



# Switch! Energy Ecologies in Everyday Life

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There is no single answer to the question of how people should live, nor any silver bullet for solving current ecological problems—and yet, contemporary design must seek ways to think and act in light of emerging environmental challenges. We present here an overview of the Switch! design research program, a continuation of our previous work on how interaction and product design can promote awareness of energy use in everyday life. Extending this approach to a larger architectural and urban scale, Switch! was set up to explore the possibilities of design as an intervention into multiple and interpenetrating technical, material and social systems—or *ecologies*. In addition to designing materials, objects, and interfaces, Switch! also examines how design can be engaged in staging potential scenarios, narratives and debates. The design of interventions into energy ecologies and the use of design methods become a platform for exposing existing habits and hidden norms as well as for proposing alternative actions and views. These propositions have been developed through practical experimentation and the materialization of design examples. Central to our investigation is how critical practice enables us to examine and discuss the concepts, strategies and ideologies underlying sustainable design.

**Keywords** – Aesthetics, Critical Practice, Energy Awareness, Experimental Design, Reflective Use, Sustainable Design.

**Relevance to Design Practice** – This paper presents a set of alternative perspectives and approaches to sustainable design with respect to awareness of, and reflection upon, energy consumption, along with a series of design examples exploring these alternatives.

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## Introduction

Within design, critical practices play a role in exposing and debating values held within discursive and professional contexts. With the new challenges presented by climate and energy issues, design must reexamine its role in shaping and changing values—both within the sustainability discourse and within the design practices that impact production and the products that shape practices of consumption. If we consider that design has had, and continues to have, a profound power to influence consumer and societal values, then we might renew its role in light of current problematics of mass-production and (over)consumption. We might rethink how the values embodied in products influence beliefs and behaviors, and how systems of objects, service ecologies and social ecologies influence user relationships with design products throughout their lifespans and lifecycles.

Locating this critical reflection within design—as practice-based research that produces criticism not only of but *through* design—we have developed a series of speculative design research programs that aim to expose values embedded in design practice and to explore alternative concerns and priorities. As environmental concerns open up new problematics and potentials for product production and consumption, reflection on a range of related issues contributes to a larger discourse within the design discipline. Further, this suggests implications for the agency of designers in social processes, for the materials, forms and methods of design as vehicles for critical reflection, and for the strategic role of design in shaping a wider discourse.

In this paper, we present an overview of our practice-based design research program Switch! In particular, we discuss certain theoretical and methodological concerns, related to issues in

design discourse, that have motivated the program. While some of the practical experiments and studies are currently in progress, we present the repertoire of design examples developed in response to our programmatic concerns. The discussion and examples elaborate an approach to design that we propose as a basis for thinking and acting in relation to contemporary environmental problematics.

Switch! is a continuation of our previous work on how interaction and product design can be a basis for promoting awareness of how energy is used in everyday life. Previously, we focused on the relations between people and objects, treating the redesign of repeated daily encounters and everyday interactions with products as a basis for encouraging reflection not only on, but in and through, energy use. The aim was to develop an understanding of energy as a sort of material, investigating its expressive and aesthetic potential for design and, thus, identifying energy issues as central to the design process and to design products, in terms of materials, form and interaction.

Further developing this line of research, Switch! has been set up to explore how design can influence multiple actions and

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interactions that accumulate over time, thus treating energy issues on a larger scale within architectural situations and public life. Inspired by contemporary thinking in material culture and the sociology of technology, Switch! considers design as an intervention into multiple and interpenetrating technical, material, and social systems—or *ecologies*. Although the power to control or to design and implement new systems and structures at such a scale may not fall to design research, we can use design as a vehicle for exposing, debating and intervening in values within these complex ecologies, thereby introducing new openings for awareness and change.

## Design Research Context

Design is often said to be about “value creation,” referring to the power of design to effect meaningful and valuable experiences for consumers as well as material and brand value for clients and stakeholders. Operating on behalf of producers, design is bound up with larger projects of increasing economic and symbolic capital. With respect to consumption, design is no longer, if it has ever been, solely about satisfying the basic human needs of an individual or a society, but also about creating needs and even manufacturing desire (Forty, 1986). Historically, this persuasive power of design has been employed in service to expanding consumption—indeed, design came into being at a particular stage in the history of capitalism, bound up with economies of industrial production and mass-consumption. Disciplines such as industrial and interaction design have, in fact, grown up around an interest in increasing the profitability of emerging electric and electronics sectors.

Given this history, as well as contemporary awareness of some of the undesirable ecological side-effects of previous modes of production and consumption, perhaps it is no wonder that design has often been seen as part of the problem within the discourse on environmentalism. In response, diverse strategies are collecting under the umbrella of sustainable design, ranging from those trying to minimize negative environmental costs to those trying to solve environmental problems. Much effort has been directed towards improving existing manufacturing systems, increasing the energy efficiency of processes and products, and promoting

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green consumption. Others move away from the production of and desire for the “new,” towards the endurance, reuse and sustainment of existing things, or towards continuing and closed systems of production (for example, Chapman, 2005; McDonough, 2002; Verbeek, 1998). Indeed, some are reconsidering the material basis of design altogether, evident in the increasing interest in service and experience design, and the application of design thinking and methods to the business and politics of sustainable development (for example, Fry, 2008; Manzini & Jégou, 2003; Mau & Leonard, 2004). On the defensive, much has been done to reposition design as part of the solution.

However, it is not simply a matter of being part of the problem or part of the solution—the current situation simply cannot be reduced to such terms. Due to the complexity involved in sustainability, it is simply very hard to consider and negotiate all aspects necessary to achieve a fail-safe solution, particularly since such solutions must somehow be compatible with the current state of affairs. Given the difficulty of foreseeing the future consequences of design decisions, it is possible that things we regard as solutions may produce further problems elsewhere in the world or later on in time. Humanitarian and environmental interests intersect and even compete within sustainable design, pointing to larger historical and philosophical tensions between ideas of nature and culture, progress and change, individualism and collectivism. Within this complex set of interests and ideologies, causes and effects as well as problems and solutions become difficult to identify, much less to address head on.

There is no single answer to the question of how people should live, nor any silver bullet for solving ecological problems—and yet, contemporary designers must seek ways to think and react in light of emerging environmental challenges.

## Critical Practice

Design can be characterized by its particular capacity to negotiate complexity. Rather than dealing with problems that are definable, objective and consensual, as we might characterize some of the problems treated within the natural sciences, design deals with social and political problems that can never be finally or universally solved, much less definitively formulated (Rittel & Webber, 1973).

Indeed, according to contemporary (post)environmental thinking, even problems having to do with nature and science are inevitably social and political (Latour, 2004). Further, as Shove (2003) articulates, “the vast majority of environmentally significant consumption is... bound up with, and constitutive of, irredeemably social practices ‘governed by norms like respectability, appropriateness, competence and excellence’” (p. 198). This entails the idea that (sustainable) design cannot only be concerned with problem-solving, as its task is often formulated within the systems approach and the tradition of technical rationality. Indeed, design problems might be understood as an open set of issues with many possible resolutions, the design process as reflexive inquiry in which new questions or even problems may be generated along the way, and the product of design as one proposition among many competing ideas (Buchanan, 1995).

