

# Changing<sup>the</sup> **change proceedings**

Edited by  
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# Criticality Meets Sustainability

## *Constructing critical practices in design research for sustainability*

Ramia Mazé<sup>1</sup>

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### Abstract

Sustainability requires a wider awareness of the changing conditions for design today – rather than focused solely on preserving nature or conserving energy, per se, this opens up for challenging assumptions about relations between design and society and for constructing new forms of critical practice. Tracing tendencies in conceptual and (post)critical design, this paper argues for further developing the critical discourse within design today and design research as an important arena for extending the ideological and artifactual production of such discourse to users and stakeholders. In relation to my own experiences within the Static! and Switch! design research programs, these perspective are anchored in conceptual, operational, and practical examples of critical practices applied in the area of energy awareness.

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# 1. Introduction

While often at the forefront of expanding material consumption, designers are now increasingly facing the issue of how to achieve the opposite. The disciplines of industrial and interaction design, for example, grew up around interest in increasing the profitability of the emerging electric and electronics sectors – but, today, the challenge is to change reverse behavioral patterns of energy (over)consumption. Particularly as other parts of the world are rapidly growing in design competence and consumer power, is time to rethink how the powerful and persuasive forms of design might be redirected to critical practices of design and research in the area of sustainability (Buchanan 1989 ; Redström 2006). Just as product and interaction design have helped introduce the design products that we depend upon today, researchers and practitioners in such disciplines must participate in a raising awareness about the consequences of design production and consumption.

Design has long been about the expansion of material welfare. On behalf of clients, design is bound into larger projects of continually increasing economic and symbolic capital. Design is no longer, if it has ever been, solely about satisfying basic human needs of an individual or society, but also about creating needs and even manufacturing desire. However, the reality of limits to the environment – limits to the availability and resiliency of physical resources – also suggests limits to an economy based on the exploitation of such resources (Manzini 1995). Sustainability, and related arguments for an ethical, humanitarian, and critical role for design in society, presents certain challenges to the idea of design only ever ‘in service’ to expanding production and consumption at the cost of the environment (Mazé 2007). Such challenges suggest the need for an increased intellectual and ideological reflexivity within design, as a basis for changing ways of thinking and acting within the discipline as well in relation to clients and consumers.

There are a range of existing and emerging responses to the challenges of sustainability in design. With respect to the problematics of material exploitation, for example, there are calls to shift design thinking away from the production of the ‘new’ towards the revaluation of existing material goods, for a closed and continuing loop of material production, recovery, and remanufacture, and for moving from a materials economy altogether. As some turn towards immaterial design, others return to materiality in terms of the longevity, durability, and sustainment of things through use, interaction, and engagement. Others argue that sustainability is not only a question of material resources but of psychological endurance and sociological durability, through which products are sustained within social practices of consumption. (Chapman 2005 ; McDonough 2002 ; Shove 2003 ; Verbeek and Kockelkoren 1998)

This expanding range of perspectives challenge established notions of what design should be about, and also imply increased interactions with other domains of knowledge and systems of production. In order to understand and craft things with increased and lasting meaning, it seems that designers might need to relate to ideas perhaps more proper to psychology, sociology, anthropology, and material culture. Since designers must not only take into consideration immediate design process and discrete design objects, but effects and consequences that might arise long after, they might engage more extensively ideas about ‘futurology’, ‘futures’, and ‘foresight’ more familiar in the domains of business, economics, and politics. Extending far beyond the established knowledge tradition within design, this requires that

design relate critically and productively to theories and practices in other disciplines without sacrificing disciplinary integrity.

## **Constructing critical practices in design research for sustainability**

This paper traces one approach to design research for sustainability, drawing on a history of conceptual and critical tendencies in design that employ design materials and form for purposes of 'problem-finding' in disciplinary discourse and wider society. Arguing against design 'in service' to ideas imposed from outside and above, critical architecture and anti-design have been arguing since the 1970s for an ethics and ideology proper to design – "Otherwise we will end up by designing beautiful electric chairs or mountains of rubbish," as Superstudio proclaimed (Lang and Menking 2003, 120). Through such retrospection, we might draw out strategies for designing for 'poetic'- or 'critical distance' between design products and those who encounter or consume them, a distance that might enable reflection or debate on sustainable issues. Indeed, this has influenced how we have related to material expressions and interactions in a design research program that is described further in this paper.

