

## Research

To understand the topic better, we spent time researching different aspects of the goal, looking into similar projects, potential target groups, and how applicable a potential speculative scenario would be in Malmö.

Too my surprise, we found a lot of information regarding sustainable urban planning in Malmö, and that the city has received international acclaim for its work on sustainable development. Malmö has set the goal to become Sweden's most climate-smart city by 2020, and by 2030, the city of Malmö's own organizations is to be climate neutral. New parts of the city such as Västra Hamnen and Hyllie are built to be self-sustained, where food waste is used to create biogas for busses, green roofs, installing solar panels, etc.

Inspired by work already happening in Malmö, we decided to focus on the energy aspect of sustainable cities and communities. One key indicator that we had encountered on the UN's sustainable goals website, that we found interesting, is that though cities just occupy 3 percent of the Earth's landmass, stand accountable for between 60 – 80 percent of the energy consumption, and at least 70 percent of carbon emissions produced worldwide.

Diving deeper into energy consumption, and more specifically household consumption, showed that the average household consumes about 10,909 kWh per year. In 2014, in Sweden, the average household consumed about 12,583 kWh per year, which put Sweden at rank 28<sup>th</sup> on the list of countries by energy consumption.

One aspect of energy consumption that regularly came up during research were "Standby losses" which points to the energy that appliances use when they are in standby mode. According to a study made in the EU, the average standby electricity consumption is about 305 kWh per household per year, which corresponds to 11 percent of the annual electricity consumption per year.

Discussing these findings withing the group we decided to "Raise awareness about the consequences of unsustainable energy usage, by informing people about household energy consumption".

After having found an angle to the problem that, to our knowledge, is interesting and relatively unexplored, we ideated on prototypes that could potentially trigger emotions and came up with the idea to have a plant that would represent nature. Inspired by the project Urban canaries, the wellbeing of the plant would depend on individual household energy consumption and showcase the impact that excessive household energy consumption has on the environment through carbon emissions. We divided the work so that Andrei would spend time working on the UI of the prototype and I would go on creating a digital sketch of the plant.

The initial idea was to have each of the leaves of the plant respond to the energy usage of appliances in specific rooms of the household. As portrayed above, the plant would lose its colour if the room corresponding to the leaf would exceed its energy usage above a set threshold following sustainable guidelines.

## Prototype

Due to the current circumstances regarding COVID-19 we had a discussion in the group on how to proceed with creating the prototype. Andrei and I thought about creating a physical prototype of the plant as we it would be the easiest way for us to create something that would look convincing, but with the workshop being inaccessible at this point, we concluded that creating a digital prototype was the way forward.

One important aspect of the prototype is that it must be realistic enough to be convincing and raise awareness. Drawing and illustrating the prototype would be one alternative, but might end up being too lo-fi, and based on prior experience, would not be convincing enough to create reactions of the sort needed in this project. Another alternative would be to use a physical plant as the prototype. Manipulating a real-life plant would probably be a better alternative out of the two, but due to the lack of malleability, and the lack of other materials to work with, this approach would risk creating a prototype looking “tacky”.

After having considered different approaches, we decided that creating a 3D model of a plant would be our best chance of having a prototype that would be convincing enough, but also malleable enough.

We had earlier discussed how the plant was to provide feedback to the user and had come up with the idea, that it should behave as if it was feeling well when the energy usage would be according to sustainable measurements and start to act as if it was dying when the energy consumption would exceed the threshold for sustainable consumption. Based on these circumstances, I created two more models of the plant in different stages of decaying - one with a yellowish tint and leaves that has started to hang, and one brownish with even lower hanging leaves.

Discussing the functionality of the app with Andrei, we had an idea to introduce a point system, so that when the user behaves according to sustainable measurements, points would be given to the user, that could be used to feed the plant. This would force the user to interact with the plant as if it was a regular plant, but we concluded that a point system would affect the emotional impact that the plant has when it mimics the effects of carbon emissions and would make it irrelevant, as all necessary information would be provided through the GUI to act in a sustainable manner. Instead, we decided to keep the functionality of the application down to taking a photo of the plant to get information about the current state of the plant, and furthermore receive information about how the current energy usage translates into carbon emissions.

## Concept and User testing

Now that both the plant and the GUI are done, the narrative have started to come together. The plant responds to the energy consumption of the household of which it's in and mimics an environment suffering due to carbon emissions. Through the application, the user can take a photo of the plant and receive information about why the plant is reacting in the way that it is. This will enable the user to change bad habits of consuming unsustainable amounts of energy and raise awareness about the consequences of the energy usage.

The concept wasn't obvious for the testers. There were difficulties understanding the broader picture that we wanted to portray. All participants understood the relationship between a photo being taken, the plants condition, and a connection to energy. One of the of the participants asked “What does

plants have to do with energy? Another participant said that the first thing that came to mind was “Green Energy!”.

The results we got from the user-testing points towards a couple of things that I do find to be successful. Firstly, we were afraid of the prototype of the plant not being hi-fi enough, but the user-testing showed that people had no problem with accepting the prototype as a product representing a plant. Another aspect that I also do count as a success is that the participants had no problem understanding that there is a connection between the plant and energy usage. Thirdly, the idea that taking a photo of a plant would result in information about energy usage did also come through in the prototype. As explained earlier, the prototype did raise questions such as questioning the relationship between the plant and energy, etc. What did not come through in the prototype is the fact that the plant is supposed to be connected and act according to pollution in the form of carbon emissions. This is something that we must take into consideration when creating our upcoming prototype. Another thought is that the outcomes from the user-testing would probably have looked different if we would have had one of the lesser healthier stages of the plant present in the prototype, instead of the green one.

### The Narrative

Based on the insights gathered during the first user-testing, consulting the literature and further discussions within the group we decided to work towards a narrative with parts of design fiction applied to it. By placing the product in a context where man's impact on nature is a universally accepted truth and not just a subject of discussion for politicians, we could work with visual materials that implied that the product was real and would make life easier for the user.

I started to position the plant into different contexts to make it seem like this is an actual product. By placing the plant in the context of different households, where different amounts of appliances such as computers and lights are on, and using the different stages of the plant, it seems a bit more like a functional product. To address the connection to carbon emissions, we did minor changes to the application, such as instead of telling the user about the amount of kWh used, we went with the amount of carbon emissions that different appliances are responsible for.

We also started to work on the website that we are going to use for the final prototype. The idea here is to market the plant and the application as an actual existing product. Inspired by companies such as Apple, and how they showcase their products on the web, we started to create sentences, in the spirit of advertisement, to make the product come alive EG. “Your plant is not a plant.”, and “Learn your lesson the fun way.”

We also created a space for “What People Say” where we came up with quotes from owners of the product such as “For the first time in my life I'm aware of the carbon footprint I leave behind. Plantify helped me get back in control.”

The link to the final prototype:

<https://andreibajeu.wixsite.com/plantify>

User-testing the concept did show that some of the changes we made after the first user-testing were positive. Placing the product into different contexts did help the users-testers to understand that this is a product that you place within your home. Adding the different texts explaining parts of the relationship between the GUI and the plant did provide information for the participants to understand

the correlation. We did receive great feedback on the visuals of the webpage and that the webpage looked professional. People said that the webpage was convincing and believable. The overall narrative became much clearer through the website.

Though the website did achieve portraying the product and surrounding narrative, I still found there to be room for improvement. People understood the connection between energy usage, pollution, and the plant, but the actual interactivity of the plant was presented a bit vague. I do think that having an animation / video prototype would have helped us conveying the message even better. As it was only me and Andrei working on the project, unfortunately, there was not enough time to animate a video on time.