Reflective Design Journal

We began by doing research and looking at sub-goals and specific objectives in order to gain a better understanding of how we could tackle the goal we decided to design for. We have, then narrowed down our insights and looked at how a speculative design approach could help Malmö become a more sustainable city.

One of the key insights that motivated us was taken from the UN's sustainable goals website:

https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html

As Malmö is a city that is in continuous development, we thought that a substantial energy consumption will also come in time. Thus, we decided to approach working with the UN's goal from this perspective. Looking at the statistics, we have seen that Sweden is doing a better job than other countries around Europe, but the carbon footprint is still big.

Carbon footprint

	CO2 emissions in 2014	Sweden per capita	Compared to Europe per capita
total	43.42 m t	4.48 t	7.31 t
› of which diesel + gasoline	32.35 m t	3.34 t	3.02 t
› of which natural gas	1.82 m t	0.19 t	1.77 t
› of which coal	8.01 m t	0.83 t	2.33 t
› other sources	1.25 m t	0.13 t	0.19 t

https://www.worlddata.info/europe/sweden/energy-consumption.php

We wanted to narrow down our research, but unfortunately, we couldn't find accurate data on energy consumption per household in Sweden, so we had to look at the broader picture of energy consumption / household in Europe.

https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180322-1

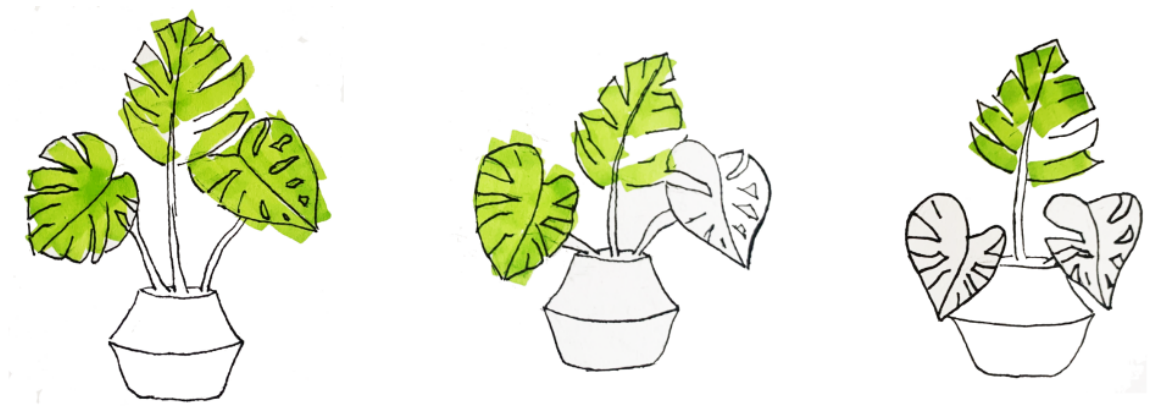
Another considerable element of energy usage that frequently came up, during our research, referred to standby losses, which stands for energy used by appliances while in standby. According to the International Energy Agency, by 2030, 15% of the overall electricity use of appliances in Europe will be due to standby functions.

Also, inspired from other speculative design approaches, such as Weather Wash, a modern laundry cleaning system, that is in direct relation with the weather, we decided to design a at a small scale, for people or each house; raising awareness in regards to energy consumption per household items.

Therefore, our objective was: **Informing people about household energy consumption by creating a provocative scenario where, in order to power electronics, people have to generate their own energy.**

Looking at another specific speculative design approach, we discovered a lot of similarities with what we wanted to do. For eg, we had the idea that people should do specific tasks/house chores, such as sweeping the floor with a special broom in order to recharge batteries or store energy, whereas the other project had the idea that the user must charge appliances through physical activities such as toothbrushing. Having this in mind, we feared that we would get stuck on an idea that has already been explored and decided to drop it and change our approach to: **Raise awareness about the consequences of unsustainable energy usage, by informing people about household energy consumption.**

After deciding on our final approach, we started ideating on potential items that could trigger strong emotions regarding to the topic we want to raise awareness about. Therefore, thinking of how nature is the one that gets affected primarily by the carbon footprint, we thought of mimicking it through nature itself – a plant. Ideally, the plant itself should be perceived as the Earth, and in this sense, inspired by **The Urban Canaries** – we thought of having a plant whose wellbeing depends on the carbon emissions of a house; this way portraying the unsustainable energy consumption consequences over the planet at a smaller scale.



