Altering expectations: how design fictions and backcasting can leverage sustainable lifestyles

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Abstract

Sustainable development calls for fundamental societal changes. Technological development alone won't suffice; in order to reach sustainable development objectives there is a need to rethink the way we live our lives. Sustainable lifestyles are today however often depicted through a sacrifice-based cultural narrative, in which losses, rather than gains stand in focus. The paper takes its starting point in recognizing that the future is open and possible to influence, but also that (ideas about) the future influences present decisions. These ideas, or expectations, about the future thus provide an opportunity for intervention. Through presenting concrete and positive representations of what a sustainable future might imply in terms of everyday life, the expectations for such a future might be altered. This paper aims to explore how design fiction and backcasting can be used to alter expectations regarding sustainable lifestyles, through creating concrete and engaging visions of everyday life in a sustainable future. The paper also presents a project based on this approach as well as some early findings from this.

Keywords

Sustainable lifestyles; Design fiction; Backcasting; Expectations; Sustainable design

Introduction

Consumption has increasingly been recognized as one of the major challenges to sustainable development. As a response to this a plethora of green consumerism initiatives has emerged, aiming at shifting consumption towards "green" or "sustainable" products. The basic premise of this is that we can go on and live our lives as usual if we only by the "right" products. After years of technological advancement in production systems and end-user appliances it has however become evident that green consumerism does not suffice, as any environmental gains from this are being outpaced by increased volumes of consumption, rebound effects and a growing global consumer class (Assadorian, 2010; Stø, Throne-Holst, Strandbakken, & Vittersø, 2006). Because, "What does it help that airplane engines become 1 percent more fuel efficient if air travel at the same time increases by 5 percent?" (Sanne, 2012, author's translation) Changing to green products alone is not enough; to reach sustainable lifestyles we need to rethink not only what we consume, but also how and why.

The shift from green consumerism to sustainable lifestyles also implies a need to rethink the role of design. In the green consumerism discourse, design has typically been assigned a role for decreasing the environmental burden of products, to design for a recycling and efficient energy use, to dematerialize consumption through a shift from products to services, and for promoting more sustainable behaviours through feedback interfaces and persuasive technologies. While all of the approaches in sustainable design form important parts of the sustainable lifestyle 'puzzle', they need to be complemented

with and guided by a more overarching and socially situated understanding of what a sustainable lifestyle can and cannot be; to go from focusing on discrete products, services or behaviours to the lifestyles and larger societal structures in which these are part and given meaning (Wakkary, Desjardins, Hauser, & Maestri, 2012).

In doing so, design for sustainability could also help abating one of the most pressing challenges for the shift from green consumerism to sustainable lifestyles, namely the lack of positive and engaging visions of the future in which consumption is limited. Without such visions, sustainable lifestyles risk being framed in a sacrifice-based cultural narrative only, in which losses, rather than gains stand in focus. While it is true that sustainable lifestyles cannot be achieved or upheld without limited consumption, this doesn't mean that these lifestyles need to be miserable or that limited consumption automatically will lead to regression and poverty. This has led to a situation where we expect a sustainable future to be a dull, boring and filled with limitations. To alter people's expectations of what a sustainable lifestyle could mean, we need to provide them with concrete and accessible visions, showing that life in such a future could be as prosperous as today.

With this challenge as starting point, this paper aims to explore how design fictions and futures studies can be used to alter expectations regarding sustainable lifestyles. We do so through presenting and discussing theories and practice from the sociology of expectations, design fictions and future studies, after which we introduce a project based on these approaches and report on some early findings.

Altering expectations

Expectations are central to human action. As a kind of inner compass our expectations guide us towards or away from different potential futures, consciously or subconsciously. Expectations are a potentiality, something that may or may not come true, a prospect that we seek to make realised or an apprehension that we try to avoid. Expectations are internalised, embedded in our understanding of problems and possibilities, and acted out as a response to this (Berkhout, 2006). Expectations thus steer what we take for granted and what we see as impossible, and through acting accordingly we contribute to these expectations to come true.