Within design, modes of reflective and critical practice engage with such problematics. For the reflective practitioner, each move within a design process is the basis for self-reflexive and wider analysis that is allowed to reframe or redirect the whole (Schön, 1983). Conceptual and critical design reflect upon the conditions and processes of design—but moving beyond describing and exposing these, practitioners also actively engage in posing new questions and problem settings. As Rendell (2004) articulates, “Projects that put forward questions as the central tenet of the research, instead of, or as well as solving or resolving problems, tend to produce objects that critically rethink the parameters of the problem itself” (p. 145). Indeed, tendencies toward critical practice are explicitly concerned with *problem-finding* within disciplinary discourse and wider society, with an ambition to open up a practical and tangible arena for criticism from *within* and *as* design (Mazé & Redström, 2007).

Such tendencies toward critical practice are not unprecedented—heritage might be traced through the modernist avant-garde, anti-design movement since the 1960s, and through (post-)critical architecture (Mazé, 2007). For example, anti-design thinking contested design as being blindly “in service” to values set by historical convention or hegemonic ideologies, espousing instead a political and ethical agenda as proper to design—“Otherwise we will end up by designing beautiful electric chairs or mountains of rubbish,” as Superstudio proclaimed (Lang & Menking, 2003, p. 120). These historical examples, and a growing number of contemporary practices, attempt to diversify or counter mainstream views on what design is and what it should be about (see also Blauvelt, 2003; Dunne & Raby, 2001). Relating to critical and social theory from other disciplines, critical practitioners have engaged in (de)constructing the intellectual and ideological foundations proper to design, thus reconfiguring how we might think about the agency and responsibility of design (Rendell, Hill, & Fraser, 2007).

In addition to a strategic agenda, such tendencies also expand the practical means and methods for making forceful propositions. Alternative forms of professional practice and collaboration across disciplinary borders have been a basis for rethinking existing conditions, situations or institutions of design, and generating alternative products has been a basis for critiquing conventional modes of production and consumption. For some, this has meant resistance to traditional imperatives of mass-production or mass-market consumption. For example, “paper architecture” applies the persuasive visual narratives and tangible forms of design, but is primarily produced for exhibitions, publications and events (for example, de Zegher & Wigley, 2001; Spiller, 2006). Indeed, the controversial propositions made through such alternative channels for ideological production have succeeded in constructing a very public and often participatory discussion around societal issues.

Critical practice opens up new ways of thinking and doing design today. Design imagination, skill and craft can be applied to stage a debate on pressing issues that might otherwise be difficult—even undesirable—to realize in other forms. Designers engage not only in solving or resolving problems but also in questioning how problems are set, by whom, and why. This is an alternative approach to dealing with emerging challenges to

design—indeed, if we only respond in a reactive, defensive or pragmatic mode, we might unwittingly affirm the conserving mechanisms of convention or become complicit with the values of other systems and institutions.

In its strategic and practical forms, and drawing on its history of ethical and political concerns, critical practice might also expand how we reflect and act upon environmental issues in design (Mazé, 2008). Indeed, as the ideas and strategies around sustainability proliferate in contemporary design, we must not only develop solutions but intellectual and ideological foundations for reflecting critically on alternatives. Indeed, we must recognize the social construction of sustainability discourse itself.

## Everyday Energy Ecologies

Engaging with the issues bound up in environmental discourse and sustainable design means, to some extent, engaging with the complexity of causes and effects, problems and solutions. Designers must consider the potential consequences and impact of their proposals in order to, at least to some extent, anticipate potential problematics and emerging issues. Propositions must also be located in a world already densely-populated with previous design “solutions” to human needs and desires. This implies that it is not only the subject of design (its intellectual and ideological concerns) that must be considered in a larger and more complex worldview—but also the object(s) of design. Design has, in fact, long moved past a narrow focus on the form of discrete objects, demonstrated by the increasing interest in product-service systems, user experiences and lifestyle values (Redström, 2006a). Indeed, the sustainability discourse has brought this to the fore through challenges to the material basis for design.

In such terms, we may think of the object of design not as a discrete and self-contained artifact, but as made up of and bound up with a more complex set of relations. There have been a number of attempts to articulate this in terms of ecology within design discourse. Concepts of “information ecologies,” “service ecologies” and “product ecologies” deal, in various ways, with the place of designed things within larger interacting and evolving systems (for example, Nardi & O’Day, 1999; Moggridge, 2006; Forlizzi, 2008). As notions of ecology are particularly relevant to areas of design that touch upon environmental discourse, we might update and expand how notions of ecology frame relations to complexity. Beyond analysis, however, design in the end must deal with intervention of the new in material, technical, social—and inevitably environmental—conditions.

Traditionally, the term “ecologies” has been applied within the natural sciences to describe the complexity of relations among living organisms and their physical surroundings. Multidisciplinary variations upon the subject include fields such as “ecological psychology,” which posits the situatedness of an animal’s perception and behavior upon its physical and social context, and “cultural ecology,” which takes an anthropological, political and geographic view of the relations between cultures and their natural resources and material conditions (for example, Gibson, 1979; Sutton & Anderson, 2004). Aligned with (post-)postmodern discourse, current discussions around “political ecology” deal not

only with how political, economic and cultural factors relate to nature, but the social construction of the environmental discourse itself (Robbins, 2004; Latour, 2004).

According to this line of thinking, knowledge about the environment is understood to be mediated by the instruments, interpretations, concerns and protocols of the sciences and other disciplines—including the arts, which have significantly influenced socio-cultural conceptions of nature (for example, Andrews, 2006; Simmons, 1993). Instead of previous attempts to distance the interests of nature-centrism from modern anthropocentrism, a logic underpinning movements towards “deep ecology” and post/anti-materialism, there is a contemporary movement towards treating these as inseparable (Latour, 2004). Peets and Watts (1996) further articulate:

The environment is an active construction of the imagination, and the discourses themselves assume regional forms that are, as it were, thematically organized by natural contexts. In other words, there is not an imaginary made in some separate ‘social’ realm, but an environmental imaginary, or rather whole complexes of imaginaries, with which people think, discuss, and contend threats to their livelihoods. (p. 37)

Instead of focusing on the separation of living and non-living systems, or even human and non-human actors, political ecology treats these as a hybrid blend of social perceptions and biophysical experiences that cannot be known or described in any absolute or final way. Instead of humans standing in relation to the systems making up an environment, as Gibson (1979) might argue, Latour (2004) might counter that the systems constituting humans and their environment intersect, overlap and co-determine one another. Thus, current study of relations between ecology and society treat, as Folke and Gunderson (2002) put it, “humanity and nature as co-evolving systems that interact within the bounds of the biosphere at various temporal and spatial scales and across scales.” Any thing is inevitably located within, and constituted by, these interconnected and interpenetrating systems, generating effects that are local and locatable, at points of intersection or interaction.

Contemporary thinking in material culture and sociology of technology place design in relation to material and political ecologies. On the one hand, not only are designed things understood to be comprised of basic matter, but embedded with the actions and intentions of their makers and commissioners (Latour, 1999). As crossovers of social and natural elements, things can be described both in terms of immanent dynamics of matter-energy and in terms of structured power and morals (for example, Bennett, 2004; Dant, 2005; Grosz, 1999). Enabling certain actions and disabling others, things have an agency in prescribing aspects of their subsequent reception and future use (Akrich, 1992). On the other hand, it is people who buy, adapt and use things, appropriating them for their own purposes within personal practices and cultures of use (Shove, 2003). Indeed, consumption of designed things includes not only integration of given affordances and embedded scripts, but the emergence of alternative interpretations and programs of use.

