

Final report

Innovating by Design

Group 10

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Executive Summary

In this report, we as Team 10, go through the entire iterative design process for developing community-centered sustainability solutions for the Positive Energy Café (PEC) under the Cocosmos initiative. The aim of this iterative process was to make sustainability feel approachable, practical, and socially engaging for diverse local residents.

First of all, in Iteration 1a, we used Design Thinking Bootleg methods like Extreme Characters and Worst Possible Ideas to explore user mindsets. This led to the concept of the Isoleerbeer, a sensor-equipped teddy bear that shares sustainability tips among neighbors. A Wizard of Oz prototype revealed the need to refine user interaction strategies.

Furthermore, iteration 1b focused on social engagement. Research highlighted that families were often excluded due to accessibility and safety concerns. We developed an Open Day for Kids event and tested its promotional poster. Feedback underscored the importance of balancing inclusivity with safety considerations.

Next, in Iteration 2, interviews in the Generalenbuurt neighborhood identified three key user groups: residents of unrenovated homes, recently renovated homes, and younger individuals. Using behavior-specific insights, we as a team designed:

- Bakkie-fiets: A flyer distributed via cargo bike showing thermal images to promote energy efficiency.
- Energy Buddy: A smart device offering real-time feedback on home energy usage.
- WasteLess: A food tracker that reduces waste through expiry reminders and recipe suggestions.

Lastly, iteration 3 tested the flyer concept in a real neighborhood setting. While feedback was limited, it validated the flyer's impact and revealed concerns about privacy.

In conclusion, the project demonstrates the value of targeted, empathetic design. While the low response rate in the final test highlights the need for improved testing outreach, the concepts show strong potential, especially when aligned with Cocosmos branding and existing services like the Klusbus. Future iterations should emphasize privacy-conscious design and scalable, tailored engagement.

Iteration 1a

To kickstart the design process for Cocosmos, we conducted a pressure cooker following the Design Thinking Process. This fast-paced iteration helped us quickly generate insights, define key design principles, and develop our first concept: the Isoleerbeer (Isolating Bear).

Understanding the User

Since time constraints prevented direct observations or interviews, we used the Extreme Characters method to explore potential café visitors. This helped us identify a few key challenges: many viewed sustainability as expensive, complex, or not their responsibility. These insights informed our design guidelines:

- Make sustainability effortless: show that it's easy and affordable.
- Create a welcoming space: ensure sustainability discussions feel social and approachable.
- Focus on practicality: provide clear, relatable actions for individuals.

Ideation & Concept Development

Using the Worst Possible Idea method, we first brainstormed deliberately bad solutions to uncover key design pitfalls. By reversing these, we generated more effective concepts, leading to the selection of the Isoleerbeer.

Inspired by the Dutch "Flip de Beer" concept, this teddy bear would rotate between neighbors after each Positive Energy Café event. Equipped with light, temperature, and humidity sensors, it would offer personalized sustainability tips.

Prototype & Test

A Wizard of Oz prototype was created using a teddy bear with a hidden Bluetooth speaker. We simulated interactions to refine its user experience. Testing revealed the need to clarify whether the bear should respond proactively or passively, and whether it would engage rational users effectively.

Conclusion

The pressure cooker provided a strong start, emphasizing structured ideation and fast-paced decision-making. However, better alignment between character insights and the final concept is needed in future iterations.