The historian and philosopher Reinhart Koselleck (2004) denotes our "field of experience" (that which we have experienced) constitutive for our "horizon of expectations" (that which we can expect). However, our expectations is not only a direct result of our experiences, but also of our imagination through which experiences can be reconfigured and combined in new and unexpected ways: "The imagination is a kind of electronic machine that takes account of all possible combinations and chooses the ones that are appropriate to a particular purpose, or are simply the most interesting, pleasing or amusing." (Calvino, 1993, p. 91). As will be presented in the following section, both design fictions and backcasting have good potential of facilitating such a reconfiguration as well as to focus the imaginative power in a desired direction, so as to accomplish what Robinson (1988) denotes as a process of unlearning and relearning.

In order for a vision of the future to alter people's expectation it needs to be perceived as urgent, credible and legitimate (Berkhout, 2006). Drawing further on Berkhout (2006) one way to achieve this is to moralise the vision of the future, "in the sense of being encoded and decoded as either utopias or dystopias." (ibid., p. 300). Furthermore, the vision needs to have an interpretative flexibility so that it can resonate with a larger group of actors than the ones who developed it. Yet another influential factor is who, what actors, it is that are proposing and endorsing the vision. One aspect rarely touched upon however is how the vision is presented. In this paper we propose using design fictions as a way to make visions more tangible and accessible to people, thereby increasing the possibilities of altering expectations.

Design fiction meets future studies

Engaging with the future is a fundamental part of design, as design is always about exploring, creating and proposing something new. This 'newness' entails a wide range of possible changes; from altering the form of an already established product or service, to creating entirely new forms and functions. Moreover, Simon (1969) underlines the normative aspect of design, in stating that design is not about any changes, but about "how things ought to be". While these "things" traditionally have been products, or services, the emergence of design for sustainable behaviours implies an expansion of "things" to also include behaviour.

In a commercial context, the normative character of design is however seldom highlighted. Instead, design typically comes through as an objective and rational process. In order to evoke the normative content of "how things ought to be", design needs to be confronted with a number of questions, such as for whom, and to what end, things ought to be in a certain way (Ehrnberger, Broms & Katzeff, 2013; Ericson & Mazé, 2011), a quest that cannot easily be done within the everyday design practice.

The wish to disconnect design from the restraints of commercial development has resulted in several synergetic trends within design research, discourse and practice. The need for a critical discourse has resulted in approaches such as critical design (e.g. Dunne & Raby, 2001; Mazé & Redström, 2009) and speculative design (e.g. Auger, 2013). Common to these approaches is the use of design as a tool to explore, highlight, problematise and change norms (Auger, 2013). In parallel to this, there are several approaches that sees the potential of using design as a tool for change, and that suggest its use for social or societal challenges such as transformation design, social innovation and sustainable design (Brown, 2009; Manzini, 2003; Thackara, 2005). Common to these approaches is the use of prototyping as a central method for co-creation, innovation and rehearsal of the future (Hillgren, Seravalli & Emilsson, 2011).

While approaches focusing on innovation and co-design are needed to develop and propose possible alternatives to present unsustainable products and practice, the critical and speculative approaches are needed in order to challenge norms and to open up the design space beyond the incremental. But there is also a need for approaches that combines the critical with the innovative, where speculations about the far future can be the subject of co-creation and discussion.

Design fictions

Design fiction is a designerly approach to speculate about the future through a combination of prototyping and storytelling. As such it brings together the notion of design, the capacity to imagine and make concrete not yet existing products and services for everyday life, with that of science fiction, the imaginative storytelling that speculates about future worlds. The term design fiction was originally coined by science fiction writer Bruce Sterling (2009) and further developed by e.g. Bleeker (2009) and Knutz, Markussen, & Rind Christensen (2013). It is close to other concepts such as speculative design and critical design.

