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University



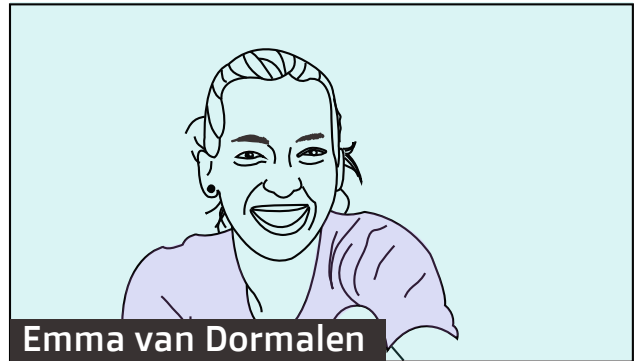
Ministry of Education
and Culture, Finland

Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

Carbon Neutral Generation



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1. Executive Summary

Finland's government has set ambitious goals to be carbon neutral by 2035 and carbon negative soon after that. During the Design for Government course, the challenge for us was to see how climate education could contribute to these goals.

We combined desktop research with a collaborative workshop and in depth interviews that we conducted with teachers, climate education experts, principles and other stakeholders. The research showed that there is a need for climate education to include more climate action at various levels, ranging from personal to global. To make this happen, one needs to understand that there is a variety of attitudes towards climate education between different students, as well as teachers. Since teachers in Finland are very autonomous they become the gatekeeper for climate education. As a result, the content of climate education varies between different classrooms.

In response to these insights we developed our proposal, Carbon Neutral Generation. It is a program owned by the government that provides a flexible structure for high-schools to help them deliver continuous, action-focused climate education to all students. The program is supported by an online platform. Here, the students do a yearly carbon footprint calculation, share climate projects done at school and continuously reflect on their climate actions as well as their values and emotions concerning sustainability.

Through the program, schools and teachers get more direction and support on how to provide action-focused climate education, while the government gets a better understanding of what happens in the classrooms. Students get to experience taking climate action in different ways and develop their values concerning sustainability, becoming climate conscious and active citizens that will help create a carbon neutral Finland.



“The Government will work to ensure that Finland is carbon neutral by 2035 & carbon negative soon after that.”

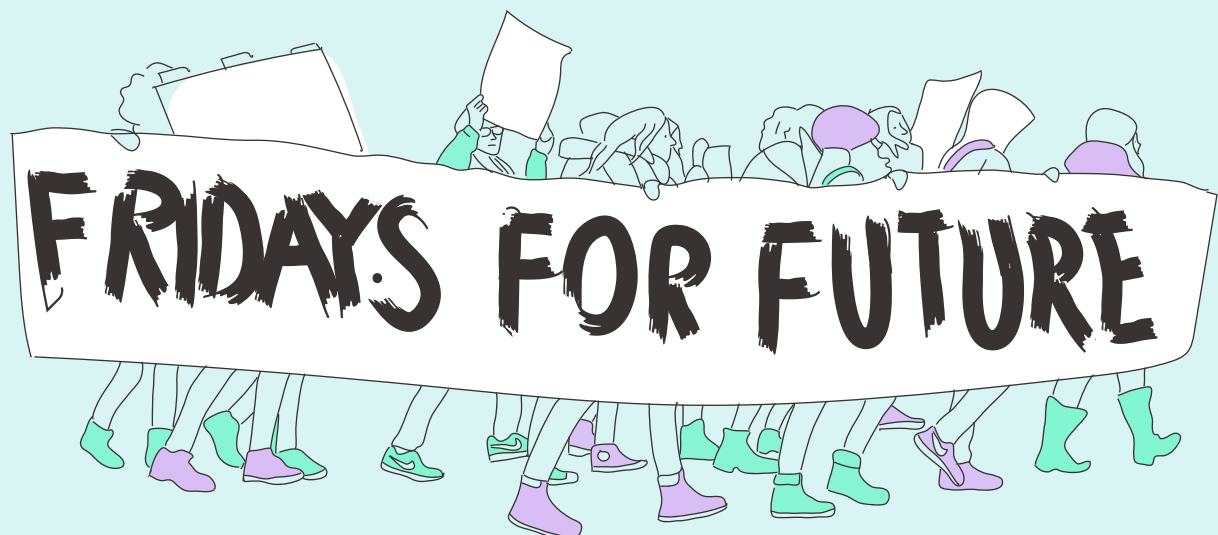
2. Introduction

“We are no longer able to avoid the climate crisis completely. We also have to achieve concrete results in adapting to the inevitable” said Finland’s President Sauli Niinistö at the United Nations General Assembly in 2019 [12]. Finland’s government has made a commitment to ensure that Finland is carbon neutral by 2035 and carbon negative soon after that [17]. These are ambitious goals, and in order to reach them, we need action.

Which is also what many young people think! In recent years, youth has become increasingly visible as climate activists, in particular through the Fridays For Futures movement.

“From primary schools to high schools, young people have walked out of school every Friday to pressure their respective governments into taking more assertive climate action ... School students have thereby boosted global climate activism considerably [9].”

Students, as well as the Finnish government are demanding to increase climate action. Education can be seen as a communication channel between the government and its younger citizens. By boosting climate education, the government and youth can better collaborate to take climate action towards a carbon neutral Finland.



The Brief

The Design for Government course develops design addressing the complex challenges of the government and public sector. It is a twelve-week project-based course, in which projects are proposed by governmental stakeholders [3] in the form of briefs. In this case those stakeholders are the Ministry of Environment, Ministry of Education and Culture, Finnish National Agency for Education and ORSI research project/consortium.

The brief 'Boosting Climate Education' describes the project as *"addressing a potential gap between governmental climate education aims and student experience within everyday learning environments and activities"* [4]. It offers a variety of opportunity areas, including

spreading climate education to the majority of the schools and classrooms (instead of only a minority of highly-active teachers), increasing focus on processing emotions and encouragement of active citizenship, as well as dealing with varying attitudes of students (including students with strong negative attitudes, climate anxiety or eagerness to learn). It is a very open brief with numerous possible outcomes and throughout the project we were free to find our own direction within this brief.

Our Focus

Climate change is a topic that concerns everyone, and to meet the carbon neutrality goals we need collective change. In order to reach a wide audience of young citizens, this project will focus on the school environment, rather than extra-curricular initiatives.

From the start of the project our team has been interested in active citizenship and climate action. Since the teenage years are a time in which young citizens are actively shaping their identities and become increasingly independent actors in society, we decided to focus on high-school and vocational school students and help them make a change.



3. Research

Methods

Our research was kick-started through a collaborative workshop in the first week. Together with the 2 other groups working on the same brief, we organised a workshop with 6 different climate education actors. It became apparent that not everyone had the same understanding on what climate education is and people also had different visions on what it should be.

Through desktop research and in depth interviews we built up our knowledge on climate education. Interviews allowed us to get a better understanding of the different actors in the system: their activities, their perspectives, their relation to others.

We interviewed:

- 3 civil servants
(ministry of environment, OPH)
- 5 climate education researchers
- 2 educational change practitioners
- 2 principles
- 4 teachers
- 1 student

Since schools were closed during our project, it was difficult to find students to talk with. Since the students' perspectives are obviously very important to the topic of climate education, we discussed these with teachers. They interact with students every day and were able to give us insights into different attitudes towards climate change that they encountered in their classrooms, which enabled us to still get an understanding of the varying student's perspectives.