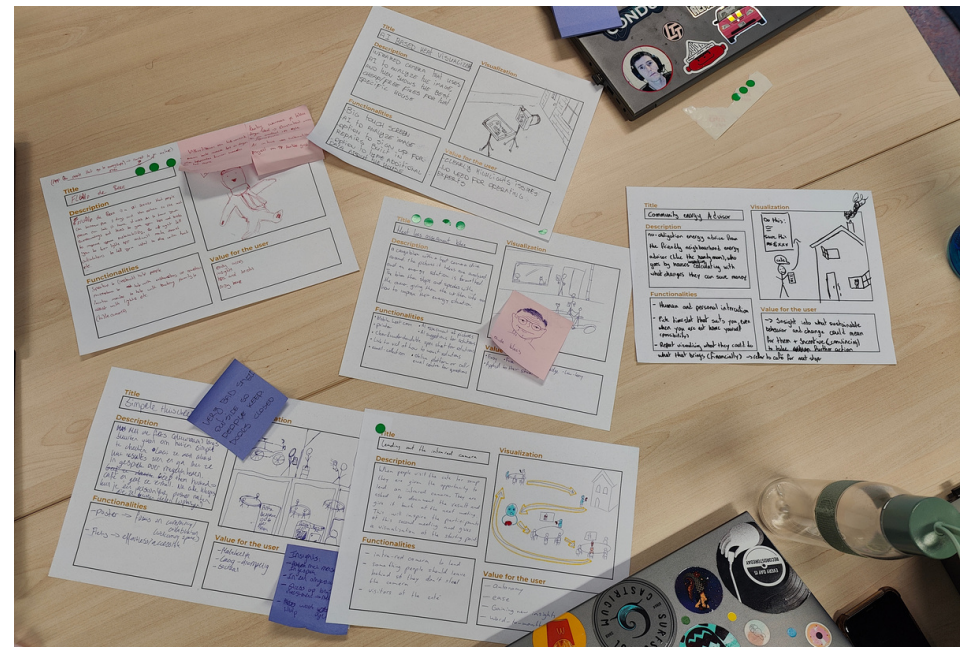


Figure 1. Pressure cooker results

Iteration 1b

For our first iteration, which was done according to the pressure cooker method, we explored how the Positive Energy Cafe could encourage the local community to make use of their resources and services. We explored both ends of the problem to exhaust most possibilities: What kind of structure did Positive Energy Cafe have and what kind of services did they offer? On the other hand, what kind of limitations did the public have against PEC that they couldn't make use of the services effectively? Our primary avenue for gathering our answers were case studies and analysis on behaviour. Accessibility issues, lack of social engagement and low relevance were the leading causes, especially for families.

Ideation & Concept Development

After gathering the necessary information, we conducted a brainstorming session to pinpoint the possible solutions. During this session we kept coming back to the social aspect of potential solutions, such as workshops on eco-friendliness or on sustainability for families. In the end, we decided on an Open Day for Kids which would bring the younger generation and families at the same time to leverage the social dynamic and educate them.

Prototype & Test

Afterwards, we created a poster as a prototype (Figure 2.) of our concept, which would be distributed in various avenues such as local community events. The appeal and effectiveness of the poster was tested through feedback of peers and potential users. Among the points of feedback, the one that stood out the most was the sentiment of everybody being invited which was reflected by our poster.

This was a point of contention, especially for families who wouldn't want their kids around a large group of strangers. Overall, the main insights gained from the testing stage, specifically the interviewing method, are the possibility that organizing open days for families and distributing flyers could be a helpful solution to increase new customer acquisition and engagement with the cafe.

Conclusion

Following the first iteration, our group was split up and merged with other groups, so our first iteration wasn't the only "springboard" moving to the second iteration.



Figure 2. Flyer prototype for first iteration

Iteration 2

Emphasize

To develop a solution that effectively engages residents, we conducted interviews in the Generalenbuurt neighborhood. The goal was to understand their perspectives on sustainability, their knowledge of the Positive Energy Café, and any barriers preventing them from taking action. Through these conversations, we explored how residents perceived their role in the energy transition and whether they felt motivated to adopt more sustainable behaviors.

After gathering the interview data, we used affinity diagramming to analyze and structure our findings. This method allowed us to cluster responses based on recurring themes, providing a clearer picture of common attitudes and challenges. A key takeaway was that many residents either believed sustainability was someone else's responsibility, such as the housing organization handling insulation or felt that they had done enough after minor home renovations. Additionally, awareness of the Positive Energy Café was low, and even those who knew about it associated it primarily with affordable meals rather than sustainability initiatives.

Define & Ideate

These insights led to a crucial shift in our approach. Rather than focusing solely on promoting the café, we needed to address why residents were disengaged in the first place. This meant developing solutions tailored to specific behaviors and motivations rather than a one-size-fits-all awareness campaign.

From our affinity diagram, we identified three key target groups, each requiring a different engagement approach:

1. Residents whose homes have not been renovated. Primarily motivated by financial incentives. They need a clear, tangible reason to engage with sustainability, particularly if it leads to direct cost savings.
2. Residents who have undergone renovations. These individuals believe their responsibility in the energy transition is complete. Encouraging small, easy behavioral changes in their daily energy use could help them see their continued role.
3. Younger residents such as recently married couples, students who are less conscious about sustainability. These residents are not putting extra time for food management and have tendency to waste foods. A tracking system for their food's expiration dates and a reminder system when the expiration date is close is needed.

With these target groups in mind, we used the How might we (Rosala, 2024) method to formulate specific objectives for our target groups:

- For unrenovated homes: "How might we leverage the financial benefits of sustainable actions to attract residents to the Energy Café, sparking conversations about sustainability?"
- For recently renovated homes: "How might we empower residents who've made their homes more sustainable to take small, easy, and rewarding steps toward more sustainable behavior, and help them see their continued role in the energy transition?"
- For young demographic residents: "How might we facilitate food waste reduction for younger residents by integrating food expiration tracking system and promoting sustainable consumption into their daily routines?"