Designed things, thus, might be understood as sites of intersection among diverse systems. These intersections may take form as the traditional spatial object(s) of design, but this must also be understood as fundamentally temporal—a site of evolving and emergent interactions among human and non-human actors, material and political forces, technical and social processes. Ingram, Shove and Watson (2007) comment:

In some situations, consumers do much of the integrative work themselves, selecting from a repertoire of isolated products (for example, shirts, socks, shoes, jackets, coats, handbags, etc.) in constructing what is for them a coherent whole. In other cases, designers and manufacturers produce what are, in effect, preassembled bundles of products and technologies (for instance, offering a complete kit of fishing equipment or coordinated suites of office furniture). In between these two extremes, designers and manufacturers routinely take note of the settings in which “their” products are to be used. This is a somewhat limited response to the substantial theoretical challenge of understanding and intervening in the coevolution of complex product ecologies, and surely there is scope for taking these ideas forward within design research. In so doing it will be important to consider the temporal aspect of the relation between people, products, and practices. (p. 12)

In such terms, ecological thinking might be sited in everyday things and set in ordinary human experience. However, it also exposes some new points of consideration. For example, it no longer seems feasible to center design around the present and future of one solution or proposal, as we might project from the current state of a product to a more efficient, eco-friendly or otherwise preferred future version of the same. Indeed, it is not so much a product in itself but the interactions within, around, and through many things within a particular setting that must come into focus. To the extent that these interactions emerge in the space between the things that people assemble and adapt to their own values and purposes, these cannot be designed nor even anticipated by design. In this sense, sustainability is not something that can be embodied in the object(s) of design but that must emerge from within the complex ecologies constituting everyday life.

It also suggests another potential for design as an intervention into everyday ecologies. Consider the effect of introducing, for example, a new piece of clothing or furniture into a wardrobe or household: not only does it add something “new,” it changes the perception of previously existing things as “old” (see McCracken, 2006). We might compare this with the approach of brand development—while a consumer’s lifestyle, values and habits, cannot be designed in totality from above, they can certainly be influenced from the bottom up. While branding might typically try to change perceptions in order to encourage people to replace their old things with more of the new, we might also think of intervening things that prompt reflection on other values. This opens up ways of working with systemic change from the bottom up, in terms of design form and forms of use, rather than top-down systems design.

Consider another example, such as relations to energy in everyday ecologies. This cannot only be constituted by

the infrastructures of electricity production and distribution nor the electric and electronic devices depending on these infrastructures—but also by regimes of value, purpose and habit held by people in a social and cultural context. Indeed, electricity raises a further interesting issue. Other technologies and products may have a more obvious novelty value, objectified and packaged in ways that more forcefully intervene in the new. However, the structures, objects and actors participating in electricity use—such as grids and infrastructures, plugs and appliances, producers and consumers—are already deeply integrated into the everyday and extensively covered within sustainable development. In fact, the question of energy is not only a matter of introducing something, but a matter of rediscovering it, of uncovering something currently hidden and taken for granted. So, here, we might take another look at when and where design interventions might matter.

## Switch!

Switch! is a design research program that inquires into energy issues in terms of critical practice and everyday ecologies. Through design interventions that disrupt existing—and introduce new—values within particular situations, the aim of Switch! is to influence the perception of energy within a given ecology.

In order to influence perceptions and values around energy use, we have been investigating the place and potential agency of design within the multiplicity of actions and accumulated interactions in complex social and urban situations. In addition to the design of materials, objects and interfaces, design is also engaged to tell persuasive narratives and to stage experiences and debates. The design of interventions and the use of design methods become a platform for exposing existing habits and hidden norms as well as for proposing alternative actions and views. These propositions have been developed through practical experimentation and the materialization of design examples, and extended into debate forums, participatory workshops and field studies.

Switch! is a continuation of our ongoing research into how design can promote awareness of energy use in everyday life (Mazé, 2008). Previous programs included Static! (Backlund et al., 2006), in which we focused on the specific interactions between products and their users. From this perspective, we redesigned the repeated encounters and daily interactions with products as a basis for reflection not only on, but in and through energy use (cf. also Redström, 2006b). The goal of the Static! design program was to develop a more profound understanding of energy as material in design, including its expressive and aesthetic potential, thus locating issues related to energy use at the center of the design process in terms of both form and material (cf. also Redström, 2005). We expressed this approach through two main design themes:

- *Aesthetics of energy as material in design*—working with energy not only from a technical but also from an aesthetic point of view.
- *Reflective use*—treating use not only in terms of utility and ease of use but also in terms of critical reflection through the objects at hand.

The ambition was not to develop a single or optimal design, but to create a repertoire of examples of what design based on such perspectives could be like. Therefore, we developed a collection of design examples in the form of prototypes, conceptual design proposals and use scenarios, which then, collectively, became a platform for communication and discussion with users and designers.

In certain ways, Switch! continues this inquiry into the aesthetics of energy and reflective use. But, in order to consider the context of energy use as a more complex ecology, we have taken a more macroscopic view of interaction. Typically, design focus is on the proximate scale of real-time interactions between an individual user and a discrete product. Here, we attempt to shift from isolated people-product relations and the actual use of objects as the point of intervention, to considering a larger spatial scale and longer-term aspects of energy use. We do still consider the aesthetics of the materials and forms through which energy might become more present in everyday interactions. But, taking into account a wider situation and site of interaction, we also consider more elements involved in staging and inviting participation in sustained interactions. This involves both the aesthetics of the material forms, and the aesthetics of the larger experience and narrative in which these forms are embedded. In terms of the disciplines involved, this means that we not only include approaches to designing objects and interfaces, but also architectural and urban interactions. We attempt to make visible and tangible the connection of energy use to wider and longer-term issues affecting the locality, community and society. Thus, the focus shifts from energy, and even electricity *per se*, to the ecologies it provides for.

It is, however, important to understand that this is still about design and, in particular, about a certain criticism from *within* design, rather than about social or behavioral science. The notion of intervention here may therefore appear rather weak with respect to instrumental utility, particularly if compared to certain approaches developed within action research (cf. Argyris & Schön, 1991; Binder & Redström, 2006). While approaches within participatory design do share certain characteristics with participatory action research, the work presented here develops another relation to interventionist strategies. Our notion of design intervention is used to circumvent the typical focus in (sustainable) design with object- or product-centered (as well as opposing anti-material) strategies. In this way, we attempt to transform certain questions about what the outcome of a design process might be. Here, design is not considered as an instrument or tool employed to create interventions—instead, design discourse is the target of our attempt to intervene with new perspectives on how we might relate to environmental issues. In practice, this entails the design interventions being largely determined by issues in design discourse rather than optimized to influence the application domain, an approach that might appear rather peculiar from a traditional action research perspective. This is not to say that we do not engage in real-world interventions as well, but that these are typically carried out as studies in later stages in the development of the design examples (such as the study reported in Routarinne & Redström, 2007).

This shift from products, to the relations within product ecologies that new designs might expose and transform in Switch!, is not only a consequence of our own research, but also a response to significant developments in the field. Between the conclusion of Static! in 2005 and now, a range of products that are in some ways similar to the design examples we developed have entered the marketplace (including a few of our own). Besides this perhaps double-edged success of encouraging production and consumption, there are also conceptual reasons driving us to push the boundaries further. This is not innovation for innovation's sake, but because the creation of a reflective or critical relation to practice requires a certain tension between what is and what could be, between the possible or probable and the challenging and speculative "imaginaries" needed to deepen and develop a discourse.