Further, critical practices also expose certain possibilities and problematics for design research. Such critical practices have been reconfiguring the relation between theory and practice, both for purposes of building an intellectual and ideological foundation within and proper to design and also for relating to critical and social theory from other disciplines. Further, contemporary conceptual and (post-)critical practices argue not for criticism or evaluation of past or existing things but for the proactive production of new and alternative ideas, an ideological and artifactual production concerned with materializing a 'criticism from within' one's own discipline. Alongside theories that have become some of the critical terms within design discourse, the growing discourse around sustainability constitutes another and essential set of relations that we must find rigorous and generative ways to incorporate into our thinking and making. Given the problematics of (inter)disciplinarity, this requires new and means of constructing and conducting critical practices in design research.

In recent years, I have been part of a collaborative effort to develop design research programs related to sustainability at the Interactive Institute in Sweden ([www.tii.se](http://www.tii.se)). Since 2004, we have grown a relationship with the Swedish Energy Agency (Energimyndigheten) to inquire into how design and technology might effect energy awareness and behaviors. This has been the focus of two research programs, Static! and Switch! that are presented in this paper. While discussions of Static! as a whole, and the individual prototypes created within, have been presented elsewhere (among others, Backlund et al 2006), this paper draws out some of our thinking behind the program in terms of 'critical practice' and discusses relations to paradigms of practice-based research in the applied arts (see also: Mazé 2007 ; Mazé and Redström 2007). Further, this paper draws out issues from Static! and its relation to critical practice and extends these to describe our approach to our current program called Switch!

## 2. Critical practices

Design is located in an ambivalent place, wavering between the concerns of culture and capital, which may be more decisively dealt with in other fields. In architecture, for example, criticality has a vivid tradition since a dramatic rethinking in the 1970s of criticism and critical theory within the discipline and within the profession. While contemporary architecture seeks to escape the rigorous and restrictive criticality of the past, product and interaction design are only beginning to feel out intellectual and ideological underpinnings. As John Thackara notes, “Because product design is thoroughly integrated in capitalist production, it is bereft of an independent critical tradition on which to base an alternative” (Thackara 1998, 20). This lack would seem to pose a challenge for designers looking for alternative tactics and values than those present in mainstream production and consumption – indeed, such alternatives might seem essential to sustainable design today.

### (Post-)Critical architecture

In architecture, critical discourse has been an arena for developing relations to theory – or, more precisely, ‘Critical Theory’, posed by the Frankfurt School, and ‘critical theories’, as more generally refers to subsequent poststructural, feminist, and postcolonial theories. Based on structuralist thinking, the debate in the 70s ended an ‘era of manifestos’ (generally characterized by a few polemic positions and loose relations between theoretical rhetoric and practical reality). The debate was an attempt to separate ‘operative criticism’ or ‘instrumental theories’, located within inevitably biased positions within professional practice, from theories originating from and operating without, for example in historical or philosophical projects. An outcome of this debate was the emergence of what has been called ‘critical architecture’, concerned with excavating a realm of autonomous knowledge proper to the discipline of architecture. (For background to this discussion see: Allen 2000 ; Hays 1999 ; Hays 2002 ; Rendell, Hill and Fraser 2007)

Examples of critical architecture, such as deconstructivist works, operate through strategies such as the systematic reversal or transgression of the visual and spatial expectations of form, experienced as an disorientation of cognitive and perceptual faculties. More recent approaches resist negating or inverting norms, constructing a more subtle interplay of historical, social and spatial factors to expose and alter the construction of different sites and situations in terms of power, gender, or class. Inherent in strategies associated both with the ‘critical’ and ‘post-critical’ is the use of built form to evoke a conceptual attitude or experience. Where deconstructivism tended to posit the building as a text, which might then be ‘read’ in terms of norms and their rupture, other strategies might be understood as a sort of ‘embodied conceptual art’, in which bodily performance takes precedence.