To expand our knowledge further, we did desktop research throughout the whole project. Where the interviews gave us a rich understanding of the experiences of different stakeholders, desktop research provided us with additional information that helped us fill in any gaps. Next to this, it enabled us to 'stand on the shoulders' of other researchers and practitioners by reading about existing research and initiatives in climate education.

Through our desktop research we reviewed:

- The structure of the Finnish education system
- Different organisations and the work they do
- The Finnish national curriculum
- Climate education literature and theories
- Existing material sources for climate education (both in Finland and abroad)
- Successful initiatives for climate action and other forms of societal change around the world
- Attitudes of youth towards climate action

Collaboration during COVID-19

After the first week in which we did the workshop, schools in Finland closed due to COVID-19 measures. This meant that both our participants and ourselves were forced to work from home. It was a confusing time for everyone and it had an effect on who we could engage with, and how.

Our primary research method became in-depth interviews through video calls. The interviews were efficiently organized in coordination with all the groups working on the brief. Sharing our research with others allowed us to maximize the information in a short amount of time and overcome obstacles arising from the exceptional pandemic situation.

4. Analysis

The aim for our research phase was to understand climate education from a systems perspective, as well as a human perspective. The tools for analysis that we used were the systems map and affinity diagram, which we elaborated on throughout the project as the research expanded.

Systems perspective & Systems map

From a systems perspective, we reviewed the structure of climate education. We learned what people and organisations are involved, what their roles and responsibilities are and how they relate to each other. Through creating a systems map, we could visually summarize all these systemic insights, enabling us to get an overview of the big picture.

As can be seen from the systems map, we learned that the Ministry of Environment and Ministry of Education collaborate with the Finnish National Agency for Education in setting the values for climate education in Finland. These are then communicated through the Finnish national curriculum. Other stakeholders, like researchers, school book writers and teachers are free to give feedback on the new curriculum before it becomes official. School books are based on the curriculum and there are NGOs providing specific climate education materials. Teachers are the

ones who bring it all together: they are in charge of interpreting the values of the curriculum, selecting information and activities and turning them into concrete lessons for their students. Teachers' decisions are influenced by their school and regional council, who set specific targets and allocate resources.

Human perspective & Affinity Diagram

From a human perspective we reviewed the nature of climate education. We learned why climate education does or does not matter to people. We learned people's motivations and frustrations, their hopes and their worries. The human perspective on climate education was analysed through creating an affinity diagram, a clustering of notes from our interviews that shows common themes among the many anecdotes.

We learned that there is a high level of trust in teachers in Finland and they are given a lot of autonomy to interpret the values of the curriculum. The way to teach climate education is not made very explicit in the curriculum and is a relatively new topic, which leads to every teacher taking a personal approach to climate education. To make climate education a success, there is a strong need for collaboration, both within the schools, as well as outside the school.

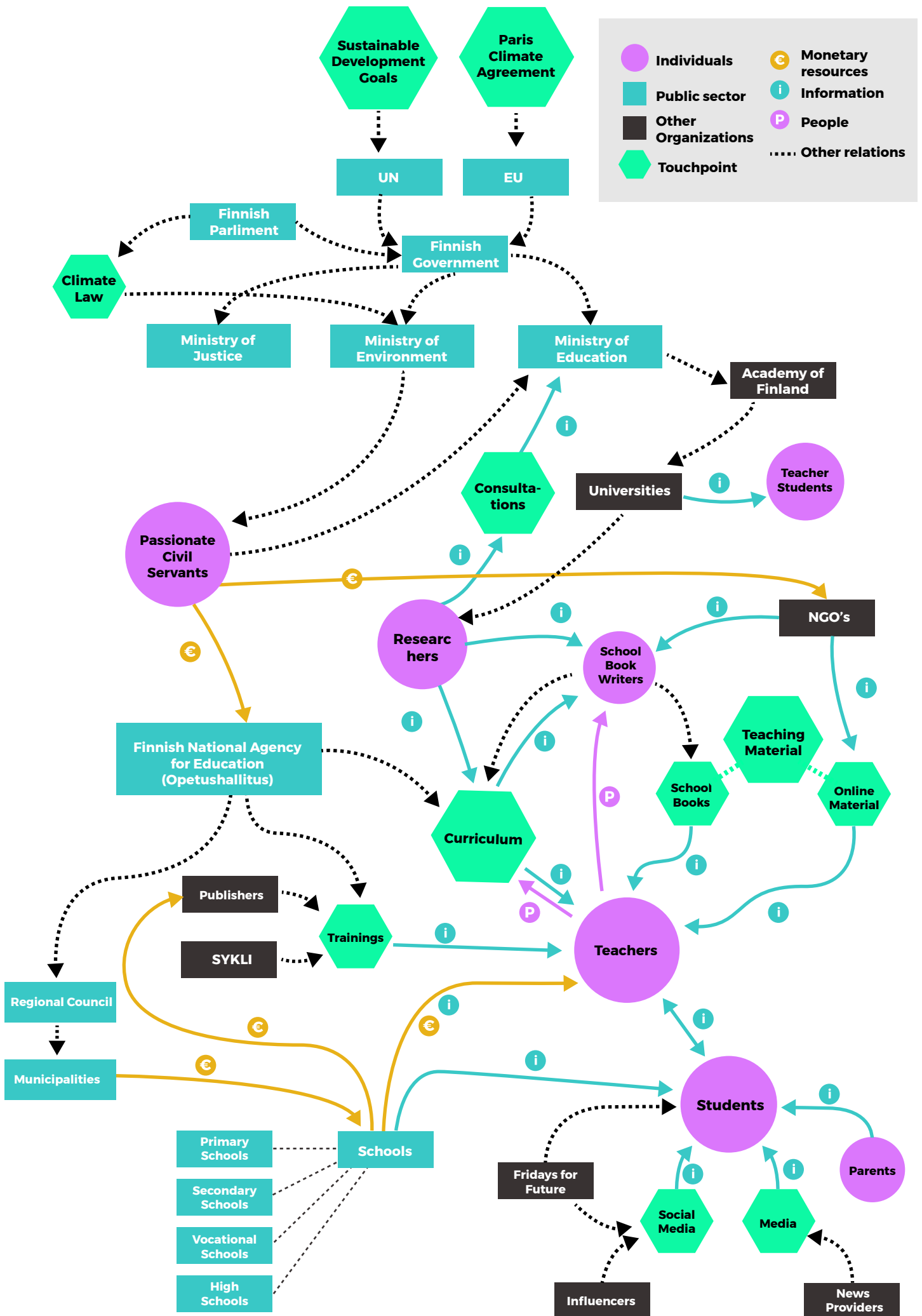


Figure 1: Systems map

5. Key Insights

Insight One: Climate Education Includes Climate Action

Our research provided us with rich insights into the climate education system in Finland, as well as the experiences of individual actors.

Climate education includes climate action. One of the first facts we learned was that the interpretation of climate education varies between different people.