Bakkie-fiets - Financial Savings Flyer with Heat Scan Visualization

Designed to raise awareness and attract residents to the Energy Café, this flyer visually represents potential heat loss in their home using thermal imaging. It highlights how much money they could save through better insulation, directly linking sustainability to financial benefits. To make the information actionable, the flyer includes a direct call to visit the Energy Café, where they can receive free expert advice on improving their home's efficiency. The flyer is handed out from a cargobike, where residents can get some quick information and a cup of coffee.

Prototype

To explore the flyer concept extreme characters (Djajadiningrat et al., 2000) was additionally used, imagining exaggerated versions of potential users to ensure the design was compelling across different personality types.

Test

To test this idea, we would go round the Generalenbuurt and approach people. We could take pictures of homes and show them as a conversation starter, but also test our riskiest assumptions.



Figure 3. Bakkie-fiets flyer prototype



Figure 4. Bakkie-fiets concept visualisation

Energy Buddy - Smart Home Energy Assistant

A small, interactive device that connects to the P1 energy meter, displaying real-time feedback on energy consumption. The outer ring changes color based on efficiency (green for good, red for excessive use), providing a subtle but constant nudge toward better energy habits. The device also uses emoji-based messaging to reinforce positive behavior, making it easy for users to understand their impact without requiring technical knowledge.

Prototype

The story share & capture method (INTERACTION-DESIGN.ORG, z.d.) was applied to the Energy Buddy concept, drawing from real-life user narratives to create a solution that felt intuitive and engaging.

Test

Testing this idea, would mean a working prototype and having a few people test it for a longer time, getting rich qualitative data.



Figure 5. Energy Buddy concept visualisation



Figure 6. Energy Buddy prototype

WasteLess - Food Tracking Monitor

Developed to engage younger residents who are often waste foods due to lack of time or awareness using technology. WasteLess is a kitchen device that tracks expiration dates of foods. It is a monitor screen with barcode scanner on it. When groceries are bought, users can scan their barcodes which allows the system to log and display how much time is left before each item expires. In addition, it sends reminders to users as dates approaches and it gives simple recipe suggestions that can be made using the reminded food. This makes food management easier, food usage more efficient and encourages more sustainable consumption habits for users.

Prototype

Wizard of Oz prototyping (Nielsen Norman Group, 2024) was used for the WasteLess idea by simulating the device with an iPad and running a functional web interface on it.

Test

Although barcode scanner feature was not present, the selected method allowed us to test how users interacted with the concept and gather feedback on its practicality.



Figure 7. Wasteless concept visualisation

Iteration 3

Emphasize

After deciding on presuming with the 'cargo bike - thermal flyer' idea, we wanted to make an improved iteration. We had some concerns about how people would react to receiving a thermal image of their house. That is why we wanted to test their responses before actually starting to put out the flyers in real life, so we could (re)design the flyers according to the results.

To test these responses, we put together small research (survey) that aims to understand the initial reaction, emotional responses and the concerns that residents might have when receiving a thermal image of their house (Ponto, 2015). Participants were asked to imagine receiving a flyer (Figure 8.) that invites them to the Energy Café, after which they answered a couple of survey questions (Figure 9.). We then analyzed the results, derived insights from them and used those to create a flyer design that feels respectful, clear and engaging.



Figure 8. Flyer mockup for small testing

Define

We analyzed the result according to a thematic analysis. We read through all the responses carefully, highlighted phrases or statements that stood out and subsequently grouped these similar results into themes (Sovacool et al., 2023). Some of the main themes we identified were: That is was unclear what exactly the picture (especially the colors) meant, people appreciated the (personalized) effort and did not mind the picture of their own house and lastly, that people were interested to learn more (Figure 10.).

Ideate

Subsequently, we briefly brainstormed (IDEO U, n.d.) based on the insights from the little research, with the goal of further improving the flyer. We came to the conclusion that it would be necessary to state on the flyer that the picture is a thermal image. Next to that, we added a legend that explains that the bright/warm colors indicate heat loss and that dark/cold indicate the opposite, to avoid confusion over the meaning of the colors.



Figure 9. Small testing results



Figure 10. Small testing analysis

Prototype

Through a spoken table-top brainstorm session we went over our ideal product, its charms and capabilities, and how we might replicate those whilst staying in our student budget. This allowed us to create an MVP-prototype without sacrificing necessary components.

For the prototyping stage, we aimed to get as close to our final vision as possible. This approach would allow us to conduct the appropriate tests. To achieve this, we used the Wizard of Oz prototyping method. This method involves simulating the user's experience with the final concept, even though it is not yet fully developed. Since the most substantial element of user interaction is the flyer they receive, we chose to replicate that experience (Figure 11.). The difference between the prototype and the actual concept is that the thermal image displayed on the flyer is not a real thermal image of the user's own house. We also briefly had a cargo bike and an infrared camera for our prototype. However, this was only used for display purposes during our final presentation. It was never intended for testing.