Theory has a role in establishing a ‘critical distance’, whether this is distance from mainstream practice or from other related practices, and defining an attitude or position in relation to the conditions within the discipline and those circumscribing it from without. In this sense, criticality, as deployed in architecture, has a purpose and a context, expressing a point of view as a response to existing conditions. Further, as Michael K. Hays articulates, “Critical theory... provides a chance to reflect upon what there is, but also to imagine something different – to question and transform rather than describe and affirm” (Hays 2002, 148) The term ‘critical’ can be posited as “the constant imagination, search for, and construction of alternatives” (Hays 2002, 326), the variety of (post-)critical practices within architecture open up a space for architectural

practice as an arena for conceptually and physically 'constructing doubt' within the observer or inhabitant as well as making 'forceful propositions' about alternative or future realities.

## **Conceptual and critical design**

In other fields of design, such as the relatively new fields of industrial, product, and interaction design, the basis for criticality is less definitive. At the same time as post-critical architects are reengaging with the material, procedural, and political conditions that circumscribe the profession, product and interaction design are attempting to establish critical terms and construct theoretical bases. As market logics and popular culture have long determined almost all of what happens within product design, designers are seeking and creating alternatives. There are a range of perspectives in contemporary design – amended as 'conceptual' or 'critical' – that draw on a heritage in radical crafts, anti-design, and critical architecture to diversify or counter mainstream design. (For background to this discussion see: Blauvelt 2003 ; Dunne and Raby 2001 ; Kristoffersson 2003 ; Robach 2005)

Conceptual design draws on the strategies of conceptual art, shifting focus from the maker and the object to the concept behind. Aaron Betsky characterizes the task of conceptual designers such as Droog as "as gathering objects on the streets and reusing them, with the designer adding only something invisible: the concept" (Betsky 2001, 51). High and low materials, precious substances, readymades, technology and trash, may be combined to expose issues of 'taste' and 'good' design – even material scarcity may speak to ethics and (over-)consumption. Dunne & Raby posit the designer as a sort of 'applied conceptual artist', drawing on critical theory and modernist aesthetics to challenge assumptions of 'utility' and 'usability' in industrial and interaction design. While relating directly to everyday life and utility, conventional terms are revealed to be essentially contested, along with related traditions of judgment in art and design (history) discourse or of technical rationality and scientific positivism. Rather than 'in service' to culture or capital, design form and craft are viewed as vehicles for 'problem-finding' – rather than 'problem-solving' – within disciplinary and societal discourse.

Even as these tendencies engaged with social and political theory, the activity and materiality of designing are nonetheless seen as the basis for 'active critical participation' (to borrow a term from anti-design) in larger ideological systems. From modernist aesthetic theory, for example, strategies of decontextualisation, defamiliarization, and estrangement are applied to discourage unthinking assimilation and promote skepticism by increasing the poetic distance between people and products. Such techniques are not merely applied for purposes of analysis or commentary, but for crafting constructive counterproposals and projective critiques. Made concrete in experiential and material form, socio-aesthetic theories from (post-)modern discourse are embodied to interject a critical distance or resistance to easy assimilation between ideas and things. Design form opens up such critique for wider speculation and debate – beyond 'problem-finding', conceptual and critical design might be said to ask questions and open these up to designers, clients, critics, and users.

## **Research through (critical) practice**

In the terms of research most established in relation to design, those of history and theory, developing an 'intellectual stance' within a discipline requires the development of a relation to critical and social theories on the terms of historiography and philosophy. These were certainly the terms that have preoccupied such a discussion within architecture. However, even

within this discussion, alternative conceptions were being proposed and acted upon. Proposing a notion of 'criticism from within', for example, Jorge Silvetti argued on behalf of establishing a relation to theory and ideology through the languages proper to architectural practice – that is, the activities, mechanisms, logics, and forms of making (Silvetti 1977). Rather than the study or criticism of architecture, this posits a notion of criticism as architectural practice and in the form of architecture.

Along the lines of Christopher Frayling's distinction (based on Herbert Read) between research *into*, *through*, and *for* design, a possibility is opened for knowledge structures and production by means of design processes and products (Frayling 1993/4). Indeed, central to critical practice as discussed here is engagement with the conceptual realm of design. While design craft, techniques and form remain central, these are employed to direct attention to the ideas and ideologies behind and beyond the object in and of itself. In Dunne's case, "the electronic objects produced in the studio section of his doctorate are still 'design,' but in the sense of a 'material thesis' in which the object itself becomes a physical critique... research is interpreted as 'conceptual modeling' involving a critique of existing approaches to production/consumption communicated through highly considered artifacts" (Seago and Dunne, 1999, 16-17). Indeed, the artifact produced within critical architecture and design might be considered as a materialized form of discourse.