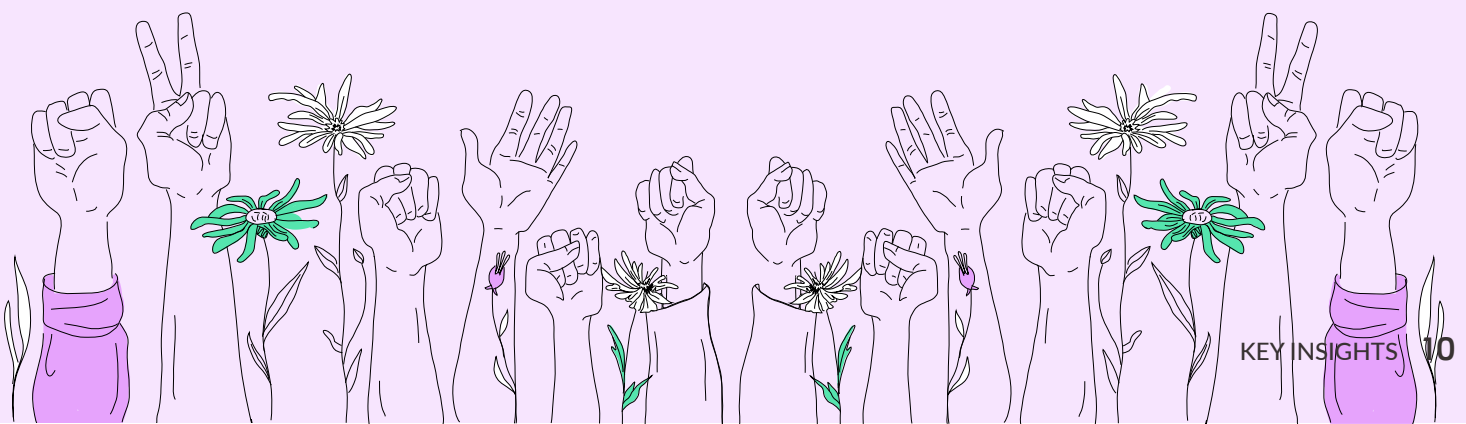
Front runners in climate education, see it as a comprehensive topic that requires different skills and should be covered by all subjects. However, less engaged people might have a more limited view on climate education, for example by focussing only on improving consumer behaviour.

In desktop research and our interviews, experts have emphasized the importance of coupling active citizenship with climate education.

This means schools have a new role when providing climate education, which is to teach students not only about climate change, but also about climate action.

“It is important to change school culture, it should be more towards environmental action. Not just talking, but doing.” - WWF senior officer

Climate Education = Climate Knowledge + Climate Action





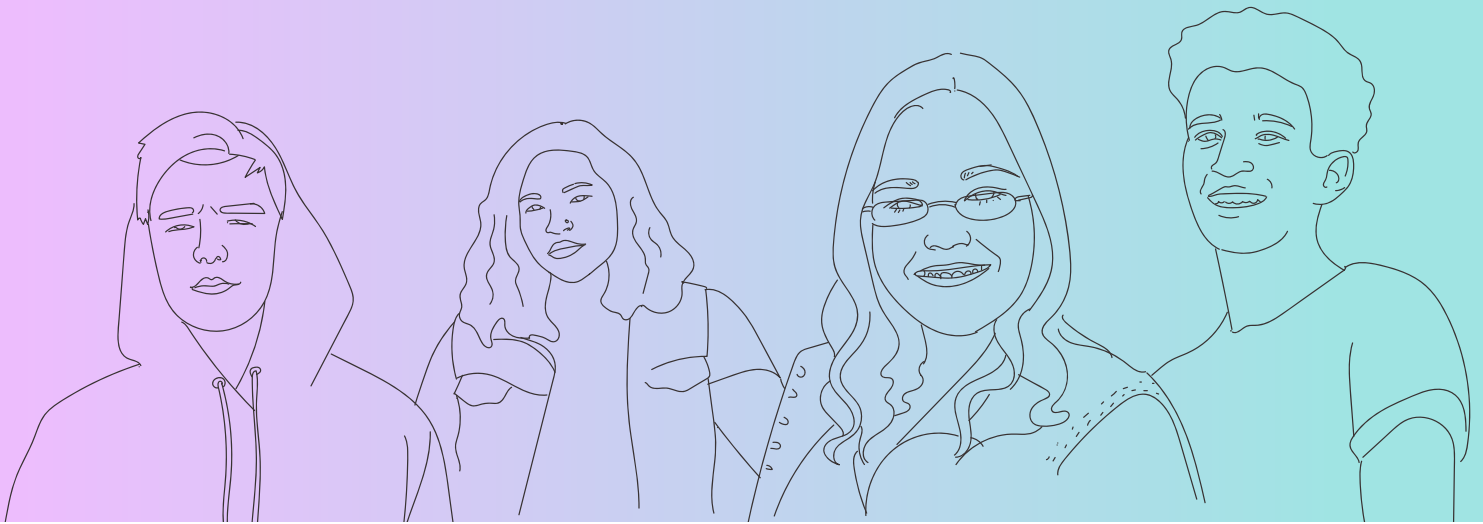
Insights Two: Climate Action Should Be Varied

When we talk about climate action we often think of climate strikes. Although climate strikes are of major importance, they are organised by only a limited part of the students and provide a limited view on what climate action means. There are many other ways in which to take climate action.

When talking with a civil servant, an example was given of students who would come to the ministry with plans and ideas, while the solutions would be at the level of the schools. In this case students were being active, but they were not addressing the right people.

Climate action can happen at many different levels and scales, ranging from personal to global. Students currently lack support to find different ways in which to be active citizens.

“students get a general idea of democracy, but no practical support on how to be active citizens” - civil servant



Insight Three: Different Levels of Student Motivation for Climate Action

Climate change is a topic that concerns everyone, and to meet the carbon neutrality goals we need collective change. However, each class is a mix of students with varying experiences and perspectives, ranging from very active to very passive. When speaking with teachers and students we learned that some of the students really want to save the planet and are taking action already, for example by doing climate friendly projects in school.

However, on the other side of the spectrum there are students who don't see the point of taking climate action or feel like there is no hope for the planet anyway. Focusing on possibilities and hope was seen as a way to deal with these negative attitudes.

“I have had students who felt like climate change didn't concern them. I think the real problem is that students are scared and need hope to deal with it.” - vocational school teacher