### Set-Up and Structure

Given our interest in new ways that critical and ecological thinking could be applied to energy issues, the program set-up was itself an inquiry into ways of doing practice-based design research. Participants in Switch! came from art, design, anthropology, architecture, philosophy, computer science and engineering—each bringing a different set of concerns, methods, knowledge and expertise.

### Program and Experiments

The Switch! set-up can generally be described as an overall research program carried out by means of a series of experiments within smaller teams. By "program," we refer to a set of theoretical and operational strategies that frame a sort of "provisional knowledge regime" (Binder & Redström, 2006). While the problematics of design research in energy issues can be approached in any number of ways, the Switch! program frames a more specific set of theories, many of which are described above. While it is clear that such a program is only one of many possible approaches, interdisciplinary research does require a boundary around a substantial common ground for diverse participants to relate and work within, or else the situation becomes more of a meeting place for conversation than a deep collaboration. As a provisional knowledge regime, the program encourages a sort of mutual "suspension of disbelief" among participants, thereby enabling the research team to engage directly in design experiments, exploring consequences of the program through joint work together. As such, it is also instrumental in challenging and re-negotiating the boundaries among the many disciplines involved, thus facilitating a genuinely collaborative effort.

From this perspective, the experiments can be seen as constituting the main bulk of the research and the resulting design examples as the main results of Switch! Each experiment drives the program forward through more specific and deeper inquiry into the general themes and questions set out in the program—the span of experiments illustrates the breadth of the program in terms of common interests on an interdisciplinary and cross-domain basis. Just as theory and practice do not necessarily meet in any direct, absolute or even equivalent relation in practice-based

research (Mazé, 2007), experiments do not operate as a proof or test of the program, but as a means to learn about, reflect upon and challenge certain general or pre-conceptions. Within each, specific design ideas, research methods, representational techniques and dissemination formats are developed and implemented. These culminate in a design example that is more fully elaborated through one or more visual and tangible artifacts.

While this set-up addresses certain problematics in interdisciplinary and practice-based research, theory and practice are related in ways that appear different from other, perhaps more traditional, models of research. On the one hand, the ideas expressed in the design examples are selective, specific not only to the program but to the participants and circumstances of each experiment. This entails that the design examples may not relate to the general theoretical issues on a direct or one-to-one basis, and that the repertoire of examples does not completely exhaust the space of possible design responses to the program. Indeed, there are many ideas left open to further investigation—and, indeed, further ideas and questions are raised within the experiments. On the other hand, the selection of ideas within the design experiments is neither random nor arbitrary. The design examples are direct responses to the program—as it has been made operational within the particular social and material culture of the research environment over time. Indeed, this means that the tactics we introduce to situate these daily operations are important not only for the research culture but also for the research content.

### Curation and Events

The Switch! program has been carried out as an event-driven process (cf. Brandt, 2001). Each event has involved many participants in an intensive collaborative session over one or two days, focused on a particular aspect of the program. The main events of Switch! have addressed concepts of ecology in design, material experimentation and analysis, participatory design and design ethnography. Within each event, there have been various tasks such as presentations, readings, collaborative analyses, hands-on workshops, critiques and joint writing (cf. Clark, 2007). The events have been operated to establish a conceptual background for different topics and to expand, challenge and specify aspects of particular interest—spin-offs of the events have included pre-studies focused, for example, on smart materials or experience prototyping methods. Through the course of the events, certain ideas have persisted and collected around the intersection of complementary research questions, areas of interest, and expertise within smaller groups of participants. These have been further positioned in relation to topics in sustainable design and articulated as a series of potential design research briefs. Elaborated not only in terms of the core ideas, but also methods and feasibility, potential collaborators and stakeholders, several of these briefs have been taken forward by project teams as starting points for experiments.

It has been our intention that the research management of the program act as a sort of curation. Rather than a more traditional approach, which might involve top-down organization of teamwork, comprehensive project planning, assignments

and briefs set in advance, the main structuring devices here are the programmatic ideas, a series of initial events, and ongoing critiques, seminars and writing. More specific ideas, methods and design concepts have been developed locally and together, within events or experiments. Indeed, it has been essential in certain cases that these aspects could evolve along the way, to allow for incorporating additional expertise that could not be planned for or predicted in advance, such as the collaboration necessary for developing the representations and evaluations of the design examples. We have worked with such open-ended formats before (e.g., Redström et al., 2005), but Switch! has involved a particular assembly of participants involved in other activities in parallel and outside this program, including long-term doctoral studies, other research and teaching work, and commercial consultancy. As research leaders, we have set out certain frames and structures, invited participation and ourselves acted as participants—but much is left open to evolve along the way, on the basis of research agendas formed through and driven by individual initiative and group work.

This setup has been a tactic for dealing with a complex research and design space—through the introduction of diverse perspectives and competing ideas within an open-ended program, we are also experimenting with how certain theories and methods from the program are taken up, interpreted, and appropriated in experiments by and with others. For us, this opens up the way for fresh and unique interpretations, deep expertise in diverse disciplines and domains, new audiences, additional partners and even additional funding generated from the bottom up.

Following are six design examples developed within Switch!

## Design Examples

### Energy Futures

“Energy Futures” speculates on forms of energy consumption in the future. Applying methods from futures studies, Energy Futures takes root in current behavioral trends and forecasts of energy futures. As tracked by social scientists, tipping points in energy costs trigger radical behavioral and cultural effects. Extending these methods and findings to design, the project revisits familiar urban and domestic artifacts, which are reinterpreted in terms of potential behaviors and beliefs around electricity consumption. For example, common electrical hardware is rewired by eco-terrorists for socket bombing, daily weather reports feature sun and wind in kilowatt-hours for life “off the grid,” new national holidays and local rituals arise around energy saving, and city zoning encourages voluntary electricity abstinence. Countering both the incremental reforms of user-centered design and the utopias of visionary design, Energy Futures operates between the familiar now and the extreme future, intervening with strangely familiar objects that exist somewhere in between.

The project takes the form of fictional scenarios in which a series of (re)designed artifacts transform personal lifestyles and urban life. So far, the presentation format for these has been small gatherings within a gallery setting. The scenarios and artifacts, together with supporting “evidence” such as faked documentation and websites, set the stage for a performance and discussion about Energy Futures carried out this past autumn. Groups of invited designers, architects and other stakeholders were gradually immersed in the fiction over the course of an hour. An absent tour guide gave an oral history of the scenarios and instructions about



Figure 1. Energy Futures event. Documentation of the performance (left) and stories and artifacts (right).

operating the artifacts via a multi-party telephone call—amongst themselves, the participants had to collaborate to unfold and make sense of these Energy Futures. Emerging along the way were a variety of intimate stories and personal opinions, as well as political issues and professional points of view. Through the intervention of a (super)fictive narrative and props, the project operated as a platform for hosting a debate about probable and preferred futures of electricity consumption.

**Project team:** Ramia Mazé, Aude Messenger, Thomas Thwaites, and Basar Önal.

### Telltale

“Telltale” is a piece of furniture that collects traces of energy habits. Connected remotely to a household’s electricity meter, the surface and structure of the object are designed to respond to increases or decreases in energy consumption. Increases cause its internal structure to become less robust—as the object is used in more weakened states, the specially-treated textile surface becomes more prone to fading, flaking, crackling or wrinkling, such that energy (mis)use leaves traces on its surface. An information and exchange service is also proposed—Telltale is intended to be a transitional object rather than a privately-owned consumer product. Traveling from house to house and staying for some time in each, it communicates locally, to its immediate users, and also carries traces of those that came before, introducing an awareness of others’ energy transitions and an experience of the cumulative

effect of local actions. A full-scale but low-tech prototype of Telltale will shortly be intervened into two households for a small-scale study—techniques from design ethnography and participatory design will serve as a basis for observing and discussing how the families perceive the evolution of the material form and relations to their family’s energy behaviors.