Explicitly dealing with the materialization of concepts, theory is engaged not only in external or retrospective descriptions, but as an integral part of the design objects as such. While criticism of design can only happen after and about an object that has already been designed and materialized, this opens up for another form of criticality. As Jane Rendell 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" (Rendell 2004, 146). Resulting objects may not solve or resolve problems that might the focus in professional practice, but operate to open up and expose problematics. While it may not be up to design to solve or resolve the complex problematics of the 'prevailing order' that circumscribes the discipline and the profession, design may expose and articulate these in ways that make them more accessible to understanding – and to change.

## **Constructing critical practice**

Past conceptions of criticality (such as those debated in architecture in the 1970s) relied on distinctions between different disciplines and disciplinary concerns. For example, borders might be defended or challenged in terms of discrete 'systems of production' – that is to say, the concerns, techniques, and knowledge proper to one discipline that might distinguish it from others. Separations between history, theory, and practice were made in order to distinguish respective theoretical frameworks and knowledge interests proper to each. Further, each discipline could be seen as a system of production in and of itself, defined by a distinct and autonomous set of normative features, upon which a critical relation or knowledge exchange between disciplines might be based. Indeed, (de-)constructing such distinctions may be important to a disciplinary project – just as architecture is currently seeking to ease the borders separating theory from practice, newer fields are seeking to establish knowledge foundations and disciplinary boundaries.

However, the contemporary situation of design research and sustainable design are more aptly characterized in terms of multi-, inter-, and trans-disciplinarity. Further, in (post-)critical practice, the interpenetration of theory and practice in the processes and products of design

renders such distinctions difficult and perhaps counterproductive. This implies a need for other approaches to constructing critical practices of design and research. One such approach has been developed by Thomas Binder, Johan Redström, and colleagues (Binder and Redström 2006) that characterizes examples of design research that will be described in the next section.

– Research program. As an alternative to disciplinary distinctions, the research program acts to frame a ‘provisional knowledge regime’. The program refers to a set of theoretical and experimental strategies and relations between, a set that is relative rather than absolute but that nonetheless functions to frame a common ground for constructive and collaborative work.

– Experimental design. Driving the program are a series of practical experiments that inquire into and exemplify various concepts and questions set out in a research program. The purpose of experimental design is not to operate as a proof or test of the program, but to learn about, reflect upon, and challenge certain conceptions. The relation between an experiment and the program, and between experiments within a program, provides significant basis for knowledge production on a (transdisciplinary) basis.

### 3. Criticality meets sustainability

On the surface, sustainable and critical design might seem to be at odds. Indeed, the concerns of 1960s ecological, organic, and pacifist movements were not necessarily congruent with those of contemporaneous radical and anti-design (Burkhardt 1988). Where green and sustainable design may earnestly try to solve pressing, large-scale problems, conceptual and critical design embrace irony, complexity, and ambiguity in order to ask and pose, rather than solve or resolve, questions. However, sustainable and critical design intersect in contesting – rather than affirming or acquiescing to – mainstream or traditional notions of production and consumption. Starting from this shared concern, the intersection of criticality and sustainability might contribute to the ideological foundations in design, as discussed in the previous section, and expand strategies from critical practice to design research for sustainability

Located at a critical distance from mainstream design, and from typical approaches to sustainability, a space is opened up in between, wherein a spectrum of new possibilities might be investigated. It is precisely these possibilities that we have been probing into at the Interactive Institute. For some time, we have been interested in conceptual and critical design strategies to materiality and aesthetics, as well as how the spatial and temporal aspects of designed and interactive forms relate to more existential issues, such as the emotional, ethical, and social values embedded in technical systems. Further, we are interested in how to relate to use as an ongoing achievement, a form of ‘active critical participation’ (to borrow a phrase from anti-design) involving agency in continually reinterpreting and reflecting on things. Thus we are interested in moving critical practice beyond ‘problem-finding’ for its own sake but in how questions might be opened up and passed along for reflection – as well as debate and choice – among users and stakeholders.