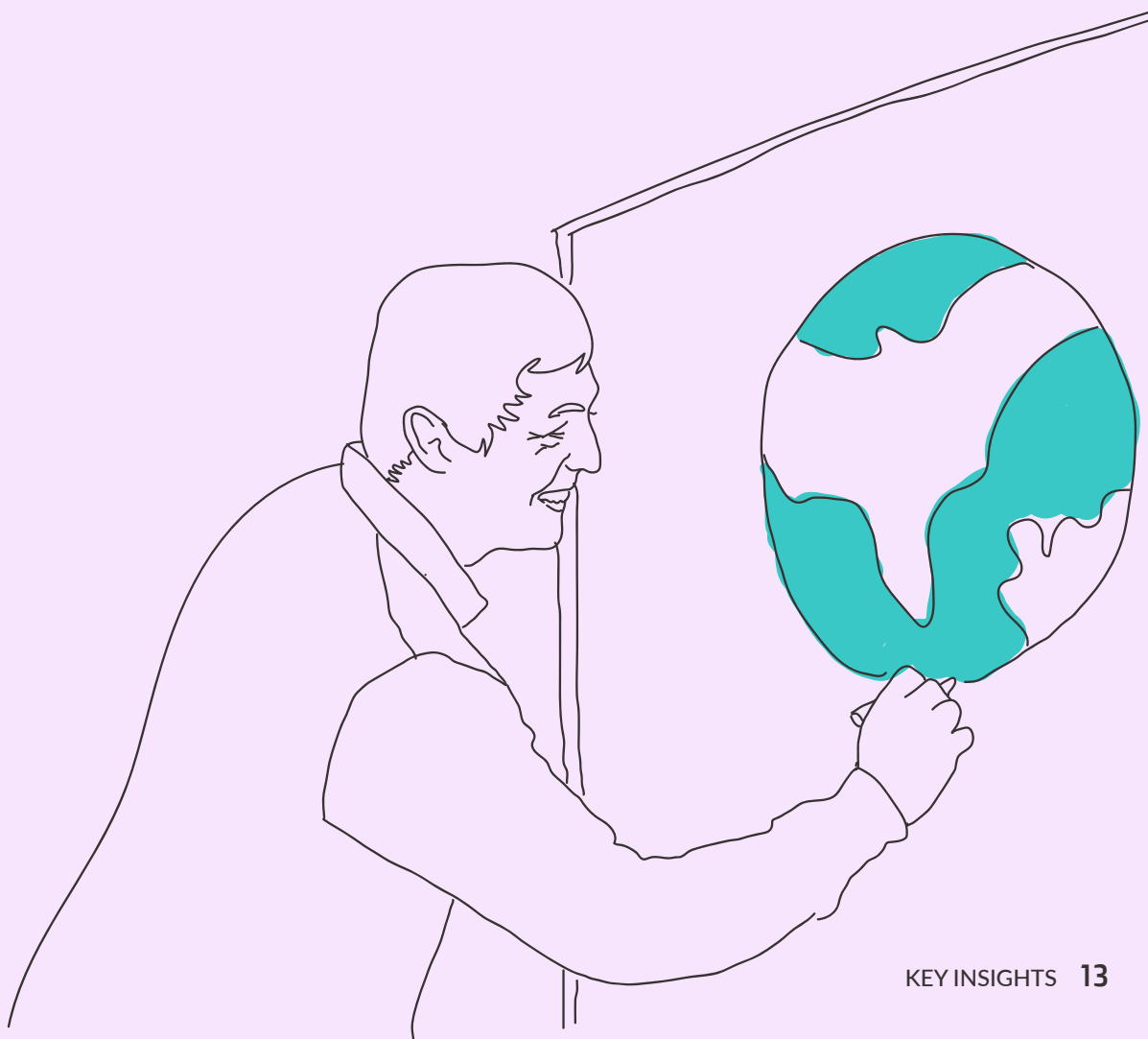
“I'm in second grade. I'm very interested in Climate Education. I went to Brussels last spring to take part in a European project. Teachers asked me to participate as I have been involved in every climate project.” - secondary school student.

Insight Four: Teacher Autonomy

Finland's educational system is rated to be one of the best in the world. *“Finland (...) reaches high levels of achievement by attracting highly qualified teachers with supportive working conditions, strong degrees of professional trust and an inspiring mission of inclusion and creativity” [6].*

In almost all interviews, teacher autonomy and trust was mentioned as a positive force for education in Finland. However, as the National Curriculum is also value based, the way climate education is taught is very dependent on the teachers. This means that across Finland, the content of climate education may be very different.

“Maybe the ministry should give a more clear message about what schools should do, however obligations aren’t very Finnish. The curriculum is the basis, but teachers have pedagogical freedom. I trust teachers will follow the curriculum.”
- principle secondary school



6. Ideation

Through our research on climate education we were able to develop insights and identify potential areas of opportunity. The defined opportunity statement was:

What educational structure could support young citizens to feel confident in their ability to drive sustainable changes to their environment, at a personal, local, or at national level?

This became our focus for the ideation phase. The ideation phase included multiple brainstorm sessions. The first ideation session using post-it's and a short time frame allowed for initial content to open up dialogue for further discussion and a base to build upon.

In later sessions ideas were further defined using drawings, benchmarking and storytelling as tools to further explain the concepts and experiences of the stakeholders involved. Through discussion, research and iterations we developed our final proposal.

Another activity that helped us further define the direction for the project was to set design drivers. The design drivers were developed simultaneously with the brainstorm sessions, they informed each other. The design drivers enabled us to set priorities and decide on the main principles for our proposal.

Design Drivers

1

Our project focuses on climate action in schools, at different levels.

2

We want to reach all students, not only the ones who are already active.

3

Our aim is to build student's motivation and confidence that they can in fact make a positive impact on their environment.

4

We want to maintain teachers autonomy and cater to many different teaching styles,

5

We want to maintain teachers autonomy and cater to many different teaching styles,

7. Proposal

Our proposal is called: Carbon Neutral Generation! It is a program that provides an approach to deliver continuous, action-focused climate education to all students. The program comprises three parts: carbon footprint calculator, climate project and reflection that will be supported by an online platform accessible by the students and the schools. We are focusing on high-schools as a starting point. However, if successful, it could be rolled out to other school levels.

In order to raise a carbon neutral generation, the programme focuses on 2 general learning goals.

Firstly, supporting the students in becoming climate-conscious citizens by providing key information on climate change. Secondly, inspiring the students to be climate active by taking actions to tackle climate change at personal and collective levels.

The three year programme is designed to provide direction to schools and teachers without compromising their freedom to apply personal teaching styles and methods. Schools and teachers will ultimately arrange the learning processes and activities to achieve these goals.



**Carbon
Footprint
Calculator**



Climate Project



Reflection

Related Work

For the proposal, we have been inspired by two existing climate education initiatives: The Bicycle Model on Climate Change Education (Aarnio- Linnanvuori et Al. 2020) [1] and UNESCO's Getting Climate Ready handbook (2016).[18] From the Finnish Bicycle model, we got some guidance on designing the principles needed to efficiently learn about climate education, as well as the student (user) centered perspective.

At a later stage, we have verified the structure of our proposal against the global UNESCO guidelines.

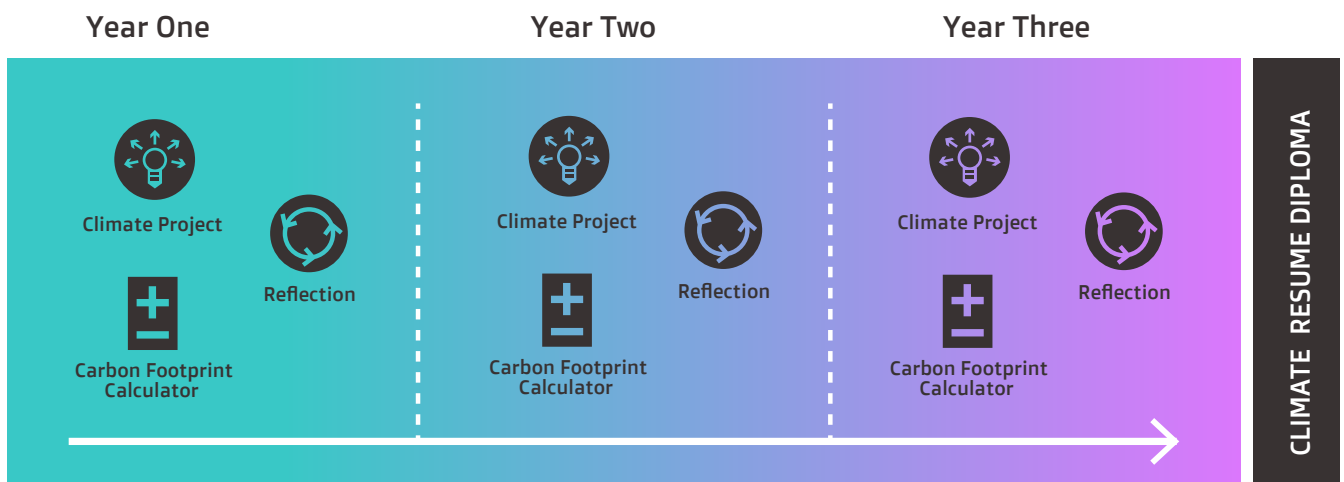
This step was fundamental for us to convalidate and finalize the three components of the Carbon Neutral Generation programme: carbon calculator, climate project and reflection. This structure of our proposal encompasses both the key aspects of the Bicycle Model as well as a similar repartition adopted in the UNESCO programme. The solid structure of the proposal will ultimately enable students to have the basis to become climate conscious and active citizens.