In response to issues around the private ownership and planned obsolescence of products, Telltale intervenes an alternative point of view. Inspired by some current approaches to treating dependence on energy in terms of addiction, the Telltale concept relates to the psychological theory of “transitional objects” that accompany people from one stage of life to another—particularly as the theory is related to intimate and often textile artifacts (such as children’s blankets) in the field of material culture. A central research concern has been the role of an object that is both personal and collective, how its materials and form place it within the home, and how data might be given a dynamic expression through the aesthetics of smart materials. The aesthetic of each Telltale is intended to be unique, a joint product of energy consumption and daily use—the object becomes an increasingly valuable record of domestic life, even as its durability is made more precarious due to an increased dependency on personal actions and collective effort.

**Project team:** Jenny Bergström, Ramia Mazé, Johan Redström, and Anna Vallgård. The prototype was built with Alberto Frigo and the household study is being led by Brendon Clark.



**Figure 2. Telltale materials development.** Textile samples resulting from the materials experiments (bottom), full-scale low-fi formal study (middle), associated domestic situations (top).



### 3Ecologies

Inspired by the philosophy of Felix Guattari, “3Ecologies” examines three factors—environmental, sociological and psychological—that impact upon the sustainability of human-made artifacts. For a series of common consumer products, we have been mapping these factors over time, through lifespan (purchase, use, and disposal) and extended lifecycle. This mapping has been developed as an information visualization in which the history and potential futures of products are projected, including natural disintegration, active recycling and unexpected adaptations—providing a long view of the “life” of things we might ordinarily take for granted. Key decision points for consumers and potential interactions between the products or product domains are situated and sequenced over time within the product lifecycle. 3Ecologies is currently under development as an open-source web application and as a media installation for a museum—it is aimed at a wide audience ranging from product developers to the general public.

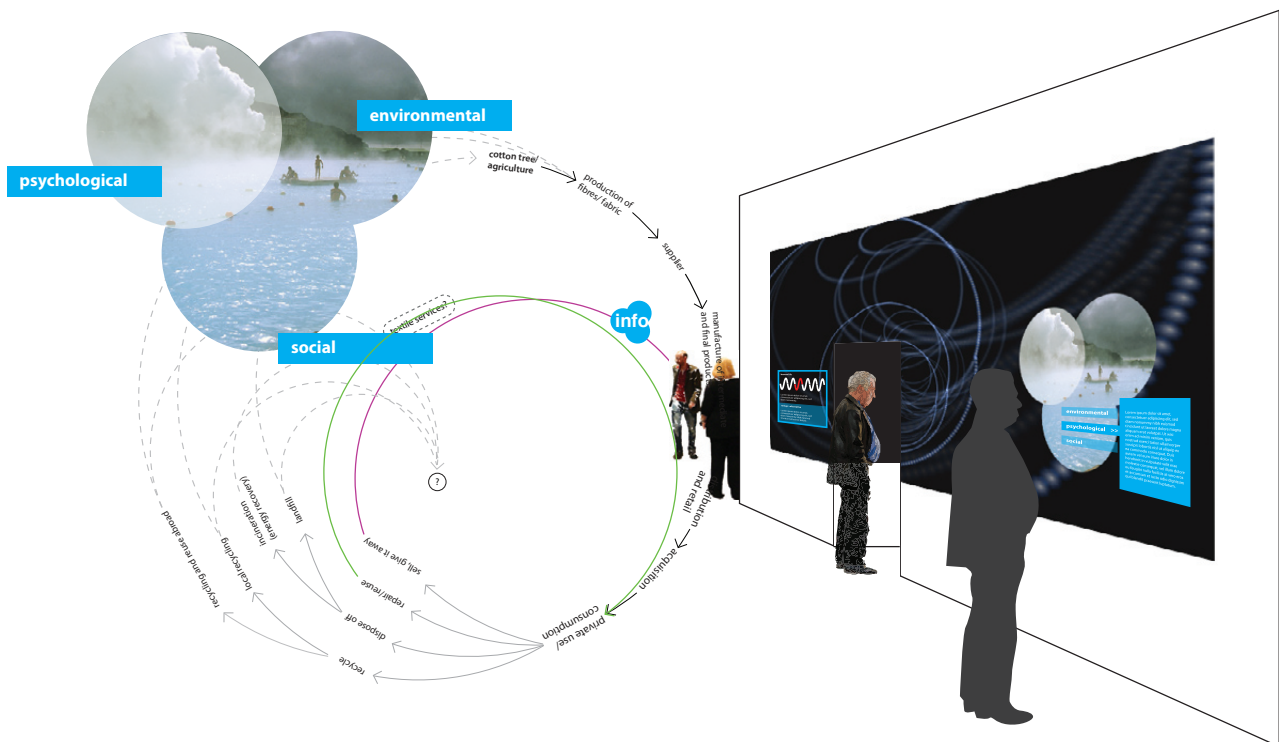
In relation to traditional lifecycle analysis in engineering, 3Ecologies challenges the reduction of sustainability to statistical data that is often solely based on environmental aspects of material origins and offsets. Instead, qualitative aspects are visualized through graphical diagrams and narrative stories, and interactive functions activate alternative choices and consequences—aspects of presenting and learning about sustainability that are often left out of scientific data and economic predictions. Indeed, we have explicitly introduced a number of accidental futures and unexpected (mis/re-)uses of products, in order to open up reflection

and provoke discussion about the power of personal actions and (sub)cultural appropriations. Thus, 3Ecologies uses visualization and storytelling techniques, and methods of provocation and projection, in order to intervene an additional set of values and questions into lifecycle(s) thinking.