First sketches of the plant

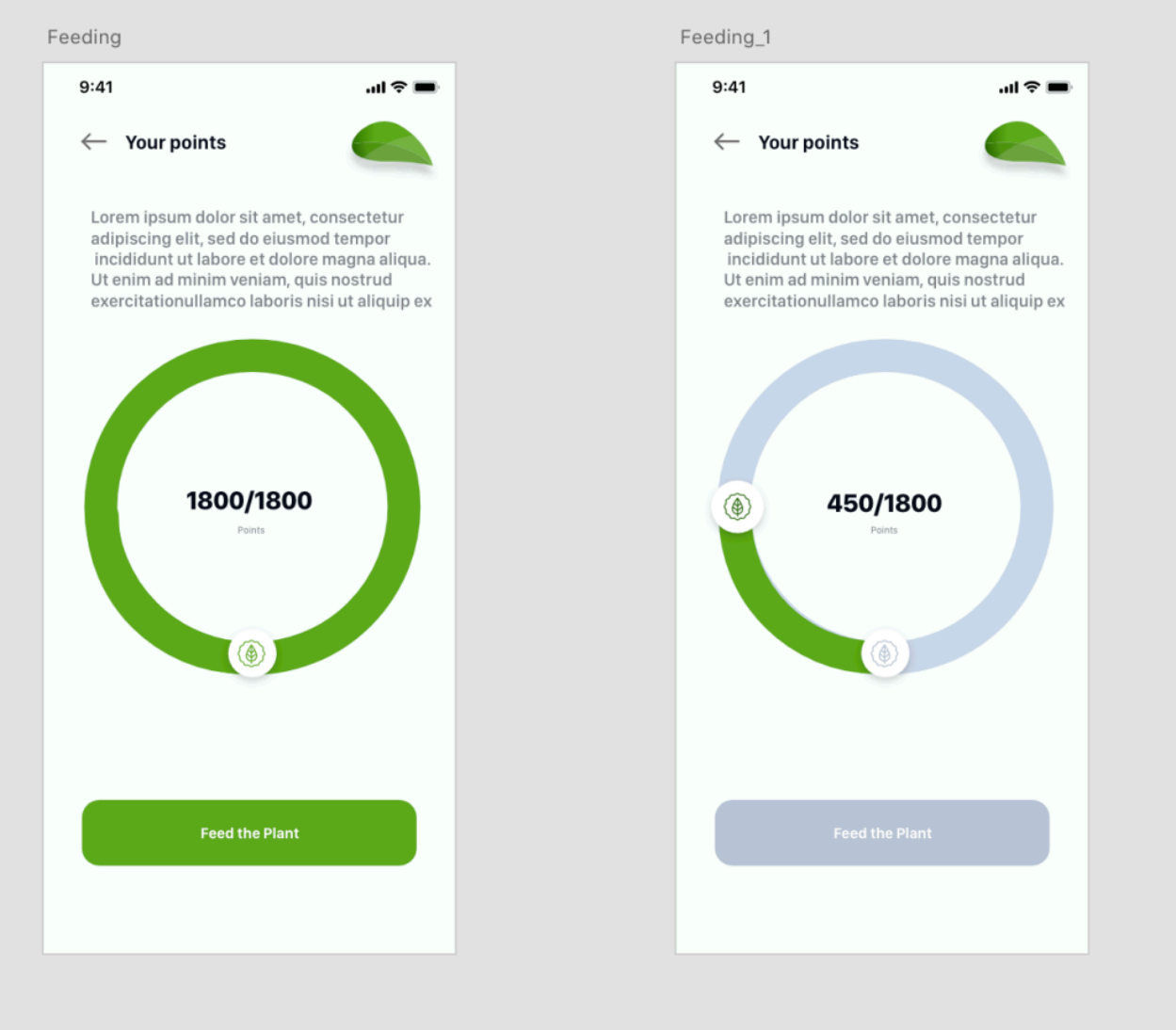
At first, our idea was to create a physical prototype of the plant, but due to some of the constraints – such as having the workshop unavailable – we decided to stick to digital prototypes only. On a second thought, this might turn out to be a better idea, since it would offer us the opportunity to manipulate the plant easier and place it in different contexts as a way of user testing the concept.