The design fiction approach emphasizes the use of prototypes as "performative artefacts", which through storytelling are given social meaning (Auger, 2013; Sterling, 2009). Sterling (2012) describes this as "[t]he deliberate use of deigetic prototypes to suspend disbelief about change…It means you're thinking very seriously about potential objects and services and try to get people to concentrate on those – rather than entire worlds or geopolitical strategies. It's not a kind of fiction. It's a kind of design. It tells worlds rather than stories". Kirby (2010) argues that the deigetic prototypes of design fictions "have a major rhetorical advantage even over true prototypes: in the fictional world – what film scholars refer to as the diegesis – these technologies exist as 'real' objects that function properly and which people actually use." (p. 43). If the story catches the attention of the

audience it might result in the actual realisation of the objects described. In fact, it has been suggested that sci fi doesn't predict the future – it shapes it. Paul Dourish introduced the idea that science fiction visions appear as prototypes for future technological environments: "science fiction does not merely anticipate but actively shapes technological futures through its effect on the collective imagination" (Dourish & Bell, 2013). When William Gibson wrote his novel Neuromancer (Gibson, 1984) it did not take long until "Cyberspace" was not just a literary fantasy, but actually realised, by thousands of hardworking computer scientists. The idea that fiction can be used as a tool to create changes in the 'real world' have been further explored by e.g. Kirby (2010) who has been looking into the role of movies in technological development.

It is clear that design fiction provide a potentially powerful tool to engage people in imagining, reflecting on and pursuing different possible futures. The deigetic prototypes of design fiction and the speculative objects of critical design provoke and disturb us. They spur discussion and inspire designers, design students and their audiences. To this date design fiction have however mainly been used to developed conceptual products, aimed at creating reflection on a certain norms or phenomena such as death (Auger, 2013), our relation to technology (Auger, 2013; Dunne & Raby, 2007), gender issues (www.androstolen.se), or energy insecurity (Mazé, Messager, Thwaites, & Önal, 2013). There is however good potential to use design fictions for exploring and proposing changes at larger scales than this, and for developing prototypes on the basis of lifestyles rather than basing the speculation on technologies only. To develop design fiction in this direction we suggest connecting it to the field of futures studies, and more precisely the approach of backcasting.

Futures studies – backcasting

Backcasting is a normative futures studies approach to explore how challenging targets can be met. This approach was developed in the 1970s as a response to the perceived problems of forecast based approaches in energy planning (Robinson, 1982; Quist & Vergragt, 2006). At that time, energy prognoses pointed at a future with an accelerating energy demand and a need for a substantial increase in energy production capacity. With a growing environmental awareness and the energy crisis in mind, such a future seemed highly problematic and undesirable. In contrast to the predict-and-provide approach of traditional energy planning, backcasting took as the starting point what a desired future level of energy use would be, and gave suggestions on how to design the policies accordingly.

Today there exist a variety of backcasting approaches. Drawing on Wangel (2012) there are however three central elements that are (or should be) common to all backcasting studies: (1) the formulation of a demanding target which cannot be reached without major societal changes, (2) the development of one or more images of the future in which this target has been met and (3) an analysis of these images in relation to e.g. other societal goals and/or in relation to the present state.

Backcasting serves a number of purposes. The images of the future can function as counter-prognoses, challenging what changes are conceived as possible, thereby altering expectations about the future (Dreborg, 1996; Robinson, 1988). Furthermore, backcasting can help to problematize the current trajectories through showing that the target in focus cannot be reached without more radical changes than is being promoted by contemporary policies, planning and other incentives. In this way it can also help raise awareness on the tension between short-term gains and long-term targets. Backcasting can also be used to examine how the gap between the target-fulfilling (sustainable) future and the present could be overcome, and in this way help companies and governments to develop a step by step plan to meet the goals. Finally, backcasting is a tool for exploring what potential conflicts or synergies for other societal targets or high priority issues certain futures could imply (e.g. Höjer, Gullberg & Pettersson, 2011a; Robinson, 1982; 1990).