This means that design cannot only enquire into the conditions for design – those that circumscribe practice and comprise form – but must consider how critical practice and alternative aesthetics condition use. Further, design may materialize ‘forceful propositions’ about concerns located outside of design – such as sustainability. These are some of the starting points for Static!

## **Example: Static! design research program**

Conducted between 2004-5, Static! was the first research initiative to develop out of a growing relationship between the Interactive Institute and the Swedish Energy Agency. The agency has many research programs directed toward systems, infrastructure, and industry but few focused on private consumers. Participants came from electrical and mechanical engineering, human-computer interaction and interaction design, product and textile design, philosophy and the social sciences, and the conceptual design group Front was a partner in the program. As a first engagement with the Energy Agency, we aimed to create some depth in our research program as well as a breadth of examples of what design research might be in this area. While this means that our prototypes and studies were, thus, correspondingly diverse, the focus here is on those developed in terms of conceptual and critical design.

### ***Research program***

The research program in Static! built upon a set of existing and ongoing theoretical concerns in our work at the Interactive Institute. For some years, we have been examining the presence of information and communications technology in everyday life, influenced by phenomenological and aesthetic theories, as well as participatory and critical design. Themes such as 'slow technology' (Hallnäs and Redström 2006), 'technology as material' (Redström 2005 ; Redström, Redström, and Mazé 2005), and 'public play spaces' (Mazé 2007) have countered presumptions of ubiquity and usability, seamlessness and efficiency, within mainstream design and Human-Computer Interaction. Developing alternative forms and interactions, our work has been concerned with putting designers, users and stakeholders in touch with the aesthetics and complexity of new technologies.

Within Static! these interests were further developed in terms of two main ideas: the idea that, as designers, we can work with energy not only from a technical but also from an aesthetic point of view, thereby integrating in a more powerful way the often separate areas of design and engineering; and the idea that product use need not only be about utility and ease-of-use, but also about critical reflection on energy through the objects at hand (Backlund et al. 2006). Countering the tendency in (especially modernist and formalist) design to conceal technical and service systems such as electricity, we shifted from thinking about energy merely as something to optimize or hide away, but as an expressive and valuable material within the spatial and temporal form of everyday design things and micropractices of use.

### ***Experimental design***

In the form of prototypes, we created a series of experimental designs to test and craft alternative approaches to our two main ideas. Drawn out of responses gathered from initial probes and interviews into local families and households, we took a starting point in a set of domestic products, such as curtains, radios, lamps, cables, and radiators. To expose the energy within and surrounding these in the home, the form and materials of these products were decomposed – literally and conceptually. For example, Front 'de-engineered' material surfaces, such that light or heat would interact chemically to alter decorative patterns (Figure 1a); the workings of an ordinary radio were hacked so that its sound would become overly-sensitive to electrical over-consumption within a local system (Figure 1b); daily interactions with a curtain woven with solar panels and fiberoptics turn it into a self-sustaining light source (Figure 1c).

These objects materialize the patterns and cycles of natural and electrical energy, as well as of habits in the short and long term.

Designing, or redesigning, familiar products to expose the (inter)dependency between energy and our products and actions, these are meant to redirect the focus of attention in mundane interactions. In relation to conceptual and critical design strategies, these examples experiment with the aesthetics of anti/utility or (un)ease-in-use. The disruption of form and/or function relates to theoretical conceptions such as how design might change the focus and availability of things to our actions and choices (Redström 2001 ; Verbeek 1998). In addition to immediate expectations, these examples also explore temporal strategies, such as transformability and open-endedness, repetition and decay (Bell 2003). Thus, we explore variations on how to design things that create a 'critical distance' or 'resistance to assimilation', to borrow phrases from critical practice, ranging from overt to subtle alterations of sensory perception and courses of action.

Further, we designed experiments in which prototypes were deployed into various situations in order to investigate the reception of such alternative 'aesthetics of energy'. Indeed, we took 'reflection in use' was taken literally – as reflection by users on and through their own consumption, interaction, and choices – as well as rhetorically – as the situation of ideas for 'consumption' within wider public, institutional, and cultural contexts. On one hand, the radio and curtain were deployed into long-term multi-household domestication studies, to inquire into immediate and longer term questions of change in relation to household dynamics over time. On the other hand, the wallpaper was created to decay over the course of an exhibition within a contemporary art and design exhibit, opening up for another sort of discussion about form and taste. These and other of the prototypes were also presented in conferences, publications, media, and exhibitions targeted towards the energy and technology sectors as well as the general public.

