy. This KPI helps to understand companies' commitments to reducing emissions and whether the company has a goal towards which it is harmonising and focusing emissions-related efforts.	TCFD Metrics and Targets, CDP Climate Change Questionnaire, GRI 103-2 and 305, CDSB Framework, SASB, EMAS	2030 climate & energy framework

Other KPI's that a company should include regarding to climate change are:

- Total energy consumption and/or production from renewable and non-renewable sources in MWH
    - Fuels consumed as feedstock are not combusted for energy purposes and should not be included in calculations for this indicator.
    - Include a breakdown of the different sources of renewable energy. Renewable sources of energy are those that can be naturally replenished on a human timescale, such as wind,
    - solar, hydro, geothermal, biomass, etc. This definition excludes all fossil fuels (coal, oil, natural gas) and nuclear fuels. Waste energy should not be included if it is derived from fossil fuels
    - When disclosing non-renewable sources of energy, make a distinction between low carbon sources and other sources of non-renewable energy
- The percentage of the Energy efficiency target
    - Companies should describe progress against the energy targets set.
- Renewable energy consumption and/or production target.
    - Companies should describe progress against the energy targets set.
- Assets committed in regions likely to become more exposed to acute or chronic physical climate risks.
    - Companies are advised to disclose the sources or methodology they have used to identify regions more exposed to physical climate-related risks.
- Percent turnover in the reporting year from products or services associated with activities that meet the criteria for substantially contributing to mitigation of or adaptation to climate change as set out in the Regulation on the establishment of a framework to facilitate sustainable investment (EU taxonomy). **And / or** the Percent investment (CapEx) and/or expenditures (OpEx) in the reporting year for assets or processes associated with activities that meet the criteria for substantially contributing to mitigation of or adaptation to climate change as set out in the Regulation on the establishment of a framework to facilitate sustainable investment (EU taxonomy).
    - Companies should report on this indicator if and when the proposed Regulation on the establishment of a framework to facilitate sustainable investment (EU taxonomy) is approved. In assessing whether an activity substantially contributes to the two EU objectives of mitigation of or adaptation to climate change while not significantly

harming any other of the EU's environmental objectives, companies should take account of all relevant criteria and conditions set out in the Regulation.

- Climate-related Green Bond Ratio: Total amount of green bonds outstanding (at year-end) divided by (a 5-year rolling average of) total amount of bonds outstanding **and / or,** Climate-related Green Debt Ratio: Total amount of all green debt instruments outstanding (at year-end) divided by (a 5-year rolling average of) total amount of all debt outstanding.
    - The total amount of green bonds or green debt should only include bonds and debt instruments issued according to a potential EU Green Bond Standard if and when such a standard is approved, or according to any other broadly recognised green bond framework, such as the Green Bond Principles and the Green Loan Principles. Companies should specify the green bond framework applied.
    - For bond issuers that have issued bonds that are not listed instruments (e.g., as private placements), the breakdown of listed and unlisted should be disclosed.
    - Companies should also consider providing future targets related to these KPIs

Social and employee matters

- the implementation of fundamental conventions of the International Labour Organisation;
- diversity issues, such as gender diversity and equal treatment in employment and occupation (including age, gender, sexual orientation, religion, disability, ethnic origin and other relevant aspects);
- employment issues, including employee consultation and/or participation, employment and working conditions;
- trade union relationships, including respect of trade union rights;
- human capital management including management of restructuring, career management and employability, remuneration system, training
- health and safety at work
- consumer relations, including consumer satisfaction, accessibility, products with possible effects on consumers'
- health and safety;
- impacts on vulnerable consumers;
- responsible marketing and research; and
- community relations, including social and economic development of local communities.

Respect for human rights

- occurrences of severe impacts on human rights relating to its activities or decisions;
- the process for receiving and addressing complaints, and mitigating and providing remedies to human rights violations.
- operations and suppliers at significant risk of human rights violations;
- processes and measures for preventing trafficking in human beings for all forms of exploitation, forced or compulsory labour and child labour, precarious work, and unsafe working conditions, in particular as regards geographic areas at higher risk of exposure to abuse;
- how accessible their facilities, documents, and websites are to people with disabilities;
- respect for freedom of association;
- engagement with relevant stakeholders.
- Anti-corruption and bribery matters
- anti-corruption policies, procedures, and standards;
- criteria used in corruption-related risk assessments;
- internal control processes and resources allocated to preventing corruption and bribery;
- employees have received appropriate training;
- use of whistleblowing mechanisms;
- the number of pending or completed legal actions on anti-competitive behavior.

Others

Companies, where relevant and proportionate, are expected to disclose material information on supply chain matters that have significant implications for their development, performance, position, or impact. This would include information needed for a general understanding of a company's supply chain and of how relevant non-financial matters are considered in managing the supply chain.