Through developing target fulfilling images of the future, backcasting can thus provide exactly the kind of comprehensive, larger-scale vision lacking in design fiction. Backcasting also provides data, which can be used to make the design fiction come through as more relevant and credible. But marrying together design fictions with backcasting comes with benefits also for backcasting. Today, the images of the future developed through backcasting are typically represented in rather technocratic and scientific ways only, which means that they do not communicate well to people who are not policy-makers, planners or researchers (Wangel, 2012). In order to engage people and to reach a wide audience, the images of the future must be represented in a way that makes them interesting and understandable for the intended target groups.

One attempt to deal with this problem is the backcasting approach of *design oriented scenarios* where the future is explored at the 'micro' level of everyday life. The original idea of these design oriented scenarios was to create inspiration for 'designers' (in numerous sectors) to develop products and services that could contribute to the realisation of the scenarios (Green & Vergragt, 2002; Manzini & Jegou, 2000). Being elaborated at the level of everyday life, design oriented scenarios also hold the potential to show how life in a sustainable future could be like (Ilstedt & Wangel, 2013). Through re-narrating everyday life habits in an unfamiliar way, such scenarios can challenge ideas of normality, as well as to diversify and alter expectations (Eckstein, 2003; Rasmussen, 2005).

Prototyping the Future - the project

The aim of the project "Prototyping the Future" is to develop concrete, accessible and engaging images of a future in which sustainable lifestyles have become norm. The project is carried out at [name of institution removed], and runs for 18 months, starting in mid 2012. The core project team consists of one researcher from design and one from future studies, with experts on strategic environmental analysis, gaming and interaction design as contributors.

The idea of the project is to build a prototype of a sustainable future, which can be experienced and tested by stakeholders and further developed according to feedback and evaluations. The prototype thus plays the same role as prototypes do in any design process, whether in service design, products design or automotive design. While the scale, resolution and material of these prototypes differ, the aim of developing them is the same, namely to objectify an idea and to create a concrete materialisation of the proposed design to function as a basis for testing, discussion and iterative development. Prototypes also have the potential to change perceptions on what is possible and desirable, and to spur innovation and development. As such they can, as discussed earlier, change the expectations about what can and cannot be done and what the future might be like.

The project takes its starting point in a backcasting study reported in the book *Images of the Future City: Time and Space for Sustainable Development* (Höjer, Gullberg & Pettersson, 2011b). This study develops six different scenarios of a future (year 2050) sustainable Stockholm based on how space and time is used by the citizens. In the study, fourteen researchers from diverse disciplines offer details on a variety of aspects of a future sustainable city. Areas of everyday life such as personal consumption, housing, food, transport and care are discussed in detail, providing a rich material for a design process. In spite of its title (and to the amusement of the designers in the team) the book is however completely lacking pictorial images.

The study presented in the book sets some important and strict delimitations of what a sustainable future is regarding the use of energy. All energy is accounted from a consumption-based lifecycle perspective, meaning that all energy used in the lifecycles of products and services are allocated to the country (or city) in which the consumer lives, rather than the place where it was produced (Kramers et al., 2013). Swedes' use of

electronics would therefore be attributed to Sweden and not to e.g. China. From a consumption based perspective Sweden's ecological footprint is not decreasing, as many reports claim, but is steadily growing (SEI, 2012). Another important outset is that the global energy resources are equally divided between all citizens in the world. In other words, we will not be able to use more energy at the expense of others. Based on this and an assumed technological development, increase in renewable energy and higher efficiency, it is estimated that Stockholmers need to lower their energy use by 60% compared to the levels of the year 2000 (Höjer et al., 2011a; 2011b). We are of course aware of that sustainability is a complex and challenged concept. Thus, out ambition is to use a natural science based definition of what a sustainable level of resource use is (in this case focusing on energy) while allowing for diversity in terms of how life could look like within these boundaries; in other words, to design (for) a variety of sustainable lifestyles.

In the project "Prototyping the Future", this backcasting study has been used as the scientific basis, for setting the target for a future sustainable level of energy use as well as providing a detailed account of the energy use related to everything from food to vacations to living spaces. For example it is calculated that consumption of meat has decreased with 50 %, living spaces by 10 % and flight travels with 70 % on an average. It is however important to keep in mind that the preconditions for these scales of changes to be sufficient is that all technologies in society have become fundamentally more energy efficient. Should this not be realised then the level of consumption would need to go down further.