In order to be able to start designing the GUI, I have started making a list with possible functionalities that the app might have:

1. Feed/Water the plant
2. Check the plant's health
3. Get an overview of the energy consumption per household appliance
4. Create different routines, such as "Cooking" and having only the needed appliances on for that

The list seemed to get longer and the initial concept fuzzier. Because of this, me and my colleague started to look into and discuss these functionalities:

1. The idea of **feeding the plant**, based on a system of points earned by using less energy felt like a playful way of interacting with the plant, but on a second thought, it seemed like this would create a big hole in the concept. Having a precise number of points according to the energy consumption, and not letting the plant behave on its own would tell our story too straightforward, not letting any room for questioning. While discussing, with my group mate, we have realized that this would also affect the emotional value of the prototype (by offering users too much control over the plant's behavior); therefore, we decided to leave this aspect out.



Screen concept for the feeding system (taken out)

2. **Checking the plant's health.** This felt like the most relevant function that the app could have in this concept. We thought that the best way of making this available would be only by having the user take a photo of the plant /scan it with the phone. The reasoning behind this is so the users would be forced to

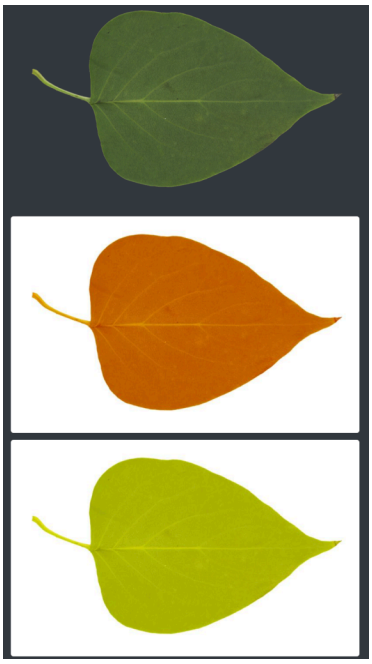
see the plant and its health condition directly, so that emotions could be triggered. By having the plant's health condition accessible on a screen without having to interact with it in any way, users might tend to neglect the plant itself and we would end up with having the app outshining the main prototype.

3. **Get an overview of the energy consumption per household appliance**. "How and how much can we show this without turning the app into a dashboard for checking energy consumption?" was the first thing that came through my mind when I first thought about this function. For this reason, we have decided to keep this aspect abstract, working with "units", without mentioning the name of the units used, in order to let the users reflect on the results.

4. **Creating Routines.** This idea was inspired by Google's Assistant Routines. We thought of having something similar, where people could create their own routines on the app and have running appliances on per routine. (i.e. when someone wants to cook, they can turn on cooking mode and have only appliances in the kitchen using electricity). We quickly dropped this idea down after discussing about how far from our concept we would risk ending up if we would give the mobile app this function.