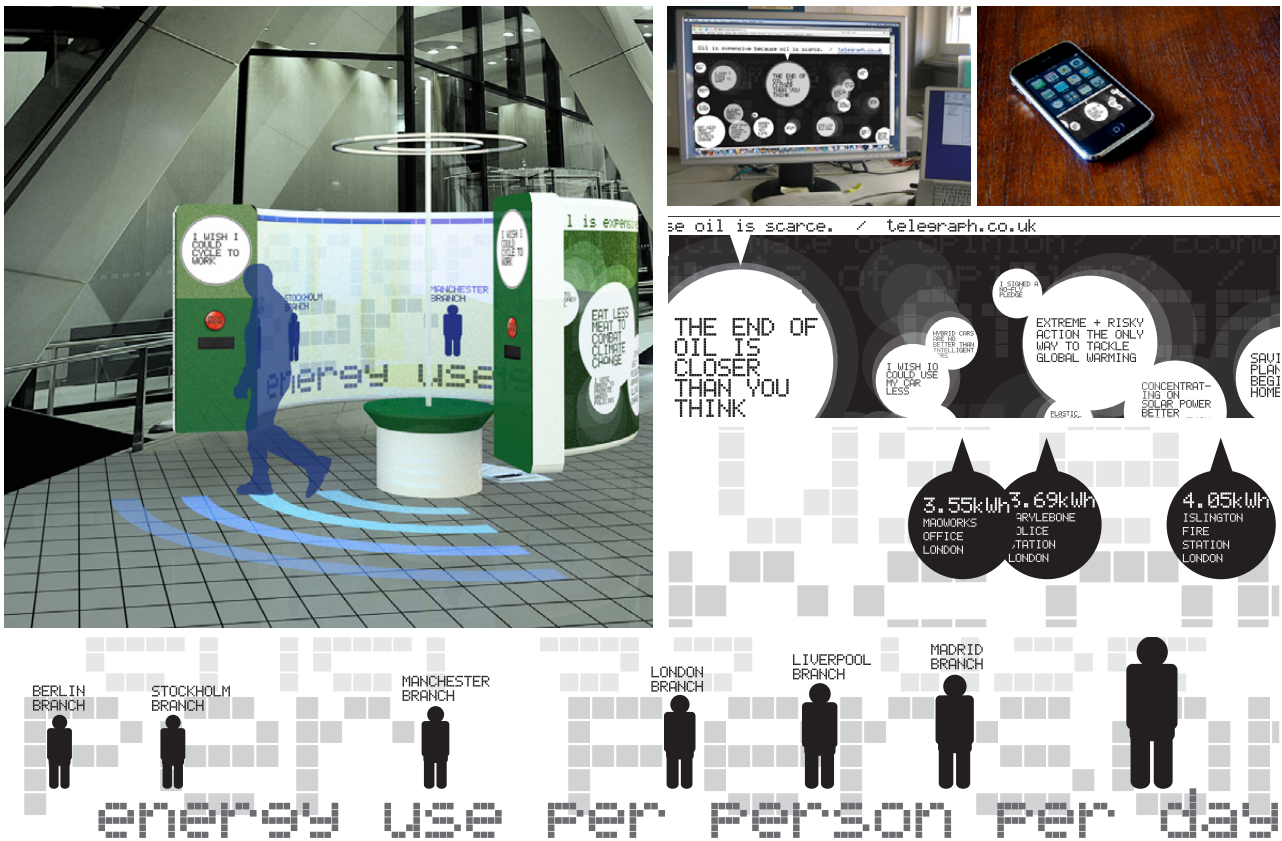
**Project team:** Martin Avila (School of Design and Crafts, Göteborg University), John Carpenter (Design/Media Arts, University of California at Los Angeles), and Ramia Mazé. 3Ecologies is funded through IASPIS (part of the Swedish Arts Grants Committee) and Switch!

### Green Memes

“Green Memes” proposes an online social network and local touch points for people to learn about and express ideas about sustainability. Green Memes takes the increasing amount of data about energy use provided by new technologies such as energy metering, smart grids and building automation and places it in a new system that people can use to visualize their personal energy consumption. Each participant’s “personal energy figure” is visualized and can be compared to others’ energy figures, locally and globally. An online research function and social network is built on top of this information visualization—media headlines acting as triggers for people to look deeper into and express positions in relation to energy and sustainability issues. Green Memes is intended to be available both locally, at kiosks in building lobbies, and as a website—through a PC browser or mobile device, people will be able to view, research and vote for



**Figure 3. Schematic drawings of 3Ecologies.** The information visualization includes elements such as a lifecycle diagram and visual/video elements (left) and is developed for museum installation (proposed layout, right).



**Figure 4. Green Memes proposal.**  
 Renderings of kiosk construction and interaction (left) and schematics of the information visualization and graphics (right).

“memes” as headlines about sustainable issues, which will grow or disappear based on users’ votes. The project is currently seeking partners to help further develop and implement the system and interface design at specific sites.

Much information about energy is presented in the form of hard data, the overwhelming amount and abstraction of which only increases as more technologies are developed for monitoring and regulating electricity. Green Memes presents such data complemented with personalized statistics and public opinions within a platform for individuals to connect, communicate and compete. The social premise of the project is rooted in the powerful phenomenon of “memes”— ideas or behaviors that can pass from one person to another through the sociosphere. Like genes, memes are reproduced and propagated, starting with individual instances and growing in society through survival of the fittest. The system depends upon a diversity of subjective positions expressed by individuals and the active participation of a critical mass of participants acting in multiple locations. Further, the project attempts to bridge this social design agenda with a proposition that globally distributed companies that take on an agenda of corporate responsibility might become powerful social actors in an area where currently there is a vacuum of power with respect to environmental issues.

**Project team:** Ramia Mazé with Tobi Schneider and maoworks. The maoworks design agency has been commissioned for the project, which has been developed as a collaboration.

**Ab|Norm**

“Ab|Norm” questions norms around the perception and use of energy in public. Many functions and forms of electricity have long been “naturalized” into subconscious expectations, habitual actions and cultural norms. We may no longer take notice of the electricity present, much less its accompanying values and consequences. Indeed, electricity in public space cannot only be a matter of reduction or efficiency—values of safety, ambiance, beauty, tradition, identity and conviviality are implicated. Ab|Norm investigates this complex space, proposing interventions into specific sites and situations in order to expose the behavioral and cultural norms that have built up over time around energy consumption. Some strategies for the design interventions include disrupting the smooth operations of energy-intensive public services such as street lighting and escalators, exaggerating the range of choices (and consequences) available, requiring increased effort to interact with electrical artifacts, provoking social and peer pressure through public competition, and inserting statistics where energy choices and consumption take place.

Ab|Norm takes the form of a series of concept designs collected in a book of sketches. The book acts as an archive of strategies and ideas, intended as a resource for interacting with stakeholders from the design and energy industries within participatory workshops. In an upcoming workshop this winter, a selection of the sketches will be deployed at different stages in an activity exploring the aesthetics of energy in public life—by