When the project was started, the only concrete idea of the prototype was that it should be some kind of interactive experience of life in a sustainable future. Besides from that we were completely open to what the prototype would look like and what it should comprise. The project of course had some restrictions, such as limited resources and time and, of course, the experience and abilities of the team members. The first aspects that were decided on were properties of the prototype, the target groups and the content of the end result. Thereafter a partly inspiring, partly painstaking work process started, in which different ideas on the form and content of the prototype were tried out, disregarded or adopted for further development. As input to this process we looked into a number of similar initiatives (e.g. SPREAD 2050, Urban Games 2001, Jegou & Manzini, 2003), tested different gaming and interaction alternatives, as well as explored how a sustainable future everyday life could look like through workshops and scenarios. Throughout the project, the researchers worked closely with the design company Veryday, a partner in the project, who was responsible for developing the interaction design of the prototype. A pilot version of the prototype was developed and shown to a test panel of 12 people, as well as at various other occasions and events such as scientific conferences, seminars and workshops. Based on the user feedback, expert comments and our own discussions the storyline, the content and interaction design model have been revised in a number of iterations.

The prototype

The prototyped sustainable future is placed in the Stockholm region in 2053. Inspired by backcasting, the relatively long time frame was chosen in order to (cognitively) also allow for larger changes in inert structures such as transport systems and other parts of the built environment. Choosing a specific geographical context might seem problematic as it implies a risk of being perceived as irrelevant people not living in this area, but without this context the prototype (as any future vision) would lose in concreteness and thus instead risk becoming less communicative. While most cities and everyday lives comprise the same basic components, there are fundamental differences in how urban structures look and function, and how practices of everyday life are carried out. This means that the challenges and opportunities for sustainable urban development and sustainable lifestyles

varies between countries, regions, cities and neighbourhoods, which then have implications for what type and scales of changes to represent. Choosing a specific context is also important when it comes to data. In order to make a consistent and reliable calculation of energy use today and in the future, real life data must be used, otherwise the prototype would risk coming through as a rosy utopia without any basis in reality. As described by e.g. Sondeijker, Geurts, Rotmans, & Tukker (2006), Kirby (2010) and Auger (2013) it is the combination of the familiar and factual with the unfamiliar and imaginative that makes future visions and design fictions 'work'.

One important decision was to depict an everyday life in the future from the perspective of the viewer/user. Most interactive tools for planning future cities are shown from a bird's-eye perspective, where the user becomes the "the mayor" or another kind of sovereign master running the city. This narrative technique creates a distance from the situation that we were keen on avoiding. Another important decision was to let the user actively take part in creating his/her life. The reasons for this were 1) to show that there is not one way of living sustainably in the future, but many different alternatives, 2) to engage the user in the experience, 3) to collect data regarding the choices the users make for further analyses.

When the prototype experience starts, the user found her/himself plunged into a sustainable future and is immediately invited to decide what life will be like: *"How do you live your life? Do you work a lot and have a high income, or do you work less and have lots of free time?"*, followed by *"How do you live? Compact and central, in a wellplanned flat in the close suburb, or in a villa in the outer suburbs?"* (Figure 1) Through these two sets of questions the basic frames for life in the future is set: income, working hours, living space and urban form.