The Program

Every year, the students of the participating schools do a carbon footprint calculation, take part in climate projects at school and continuously reflect on their climate actions as well as their values and emotions concerning sustainability.

All the components of the programme have an impact that can be categorised as individual and collective. For example, for the carbon calculator, the impact will be mainly at an individual level, for the climate project the impact will cover the collective area and the reflection will touch upon both individual and collective levels.

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Increase in student's climate consciousness and experience with active citizenship



Carbon Footprint Calculator

"I didn't know my frequent flights contributed so much to the overall emissions."



Carbon Footprint Calculator



As a kickoff activity, the students will independently take a carbon footprint calculation test on the online platform of the programme.

Carbon calculators are online tools that calculate the approximate amount of CO2 emitted by the users, in this case, the students. *“Carbon footprint calculators are potential tools to show the order of magnitude of actions [...] and help motivated people to focus their efforts on high impact actions. Calculators can also include features, informational or social, aimed at encouraging users to take action”* [14].

For this part of the programme, it could be possible to collaborate with Sitra who have already developed a functional online calculator Lifestyle Test [15]. Additionally, Sitra is at the prototyping phase of the Susla Game [16], a fun tool that students could use to cut CO2 emission and discuss the impact of

everyday actions. Carbon calculators have been previously used as workshop tools with young adults: The City as a Service for Young Citizens [8] is a clear example where the calculators helped initiating discussion and reflection.

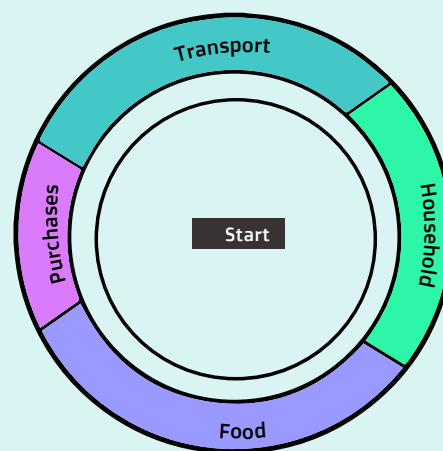
However, as the editors of Ecology, Environment & Conservation commented [5], it is important that future studies on calculators will benefit from practice approaches in order to avoid over emphasising the role of knowledge in promoting practices. For this reason, the Carbon Neutral Generation programme highlights the importance of pairing the knowledge provided by doing the carbon calculation with taking personal and collective actions in the form of Climate Projects.



Track your Progress -

How can I decrease my carbon footprint?

Take new Carbon Footprint test





Climate Project Map

*“Now I can finally see what
projects are happening and
where!”*





Climate Project Map

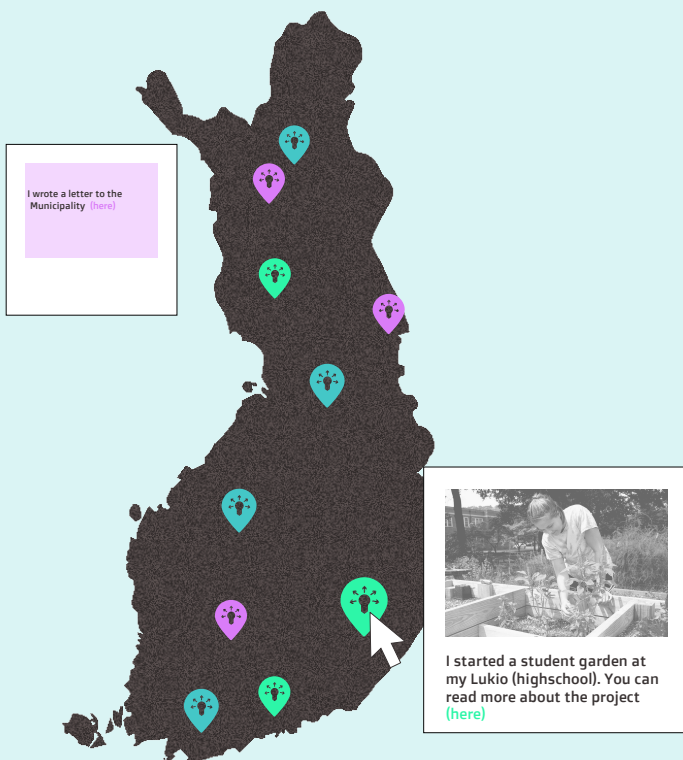


The school will support the students to initiate their own climate and sustainability related project or to take part in existing ones. All the projects, from small to big, will be registered by the school on the same online platform, where it will be possible to view them on the map by the other users of the programme.

Additionally, the users will have the chance to apply some filters and define on what scale the project will have an impact, from school level to even global, and the area of impact, such as an industry or typology of activity (e.g. gardening, food, energy, etc.).

One of the key insights that arose from the research phase of the project is that there are already numerous initiatives taking place across the country, but it can be difficult to find them.

Designing a map may be an efficient solution to list the projects and localize them geographically.