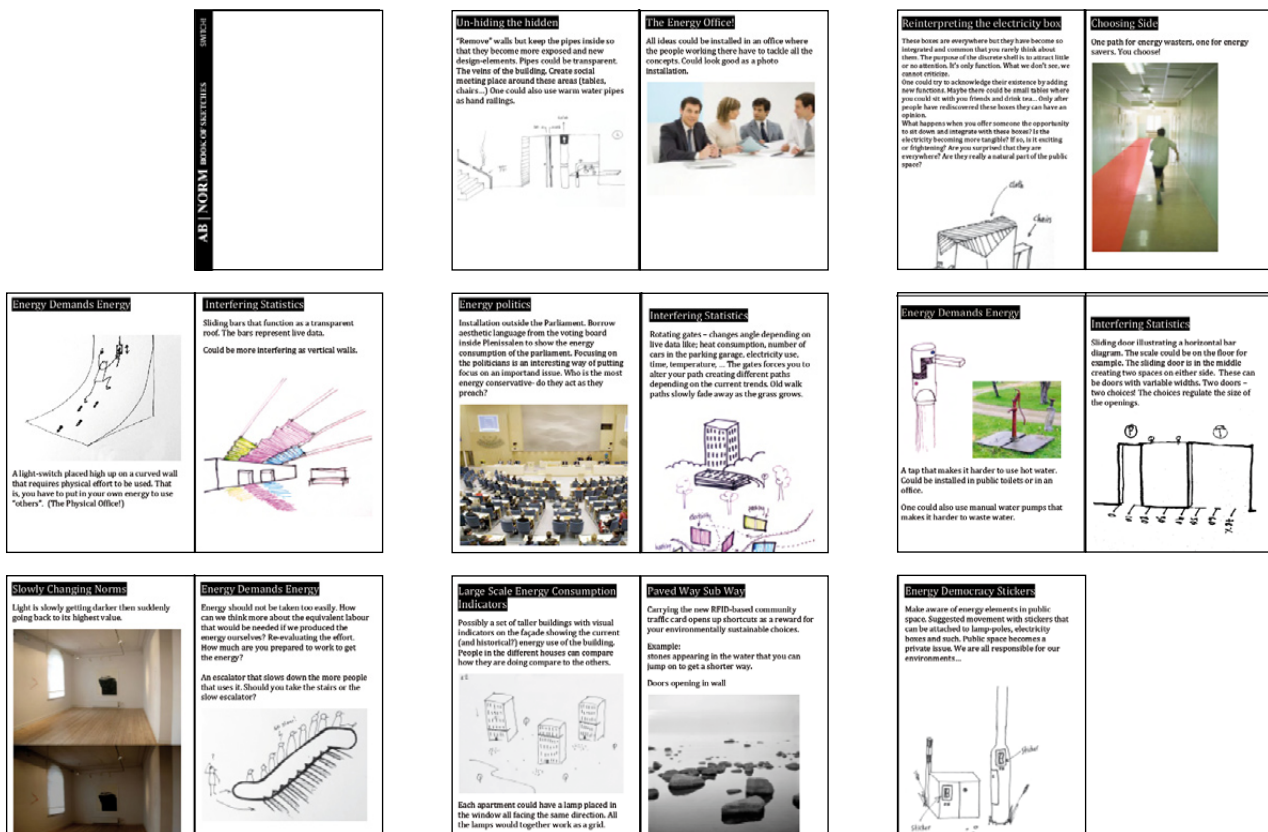


Figure 5. Pages from the Ab|Norm sketchbook. Concept designs depicted (above) can be detached and deployed in participatory workshops.

intervening and juxtaposing sketches in ways that enable contrasts and comparisons, the activity will frame a discussion around the norms and values behind current and potential strategies. The goal of the workshop is to gather information from the participants about how they currently experience and treat such issues, in both their private and professional capacities, as well as to facilitate reflection on alternatives. The sketches, thus, function as conversation pieces or props for discussion—rather than design solutions or proposals, they accompany a methodology that intends to intervene a new set of questions in current practice and among practitioners about a complex and often overlooked set of issues.

**Project team:** Looe Broms, Karin Ehrnberger, and Ramia Mazé.

### Symbiots

“Symbiots” intervenes in local energy infrastructures. The project imagines public functions that operate parasitically—these emerge and thrive when there is a low demand from private consumers on the electricity grid upon which they also depend. When people in nearby households, buildings or neighborhoods reduce their energy consumption below a certain threshold, excess energy is employed to surface playful and provocative forms within the urban landscape. Three situations are depicted: a street cinema that arises to provide a traffic-stopping experience for locals; street lights that spotlight household energy efficiency, and a mini-

golf course that builds up through collective effort. Suddenly and sometimes spectacularly visible, these serve to lure people out of their private habitats and away from their energy-consuming habits, thus further reducing private energy use. Through the provision of new functions and public forms, people are rewarded for their good energy consumption, and lured into new patterns of local activity and energy behavior.

With respect to the primacy of values such as ease-of-use, comfort, taste and rationality in conventions of “good design,” Symbiots operates to complicate such values in order to expose our unthinking dependency upon energy and the current human-(versus eco-)centered design paradigms. Inspired by symbiosis and parasitism in biology and botany, the project transfers certain interactions that occur in nature to everyday city life, allowing them to emerge as transformations of the graphical patterns, architectural configurations and electrical infrastructure typical in Swedish cities. Playing with the ambivalence between mutualism and competition, the images are strangely familiar, alternatively humorous and sinister. Painting a vivid picture of alternatives to current local priorities around energy consumption, Symbiots depicts mutual benefits for all—though, underneath, it is the interests and survival of nature that has become central.

Symbiots takes the form of a photo series in the genre of contemporary hyper-real art photography. The project has been communicated within the neighborhoods where the photos were taken through a designed poster showing and explaining the photos and through door-to-door visits and discussions with the



**Figure 6. Photo series created for Symbiots:** The three sites—public lighting, street life, a shared park—each in two states of expression in relation to different times of the day or week and different patterns of energy consumption.

inhabitants. The project is intended as an exhibit within a museum context.

**Project team:** Jenny Bergström, Ramia Mazé, Johan Redström, and Anna Vallgård; photography by Olivia Jecznek and Bildinstitutet.

## Discussion

Switch! is an attempt to create a space for reflecting upon the current status and strategies within design discourse concerning sustainability and environmentalism. In part, this is a response to changes in certain design issues and the consumer market since Static! It reflects how we have renewed our consideration of how a critical practice in this area might operate.

On the one hand, the number of design products oriented towards energy awareness now on the market requires us to further differentiate ourselves from commercial product development—otherwise the response to our research and design examples might not be critical reflection but popular appeal and commercial incitement. Thus, what we are looking for here is not a new set of solutions, or potential products, but the space opened up between established and alternative values. Indeed, it seems necessary to complicate the problem/solution rhetoric around sustainable design, since dialectics and reductionism may not help us come to terms with the scale of the current challenges and the complexity of the issues at hand. Thus, our ambition is not to converge upon a single problem or solution, nor to provide a roadmap to a particular preferred future, but to materialize a territory of possible viewpoints as a basis for curating—and catalyzing—a conversation in the here and now.

On the other hand, the growing influence of design speculations in popular culture and sustainable design has meant that we have refined and deepened our own approach. To evade

a growing genre of design one-liners and shock tactics that verge on “climate porn,” we have developed a more substantial historical and theoretical basis for framing our approach to critical practice, including a renewed relation to critical social and political theories around ecological issues in other fields. Steering clear of both greenwashing and eco-horror, future utopias and dystopias, we have been attempting to get at a more fundamental set of issues within design. While refusing both simplistic and extreme reactions, we might instead locate more specific, subtle and constructive strategies for engaging within the complexity of current design problematics. We believe that design research offers the possibility to act as a sort of curation in the development of a mature debate about environmental issues by materializing diverse—and perhaps even conflicting—values in forms and formats that people can relate to and participate in.

In response to certain problematics within contemporary (sustainable) design, we have been rethinking the object(s) of design research and practice. In terms of design interventions, we have investigated the social and cultural agency of design in two respects. For one thing, we have introduced the term “intervention” to circumvent the conventional preoccupation of design critique and history with discrete design objects, a preoccupation that often reduces discourse around the products of design to questions of form and function, usability and marketability. In light of current environmental issues, we attempt to expand the consideration of the values that design might affect by drawing attention to the larger ecologies of systems, relations and interactions that objects are located within. This does not mean that we are abandoning questions of form and function—indeed, the notion of “criticism from within” acknowledges the power of aesthetics and materiality, as well as the persuasive and performative potentials of objects—but we see these as means for redirecting attention to other ends. Thus, the design examples are clearly located within architectural,

interior, product, graphic and interaction design, but are motivated and directed at exposing an alternative set of issues.

Just as we still take as a starting point the traditions and techniques of design practice, we also want to understand the design examples as interventions into real (or potential situations) of consumption, something that has long been the interest of the social sciences in design. Indeed, the potential for design objects to throw existing conventions and norms of consumption into sharp relief is also a central concern in critical practice. While the materiality, craft and aesthetics of design objects doubtless effect subsequent reception, we might ask further questions about how these effects might relate to intentions such as stimulating “reflective use” or “design for debate.” Indeed, given the power of a new object to propagate something beyond its own appearance, to locate a material point of interaction or intersection within multiple ecologies, we might also want to inquire into particular situations in order to understand an intervention at work. This might involve designers directly in the “art of staging” within a site or situation, or methods towards a sort of “experimental anthropology,” as suggested by Latour (2004). In some projects within Switch! (such as Telltale), the objects produced will also be intervened into real households as a way to evaluate aspects of the performance and perception of the object in use, while others (such as Symbiots, Ab|Norm, and Energy Futures) experiment with alternative formats for scenario planning, design ethnography and experience prototyping in order to debate norms and imagine alternatives.