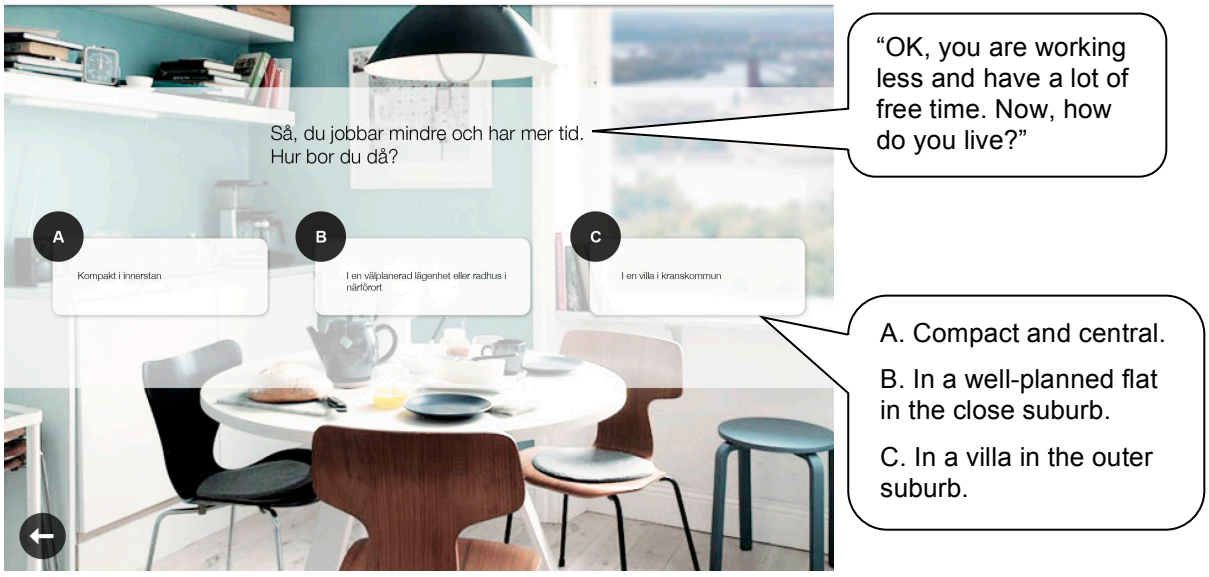

Figure 1. The second of the two introductory questions. English translations are provided in the balloons.

Following the introduction the prototype then focuses on four main areas of energy consumption; food, daily commuting, vacation and other consumption. Each of these is represented in a scene where the user is able to choose between three different alternatives (Figure 2). For the sake of future, further analysis and development, all the

choices made are logged together with meta-data regarding gender, age and place of residence.

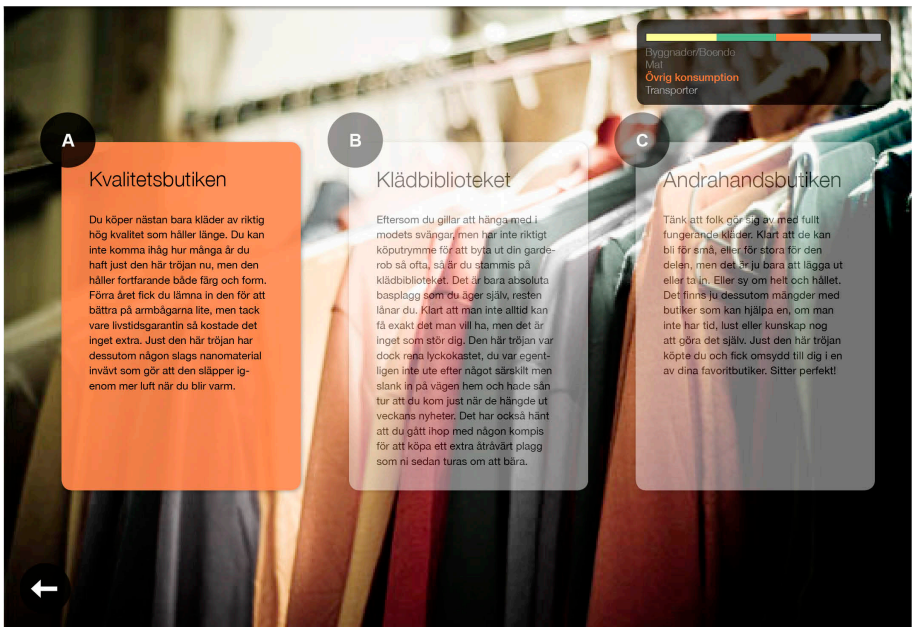

Figure 2. This scene represents “other consumption” and the user is asked to decide on from where most of his/her clothes come from. The alternatives are A) “The quality shop”, B) “The clothes library” and C) “The second hand boutique”.