Search by Categories

School



Regional



National



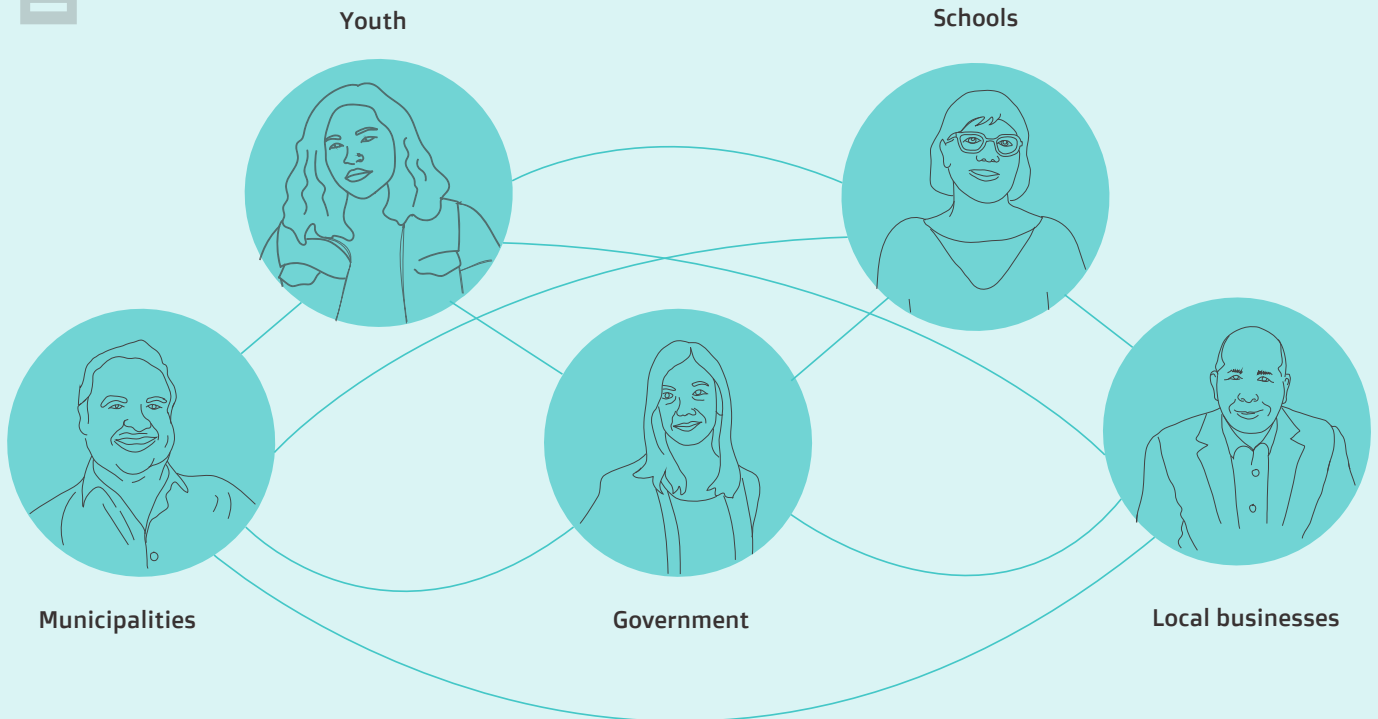
Search by Filter e.g. Food

Add your own project

+



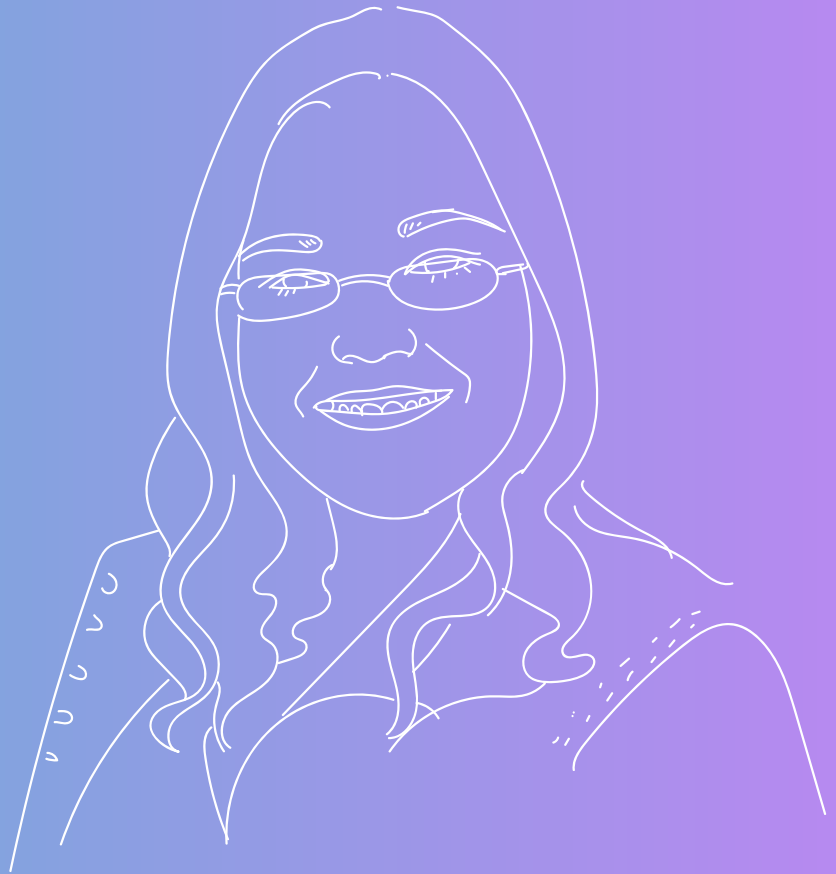
Climate Project Map



Inspiring Collaboration

Furthermore, the projects will be an opportunity to bring together students and external stakeholders such as government institutions and local businesses.

This connection will enable the students to understand the implication of the emissions in external contexts other than the schools.



Reflection

“Sometimes I can feel overwhelmed by Climate Change but it helps when I cant talk about it.”



Reflection



The third component of the programme is about reflecting on both personal and community actions. The reflection will be carried out in two complementary methods: individually and collectively.

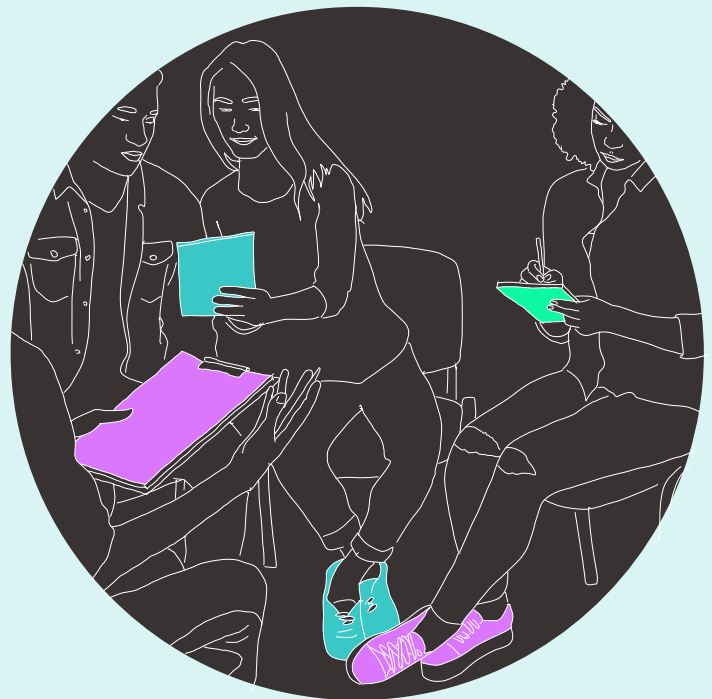
On the same online platform, the students will individually write or draw their reflections about their experience. In addition, at a group level in class, the teachers and the peer students will create a safe environment to express emotions and concerns.

This component of the programme is key to address the rising issue of climate anxiety among teens [11]. Negation and denial are some of the defense mechanisms that people suffering from climate anxiety may experience. Guided personal self-reflection is a powerful tool to share feelings without shame, build agency in confronting the climate future and working to cope with it, both individually and societally [7].