Figure 11. Flyer prototype for third iteration

Test

During the testing phase, we utilized the Testing with Users method. This method involves providing real prototypes to the intended audience, observing how they interact with them, and collecting their feedback. We executed this by distributing the flyers developed during the prototyping phase to homeowners in Woensel. Each flyer included a QR code linking to a survey designed to gather input on various aspects of the concept. In total, we delivered 40 flyers to houses in the Woensel area. The survey included questions regarding the Positive Energy Café, the effectiveness of the flyer, and potential privacy concerns related to the flyer's content. Unfortunately, we received only one response to the survey so far. The respondent expressed that they found the flyer to be very effective and that it would encourage them to visit the Positive Energy Café and reflect on sustainability. However, they also voiced concerns about a photograph being taken of their home. Lastly, they noted that receiving a thermal image of their own house would be a valuable addition.

Conclusion

For future iterations of this concept, it is important to further address potential privacy concerns. Our testing indicated that some individuals may feel uncomfortable receiving unsolicited images of their homes, even if they are intended for a good cause. Implementing a system to obtain prior consent, perhaps through a sign-up or opt-in mechanism, could help alleviate these concerns. Despite this, the feedback we did receive was generally positive. The concept effectively encouraged reflection on sustainability and showed potential in motivating people to visit the Positive Energy Café. Given how well this idea complements the already existing Klubus and the branding of cocosmos, it would be promising for Cocosmos to explore further.

Group reflection

What was the greatest challenge you had as a group?

- Our biggest challenge was the group change we had after the first iteration. Two groups were merged and four new members joined our team while four original members left. This change disrupted group dynamic and caused problems in communication and collaboration. It took some time for new members to catch up with the previous work, understand the project and adjust the team since the project had already started.

Do you feel like the group workload was equally divided?

- Right after the group change the task division was a bit unclear and not so equal with the new members trying to catch up with the current status of the project. However, as we progressed through the second iteration, the workload became more balanced. We divided the tasks based on our skills, availability and interests.

What was the strength of your group? How did you profit from this?

- One of our greatest strengths was the academic background diversity within the team. For instance, Industrial Design students focused on user research, ideation, flyer design, and physical prototyping while Computer Science students developed a working digital prototype. This multidisciplinary structure allowed us to create comprehensive solutions like Bakkie-fiets, Energy Buddy, and WasteLess each targeting different user groups with specific objectives. By considering the problems from various perspectives, we achieved practical, user-focused results.

What was the weakness of your group? How did you cope with this?

- The weakness we had as a group was the fact that our initial teams got switched and re-allocated midway during the course at week 3. 4 out of the 9 people on the team got shuffled and a new set of 4 people from another team got assigned to the original team based on the feedback of the lecturers which stated that diversity was needed among the members of the group. Therefore, due to this sudden change at week 3, the new assigned members had a hard time adjusting to the structure and the dynamics of the team while the old members also had a hard time since they had to incorporate the new members into an already existing, ongoing design process as well as having to re-divide the team work taking into account the new members. The team coped with this by setting up frequent meetings with the new members in order to ease their adjustment process to their new team. In addition, the old members of the team briefed the new members on their already in progress design idea and tried to incorporate them into the process as much as possible.

If you were to work with this same group again, what is one change the group could make to work together more effectively?

- If we were to work with this same group again, the one change the group could make to increase the efficiency of the team would be to try to blend the new and old members of the group together more effectively. Although much effort was spent on trying to adapt to the new versions of the teams after week 3, both the old members and the new members were not able to fully adjust to the new structure and the dynamic of the team. Therefore, either the change should have happened at week 1, when the project was just starting, or there should not have been a change in the teams at all.

Task	Sebas Ropers	Daniël de Goederen	Tomas Pieters	Sjors Adriaens	Aleksander Karczmarczyk	Jelle Spreeuwenberg	Kerem Gokce	Efsane Yildiz	Erdem Aydin
Desk Research	x	x	x	x	x		x	x	x
Ideating Iteration 1	x		x	x	x		x	x	x
Prototyping Iteration 1					x				
Documentation Iteration 1		x	x		x		x	x	x
Presentation Iteration 1		x							
User Interviews Iteration 2	x	x	x	x	x	x	x	x	x
Data analysis iteration 2	x		x	x				x	x
Ideation iteration 2	x	x	x	x			x	x	x
Prototyping Iteration 2	x	x	x	x			x	x	x
Presentation Iteration 2	x				x	x	x	x	x
Set-up Survey iteration 3		x		x					
Data analysis iteration 3				x					
Ideating Iteration 3	x	x	x	x	x				
Prototyping final iteration	x	x			x	x			
Concept Validation final iteration		x	x	x	x	x			
Presentation final iteration	x	x					x		
Documentation final iteration	x	x	x	x	x	x	x	x	x

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