User test and personas

Halfway through the project a user test was carried out with 12 people (6 men and 6 women, ages between 24 and 60) that tried out an early version of the prototype. The group was recruited through an agency and shared an interest for the environment. After a short common introduction the users tested each scene individually and wrote down their emotional and cognitive impressions and comments on a survey. The aim with the user test was to get general impressions and comments, but also more detailed feedback to help develop the final prototype. The users’ general feeling after the experience was curiosity and interest. Many asked for more information about the choices, the energy budget, the background data and the rationale behind. Some choices was considered too narrow or too “middleclass”, such as the summer vacation alternatives, while others were seen as very positive, such as different types of clothing services. Especially the personal energy budget was a hot issue, one woman, who came from a former communist country, thought it was dictatorial, while several others liked the concept.

For us the user test was helpful in getting a better understanding of how to outline the choices, the images and the general storyline, but we also felt a need for deeper interviews to understand what was behind some of the comments. Why for example, did the prototype make one person sad while another one happy? The answers provided were too brief to give any clues on that. While it was no surprise that a prototype of everyday life, an issue that everyone can relate to, would result in diverse reactions, we still needed to somehow manage to use this diversity in a productive way. Thus, we started to look for patterns in the diversity, to see if we could find a basis for sketching a number of personas. After a second round of analysis we ended up with three personas, representing three very different types of attitudes, lifestyles and behaviours.

- “Katarina” is an affluent person living the good life. She cares about the environment but does not want to sacrifice her standard and comfort. She hopes that technology will take care of the changes needed.
- “Cecilia” has a deep pathos for justice and the environment. She has climate anxiety and is worried about the future. She want to change her behaviour but find it difficult to know what to do, everything is so complicated. She would like to have clear advices and policies to guide her.
- “Jonas” likes to be close to nature and spend time outside. He wants people to change from within and be part of social networks. He prefers local and small scale initiatives with lots of freedom and personal control.

These personas were then used to create an imaginary “space of users” that we could use as guidance when updating the alternative choices, the images and the storyline, so as to not exclude any of them. Indeed, 12 persons who all have an interest in the environment are not representative enough for a thorough and validated persona development process. Due to the limited scope of this project, and its status as an experiment to be further developed, we still decided not to put more resources on developing personas at this stage. As a kind of rough validation test we instead compared our findings and proposals with related persona work, which showed quite good concordance.

Concluding discussion

In this article we have argued for the need of prototyping and visualising future sustainable lifestyle in order to change people’s expectations about the future. In order to create maximum impact both in terms of product and service design and in terms of scientific analyses we suggest the merge of design fiction with backcasting. The project “Prototyping the future” is an attempt for such a double approach, where the design process takes its starting point in a backcasting study of a Stockholm in 2050 where energy use have been decreased by 60%.

At this time, the project is at the point of finalizing the prototype, through developing text and visual elements and through starting developing the website at which the prototype will be displayed. This is done using results from the user test, which clearly showed that the prototype engaged people, and that they appreciated the information on energy use that was given. A major challenge will be to select images and formulate texts that provide variety enough to not be excluding. While the easiest way to go about with this is to make both images and texts ‘neutral’, so as to provide a kind of interpretative flexibility, the images and texts still need to be concrete enough to be engaging and convincing. Otherwise our ambition of altering expectations will fall.

During the project we have come to realize that the design oriented scenarios in backcasting holds much in common with the design fiction approach. This can be seen as pointing to a contemporary, cultural need for alternative future narratives. In many cases however, the design fiction scenarios lose the connection to a clear and measurable scientific goal that is evident in the backcasting studies. We do not argue that quantitative goals always are always necessary, but in many cases it helps in giving the vision more credibility. Design fictions and scenarios have the ability to inspire, inform and challenge present norms and future trajectories. Informed by environmental analyses and supported by energy targets, we suggest that these future images can be made even more powerful.

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