Secondly, we might consider another scale of effect that design research and practice might target, such as the objectives—or the object—of design discourse in critically rethinking the parameters of (post)environmental problematics. For one thing, we might consider the arguments of cultural and political ecology that ideas about nature and sustainability are socially constructed—which introduces the possibility of making conceptual or discursive interventions that de- and re-construct such ideas in order to explore alternative valuations and views. This might take departure in the reframing of “imaginaries,” with some potential relation to the “visions of the future” and “alternative nows” that have been topics in critical practice (cf. Mazé, 2007)—indeed, these have been starting points for Symbiots and Energy Futures. Another basis for operation might be rethinking the instruments and mechanisms through which we measure and value the environment that, as Latour (2004) discusses. This might take the form of alternative data sets, future predictions, consumer reports and categories of valuation—as has been present in the development of 3Ecologies, Telltale and Green Memes. While the sorts of objects that design typically produces have a role within these projects, equally important in relating to the larger conceptual and discursive objectives of design is the development of a craft and aesthetics around techniques for visualizing, storytelling, performing and debating.

As we have inquired into these object(s) and effects of design interventions, further implications about “reflective use” have been raised as we reflect upon our previous work from this new perspective. In Static!, actual use of objects is central; in Switch!, a more macroscopic notion of use in terms of patterns,

norms and trends entail that the focus shifts from discrete acts of use or objects used to potential effects within ecologies on a larger spatial scale and a longer temporal scale. Since the factors comprising such situations may not be possible to implement or replicate in a full-scale design prototype, it is not always possible (or desirable) here to test use in a traditional or literal sense, as is typically done in usability studies. But this is not the only reason for exploring notions of use that may seem far-removed from the more hands-on approach taken in previous programs. In this case, we have to consider use not only in terms of product use and consumption, but in terms of the reception and interpretation of propositions within contexts such as workshops, debates, publications and exhibitions. In a sense, this is an exploration of what notions of “use” design (research) may operate in relation to, including opening up the way for alternatives to acquisition, ownership and utility as standards for measuring value. Correspondingly, the audience—or “users”—includes not only potential end-users, but also a range of other, and perhaps more public, stakeholders.

To give a concrete example, we have wanted to encourage more nuanced or thoughtful responses to a potential object, situation or future, so as to counteract tendencies towards the commonplace and polarized responses of “I want this, where can I buy it?” or, correspondingly, “I do not like this, I’m not going to buy it!” Therefore, many of the design examples have a rather unsettling or ambivalent character, which was achieved through exploring and testing out different aesthetic strategies. In Telltale, for instance, substantial attention was given to the development of materials that would express the character of a transitional object, and also to an overall expression of change, aging and fragility that clearly located the object within the material culture of the domestic environment. In Symbiots, the narrative content, visual drama, and aesthetic genre of the photographs are as important as the form of the design concepts depicted within. It is a tension between the real and the unreal achieved at multiple levels—consider for instance the relation between strangely familiar forms surfacing in familiar environments and the conjunction of fine-art photography with sophisticated 3D-rendering and post-production techniques.

In some cases, the use of such objects simply cannot be arrived at by building working prototypes and testing usability. Letting people “experience” Symbiots through prototyping a golf course, for example, puts attention on the wrong set of issues—it is not the golf course *per se* that matters here. The same holds for enabling people to watch a movie in the street and then asking them what they thought of doing so. Indeed, it’s not just that prototyping these examples is difficult to do, but that it would very easily become a matter of prototyping the wrong issues or perspectives. From a more traditional product or interaction design perspective, this may appear as a strange paradox—but considering that it is not utility, but critical reflection and a tension between the real/unreal, that is at issue here, this paradox simply illustrates that we need to further develop our conceptions and understandings of use or consumption in design (research) today, along with an expanded set of corresponding strategies for inquiry and (e)valuation. Still, although their mode of operation and our interaction with them differ, the actual objects (photographs,

mock-ups, models, scenarios, etc.) are as important here as they were in our previous programs.

In one further sense, we are also interested in challenging notions of use in Switch! While user-centered approaches to design have gained widespread influence over recent decades, this raises some interesting issues with respect to primary value in an environmental discourse. Indeed, environmentalism requires us to reconsider our relationship to nature. Thinking in terms of ecosystems and lifecycles removes us from the center—rather than our needs, here and now, natural limits and balances, future generations and global impacts may need to take precedence. While it may be hard to spot nature within our contemporary cosmopolitan lifestyles, our (inter)dependency upon the changeable natural environment is increasingly apparent. Expanding notions of reflective use also in such directions and challenging the anthro/user-centrism determining much design, we want to explore other ways of conceiving “use” to catalyze debates. For instance, what are other important users—actors—that are not human? Where are agency, morality, values? Indeed, the holistic perspectives needed to engage with the complexity of energy ecologies makes it necessary to reconsider the role of users, since it is not only people and their experiences that matter.

Our design examples are not meant to shock nor to solve—their purpose is to propose and map out a set of new ways of thinking that throws the “old” status quo into sharp relief. By populating the design space with more options and alternatives, our intention is to create more tension between the actual and the potential, thereby undermining our habit of silently assuming the already established. It is not meaningful to evaluate such alternatives on the basis of whether they are better or worse than what exists already in terms of utility, usability or appeal—they are simply not meant to replace things that already exist, just as the design examples are not intended as further additions to an already rather crowded product market.

## Concluding Remarks

As recent debates revolving around environmentalism demonstrate, the framing of and approaches to environmental problems are inevitably tied to ideological and normative positions that must be continually examined, updated, and debated. We need only look at the current difficulties caused by traditional conceptions of nature as resources quantified in terms of “use value” and “exchange value”—such terms have long governed how related problems are set, with profound consequences for the premises and limits of conservation initiatives and environmental policy.

Indeed, within current (post)environmental thinking, there are fresh calls for design participation—and not only in problem-solving. When Stengers (2005) characterizes design as “an art of staging” (p. 994), she also poses what we might perhaps take on as a brief for critical practice:

How can we present a proposal intended not to say what is, or what ought to be, but to provoke thought, a proposal that requires no other verification than the way in which it is able to ‘slow down’ reasoning and create an opportunity to arouse a slightly different awareness of the problems and situations mobilizing us? (p. 994)

Sustainable design must incorporate and encourage mechanisms for critically reflecting on the role and responsibility of design in shaping human experience and changing social conditions. Rather than attempting to preserve the status quo or return to a previous state of affairs, this requires us to acknowledge the inevitably productive and persuasive power of design in creating the “new.” Besides new solutions—or problems—this might also include the formation of reflective practitioners and alternative products. As an “art of staging,” design might meet sustainability in “problem-finding” within existing and emerging paradigms, opening up questions to an expanded range of interests and stakeholders. Critical practice might be brought to bear on sustainable design not as simplification but diversification of the ways in which we might understand the challenges at hand. In such terms, design practice might employ research and theory in order to open up the way for constructive engagement in complexity.

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Unless other affiliations are stated, members of the project team listed above are from the Interactive Institute. In addition, we are grateful for valuable contributions to the program development from Sara Backlund, Christina Öhman and Erik Dahlquist.

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