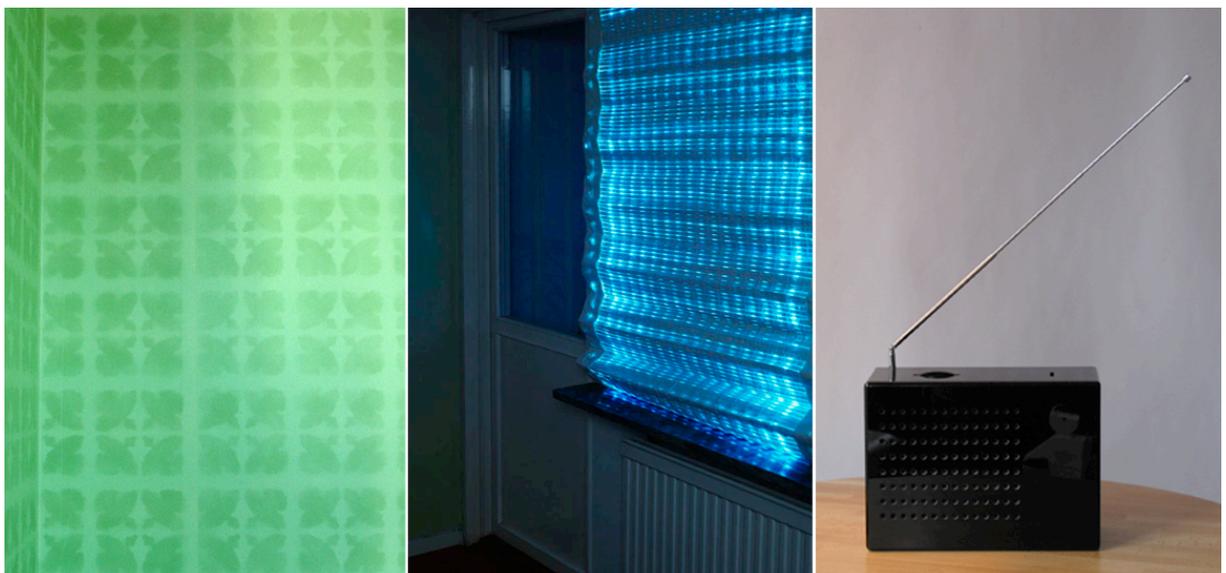


Figure 1: From left to right, (a) Disappearing-Pattern Wallpaper, (b) Energy Curtain, (c) Erratic Radio

## 4. Discussion

To the extent that we have been interested in critical practice as a basis for ‘problem-finding’ within design discourse, we have also been interested in critical practice as ‘design for debate’. Much of critical design, however, has been confined to galleries and books, rarely moving outside the ideological modes of production in art and the media. As George Baird notes, “the museum has continued to be a more receptive venue for critical work than the street” (Baird 2005, 5). Instead, we have turned back to everyday things and mundane interactions, considering the intervention of subtle changes in appearance or changes over time. Through materials and form, ideas and ideologies become available both for aesthetic reception and for everyday consumption.

For us, it was precisely utility – proximate interactions and everyday experience – that provided a site for enquiry where the conceptual and practical concerns of design practice and research might intersect. Alternative ‘aesthetics of energy’ have been about expanding the diversity and precision of techniques for inviting a poetic distance between ‘critical objects’ and equally ‘critical subjects’, such that energy issues might become more present in everyday life. Indeed, the tension between ‘aesthetics’ and ‘reflection’ exposes a range of overlapping concerns binding practices of production with those of consumption by means of the forms between. Intended tensions within the research program, such as those between notions of the ‘reified object’, typically in focus in art criticism and design history, and the ‘deified subject’, as might characterize some phenomenological and sociological perspectives on design, continue to raise theoretical questions.