Examples:

- Supply chain
- labor practices, including child labor and forced labor, precarious work, wages, unsafe working conditions (including building safety, protective equipment, and workers' health)
- trafficking in human beings and other human rights matters;
- greenhouse gas emissions and other types of water and environmental pollution;
- deforestation and other biodiversity-related risks;
- other specific KPIs

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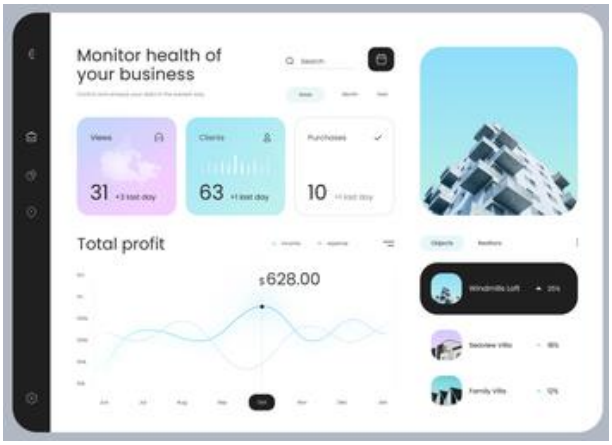
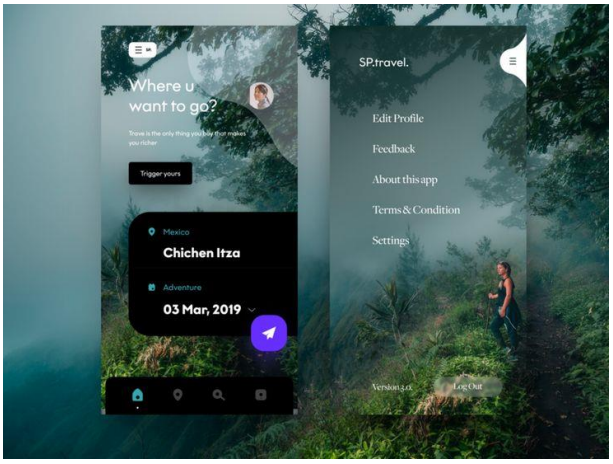
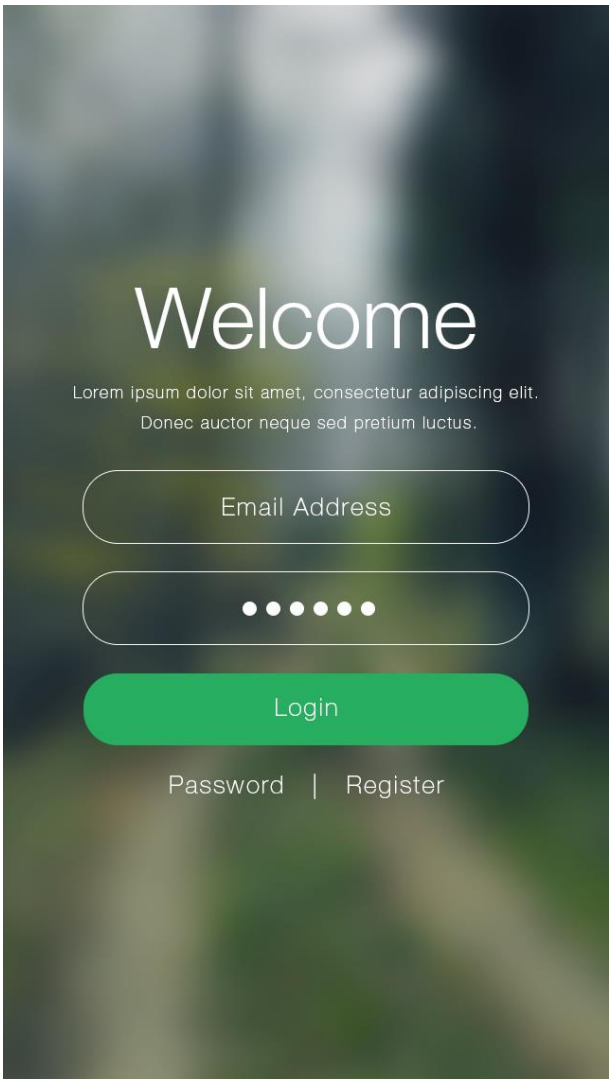
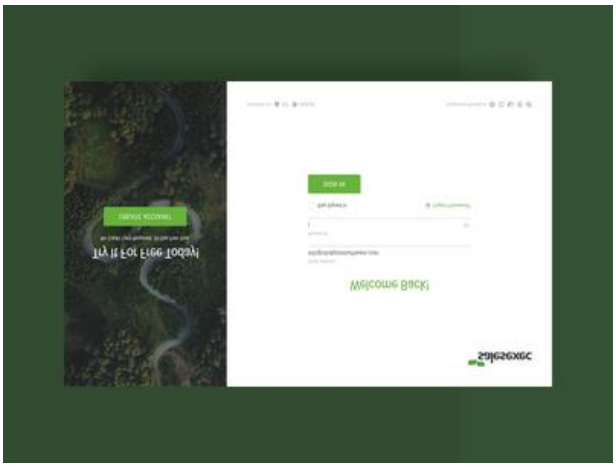


Dashboard as a home screen



Nice design. Contrast between green and black of the containers.





Nice design. Contrast between de green and the white containers.