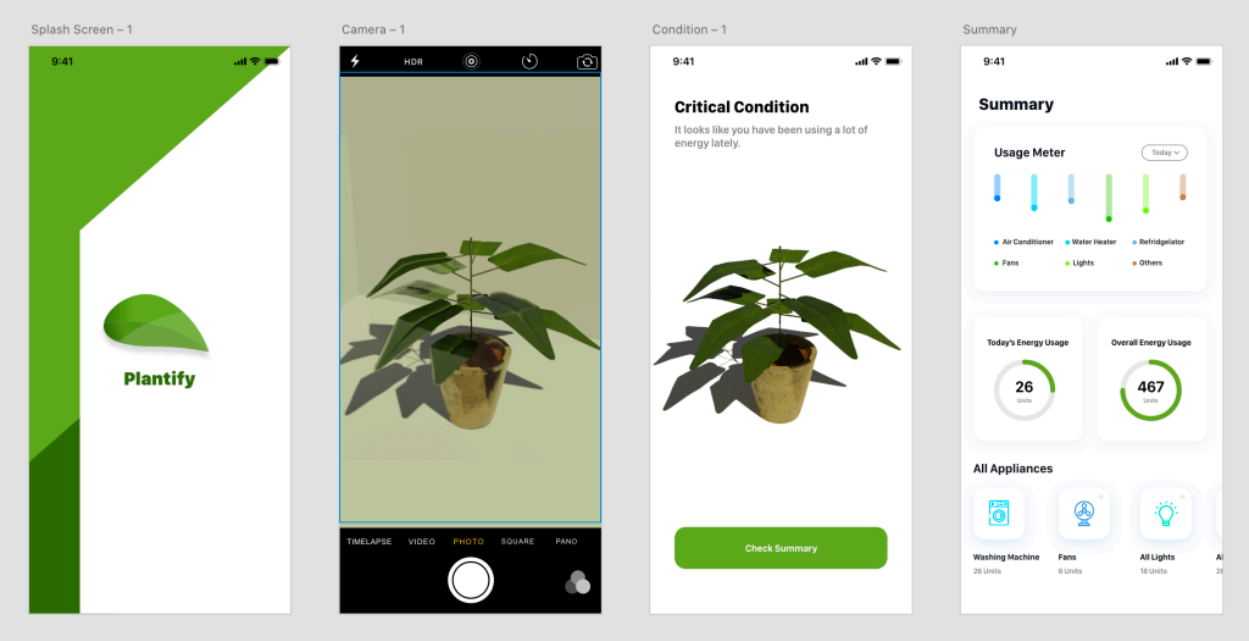
In parallel, me and my colleague have discussed how the plant would behave in relation to the app. The plant itself, would behave on its own, whereas the app would become an additional element where users could get a summary of energy usage from where they can draw the conclusion on what is affecting the plant's wellbeing.

For the creation of the plant, Christoffer made a 3D model, which we discussed it should be as realistic as possible. For this, we have decided on using leaf textures (green, yellow, brown) for each state of the plant:



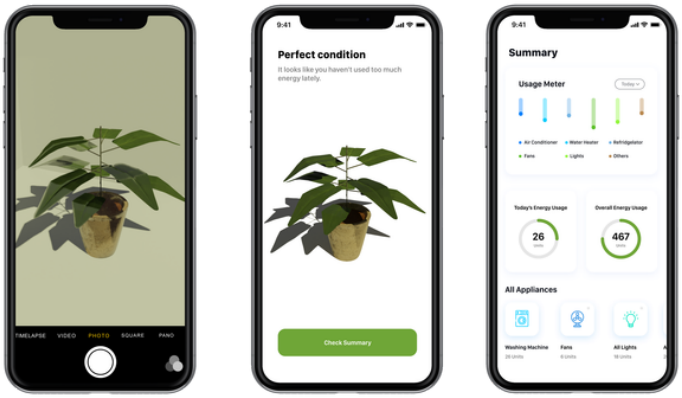
Textures used for the 3D model

In order to provoke an adequate level of emotions, in speculative design, a digital prototype should look convincing. After the model was ready, we have discussed placing it in a simple digital environment (corner of a room) and create a user flow that is going to be tested.



User flow: Splash screen -> Camera -> Condition -> Summary

As we finished building two of the digital prototypes; the mobile GUI and the 3D model of the plant, we could see our narrative in context and thought that it would be the perfect time to test it with other people. For this, we have placed the GUI in a more realistic mobile environment and approach the “think aloud” method of user testing.



The final narrative: **The plant** emulates nature by changing its health/state based on the carbon emissions produced by the unsustainable energy consumption in the house where it is placed. **The mobile app** is used to check the plant's behavior, as well as, where things went wrong (which appliance used most energy). Used together, the prototype should raise awareness about the consequences of too much energy consumption and promote changes in the users' unhealthy habits.