REFLECTION

Write or Draw your Reflection & Feedback here:

Individual Reflection

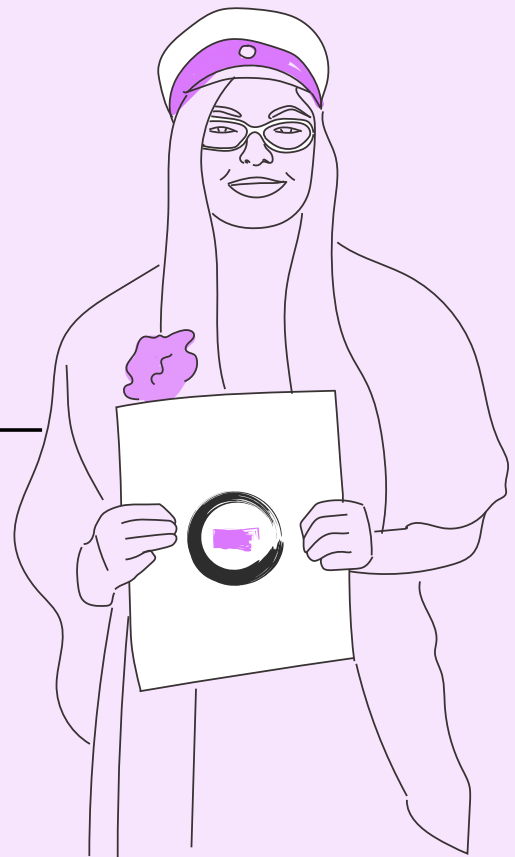
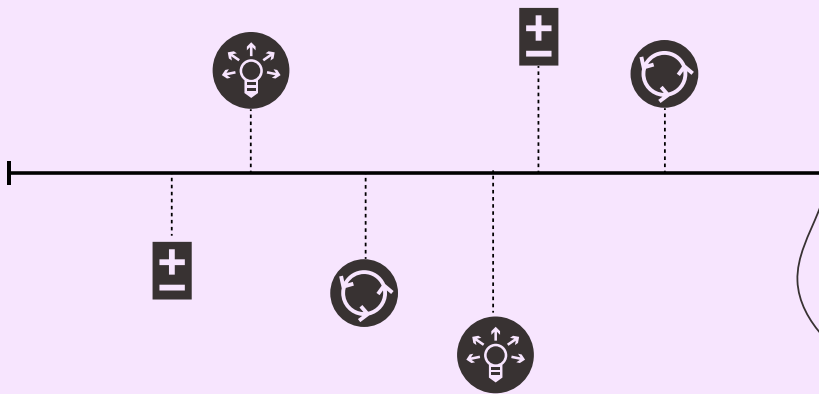


Group Reflection

Climate Resume

An important feature of the online platform used to support the programme is that the students will be able to see an overview of the climate action they have taken so far and their progress. The possibility to see the achievements throughout the years will motivate students about the value of their actions and gain a rewarding feeling for the positive impact they have accomplished.

At the end of the three year programme, when the students will be graduating from school, they will also receive the Climate Resume certificate! They are now climate conscious young adults, ready to continue bringing change in their future careers and build a “cooler” world!



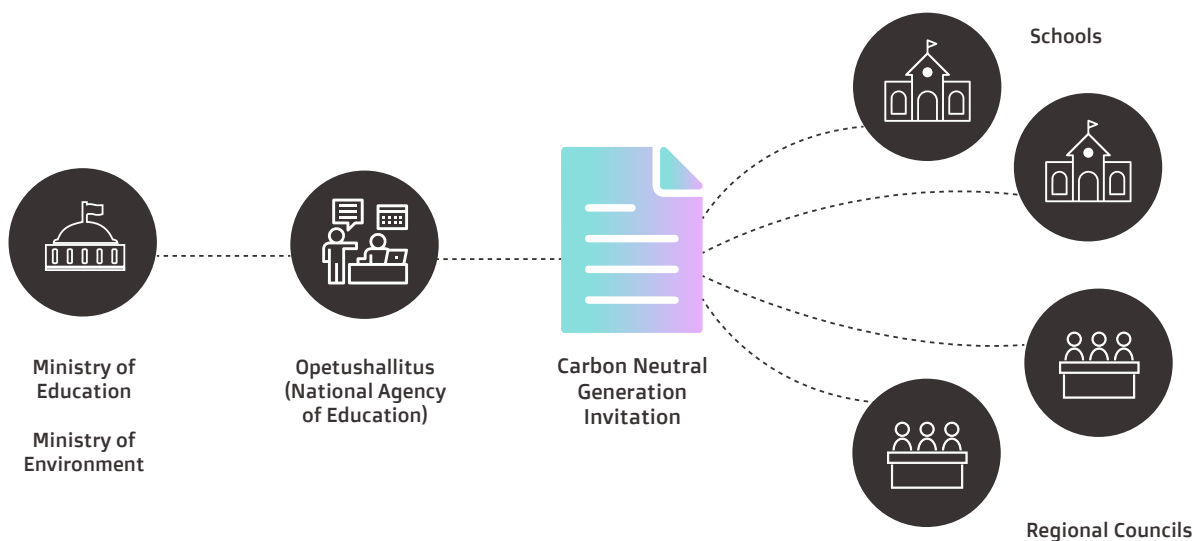
Information Flow and Stakeholder Interaction

We propose that the Ministry of Education and Culture and the Ministry of Environment will own the programme. The National Agency for Education, supported by the ministries, will be the official service provider and will deliver the Carbon Neutral Generation Invitation to the Regional Councils and the schools across the country.

The reasoning for the programme to be owned and provided by the aforementioned public sector institutions is based on the fact that the programme will assume a more official tone and will differentiate itself from already existing private initiatives that lack institutional legitimacy.

Concerning the format for the invitation, we propose to use the existing communication channels of the National Agency for Education for reaching Councils and schools. In the invitation, the Ministries and the National Agency for Education encourage councils and schools to join them in the journey towards raising a carbon neutral generation.

In the school, the principal and the teachers will organise their teaching to implement the programme. The schools are not compelled to take part in the programme, however it is expected that the participating schools will make sure that all the students will participate throughout the three years of high-school.



Implementation Strategy

This proposal has a long-term strategy and targets systemic change. The implementation strategy that we suggest has similarities to that of KiVa, the award-winning Anti-Bullying Programme, also developed under the Ministry of Education and Culture of Finland in 2009 [2].

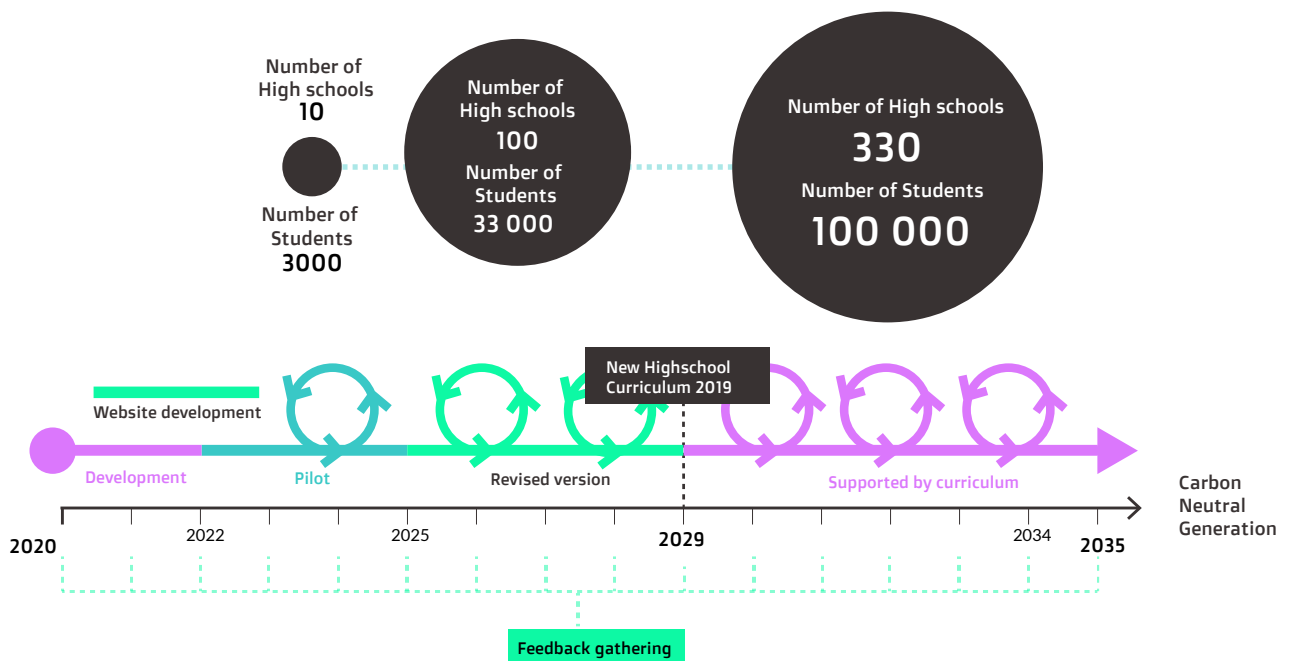
There are multiple similarities between the Carbon Neutral Generation Programme and KiVa, from teaching ethical values like the respect of others and the planet to building awareness and responsibility amongst students and influencing general norms [13].