The user testing was conducted with 3 people in separate sessions. Main insights:

- All testers mentioned that the plant looks realistic. Placing it in a real environment, rather than a "digital room" could perhaps bring more depth into this insight.
- Participants could understand the relationship between taking a photo of the plant and getting results about its condition but had difficulties in understanding how this relates to getting a summary of the energy usage in the household. For this reason, we decided to test again the concept by placing the plant in a real home environment, where appliances running could be seen.
- The participants thought that the cards showing "Today's Energy Consumption" and "Overall Energy Consumption" were related to the energy used by the plant. To avoid confusion, we have decided to change these into showing "Today's Pollution" and "Overall Pollution" and test the concept again.
- One of the participants mentioned that the first thought when seeing the image was "Green Energy". Perhaps, this thought was provoked by seeing the plant green and healthy. For this reason, in future user testing, we have decided to show the plant in different stages and see if we get different results.

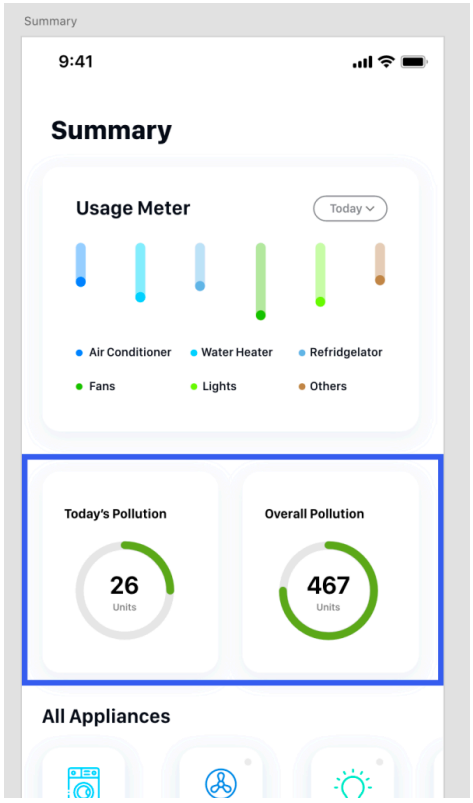
We are happy with the results we got in the first user testing session. It seemed like the concept was not perceived as desired, but we have got valuable insights that we can use to tweak the prototypes (including the upcoming website).

Making use of the insights we have got in the user testing; we have started to adapt the project so it would be perceived as desired. In order to raise discussion, a speculative project should be both real and surreal; so, finding a balance between those was our next goal. If the project seems too real, it might imply that we are offering a solution for a problem in the present; whereas, if the project is too far from reality, people might not accord it enough attention, therefore ending up without generating discussions.

Therefore, since the previous user test, we have made the following changes:

- we have placed the plant in different contexts, around different rooms with appliances and showing the plant in different states of health. We decided that this would showcase better the relationship between the plant and energy consumption, this way, making the users link these aspects out (all background images were taken from https://unsplash.com/)

- We have decided to change a part of what is shown in the summary provided by the app too. We thought that by showing the overall carbon footprint, rather than the overall energy used, people could make the connection between the energy used, the consequences of using too much energy and the plant's well-being.



After tweaking the already built prototypes, we have started building the last part – the website to get the whole concept ready for final user tests.

Not having too much time left to build the website, we have used a Wix template to save up some time. Our choices of wording and how we want to sell the product on the website was inspired by how Apple advertises their products. We wanted Plantify (the plant) to be perceived as a carefully designed product and therefore used phrases such as “Timeless Scandinavian Design”, “magical piece of engineering” etc.

In order to raise awareness and discussion on our topic we have added a strong motive: “(…) **instead of waiting years for nature to respond.** “. Through this paragraph, we wanted to raise awareness about our topic; implying that people would have to wait for years means that in reality the consequences of unsustainable energy consumption are not immediate, but rather shown over the years.

On the website, we have also decided to show made-up testimonials, a page about our mission and the mobile app specs in order to immerse the user more into the future we speculate; where the people’s impact on nature is an universally accepted fact/truth, rather than a topic of discussion for politicians

After having everything put together, we have presented the whole concept again to the same people we user tested in earlier stages of prototyping:

Placing the object within a context in order to create a narrative helped the testers envision the product as it would be real and raised questions such as: “Why is the plant sad in this picture?” or “How do you take care of the plant?”. Some of the testers seemed to offer more attention to the details on the website and answered the questions themselves.

Finally, for some of the testers’ awareness has been raised in the sense that they got provoked by the fact that the plant’s health is dependent on the household energy consumption, which seemed to deliver our message.