Considering the high level of correlation of the programmes, as well as the incredible national and international success of KiVa, we have designed the implementation process in a similar manner, including a piloting and a subsequent roll-out at national level with constant feedback from both students and teaching staff. In more detail, the proposal will be initiated in 2020 with the development phase that we estimate to last for two years.

From 2022, the programme will be launched as a pilot, encouraging schools to participate and to provide feedback throughout the whole phase. Also after the pilot, the programme will be continuously reviewed according to the feedback from the users. In 2029, as part of the new curriculum for high schools, it could be possible to make the curriculum goals on climate education even more explicit, by mentioning the three key components of the program: awareness, taking action and reflection. In this way, the higher education system should be on track with the national goal to make Finland carbon neutral by 2035!

On the same timeline, it is also possible to see the estimated number of students [10] that the project will be able to reach. During the piloting phase, we expect a limited number of schools to take part in it. This will allow us to get in-depth feedback to improve the programme.

The new curriculum will play a crucial role in the diffusion of the programme and we expect the majority of the schools to join in.



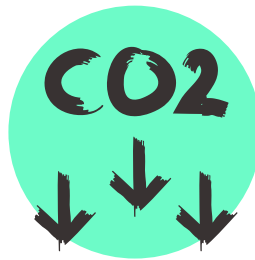
Metrics

Through these metrics, it will be possible to track how the program is developing, and make changes accordingly.



Education

Looking into the student's level of awareness and motivation to take climate action



Environmental

Looking into the amount of Co2 saved through individual actions and collective projects.



Program

Looking into the number of students enrolled in the program and number of projects.

The Benefits

In terms of benefits, all the stakeholders involved in the project will benefit from it in different ways:



Students get support to handle their emotions. They are able to understand different ways to be active. They get practical experience of climate-actions and begin to see climate as an essential part of their life



Teachers get a supporting programme that makes their teaching job easier and boosts their confidence. They are able to follow the students' progress on the online platform and the program is aligned with the curriculum goals. They also get support for actionable steps to teach.



The government gets action that takes Finland towards their goal of carbon neutrality, which is the ultimate goal of the project brief. They are able to get insight about youth's attitudes towards and impact on climate change and become one of the leading countries in climate education world-wide.

8. Conclusion

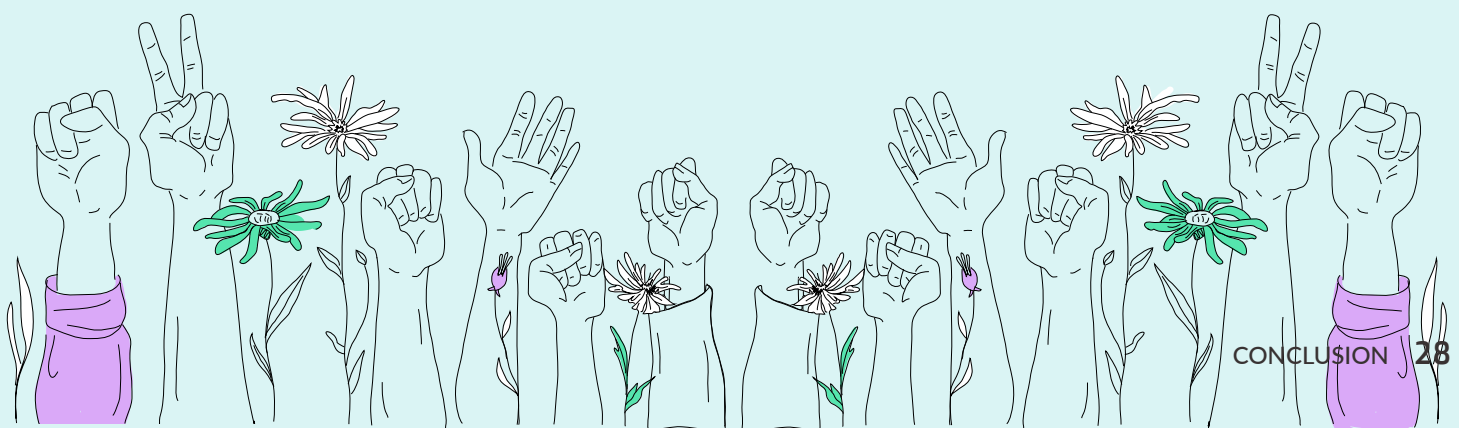
Schools have a new role when providing climate education, which is to teach students not only about climate change, but also about climate action. Throughout our research we have identified that students currently lack support to find various ways in which to be active citizens.

The way climate education is taught is very dependent on the teachers. This means that across Finland, the content of climate education may be very different. Students' attitudes vary, ranging from very active to very passive. Focusing on possibilities and hope was seen as a way to deal with these negative attitudes.

Carbon Neutral Generation is a program owned by the Government that provides a flexible structure for high-schools to help them deliver continuous, action focused climate education to all students. The program is supported by an online platform where students do a yearly carbon footprint calculation, share climate projects done at school and continuously reflect on their climate actions as well as their values and emotions concerning sustainability.

The proposal has a long-term strategy and targets systemic change. To make the Carbon Neutral Generation program a success in the long term, it requires continuous review: keeping track of students' level of awareness and motivation, amounts of CO₂ saved and number of students enrolled in the programme. Development of the program includes a piloting phase and a subsequent roll-out at national level with constant feedback from both students and teaching staff.

Through the program, schools and teachers get more direction and support on how to provide action-focused climate education, while the government gets a better understanding of what happens in the classrooms. Students get to experience taking climate action in different ways and develop their values concerning sustainability, becoming climate conscious and active citizens that will help create a carbon neutral Finland.



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10. Appendices

Appendix 1: Interviews

3 Civil Servants
(Ministry of Environment, OPH)

Counsellor of Education at
Finnish National Board of
Education

Counsellor of Education at
Finnish National Board of
Education

Ministry of Environment Civil
Servant

5 Climate Education
Researchers

WWF Senior Counsellor

University of Helsinki Education
Coordinator

University of Lapland PhD
Candidate

University of Helsinki Postdoc-
toral Researcher, Department of
Chemistry

University of Helsinki Lecturer
Department of Educational
Sciences

2 Educational Change
Practitioners

Project Specialist at Sykli

Educational Change
Practitioner

2 Principals

Secondary School Principal

High-school Principal

4 Teachers

Special Education Teacher

Vocational School Teacher

Elementary School Teacher

Art & Biology Substitute
Teacher

1 Student

High School Student