In addition to our conceptual concerns with use, Static! moved beyond to observe the transformation of perception and behavior. Still considered as forms of ‘ideological production’, the prototypes were not intended as end products or final solutions, as typically treated within evaluation studies based on usability. Instead, the domestication study focused on the role of the prototypes in emergent social relations and value dispositions within the household context and family life. In addition to ‘proper’ use and a significant increase in people’s awareness of their energy use, reactions to the curtain also included increased sensitivity to the dark Nordic winter, re-arrangement of artificial lighting in the home, and the use of extra lighting to power the curtain. In their own homemade experiments, some used the radio to make their own tests of electric waste in their homes and, in other families, the ownership of energy pedagogy was reversed as children appropriated the radio. (Figure 2) (Routarinne and Redström 2007)

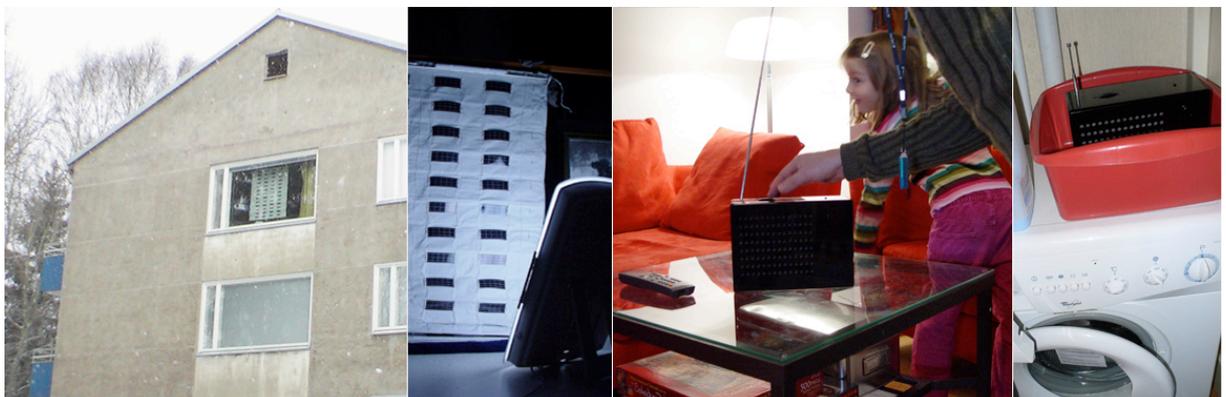


Figure 2: Pictures from the ‘domestication’ studies of the Energy Curtain and Erratic Radio

Rather than resolving our theoretical speculations, experimental design in Static! exemplified certain ideas and extended them for consumption outside our own 'knowledge regime'. While we did find affirmations of our original intentions in the domestication study, we also discovered a range of further and unexpected interpretations and behaviors. Indeed, the household study even prompted studied experiments within the households themselves, raising new questions about the relations between 'critical objects' and 'critical subjects' and between research by design and/or by use. For us, it became clear that it was not the object in itself that conveys or portrays a message, which might be more typical in 'design for debate', but the interactions among and around objects within a context and over time that might convey a more local and ongoing form of reflection, even criticality, in use.

In examining the parameters of a particular set of theories, questions, and problematics, critical practice works by means of form and formation, thus inevitably interjecting new readings and interpretations. In Static!, we discovered a range of further critical potentials to emerge in and through the extended use of 'strangely familiar' objects. In this case, it was not a question of users correctly interpreting the message or intention of the object, but of discovering their own relations to energy, as well as to one another, by interacting with the objects. This illustrates that a critical practice may not operate only in retrospect – through intervention, we might also act in a projective and propositional way. This is precisely what differentiates critical practice – in its material and operational forms – from hermeneutic practices of interpretation and analysis (Allen 2005). Static! affirmed certain hypotheses, allowed us to sharpen certain ongoing questions, and – importantly – opened up a range of new avenues for research along with new issues. While we are only starting to investigate such issues, it is these issues frame our approach to a new program called Switch!

### **Example: Switch! design research program**

One success of the Static! has been to sustain – and grow – commitment to design research within the Swedish Energy Agency. In addition to a nuanced and first-hand view of design research, the Energy Agency has also been encouraged by vivid discussions in the public, consumer, and commercial sectors. Adding to their core set of research programs, the agency has launched the area of 'Design, Energy and IT', which has funded further research projects at the Interactive Institute as well as stimulating interest in this area among other research institutes and universities. This has led to the successful applications to the agency for further research programs. The recently initiated Switch! program builds on what we learned from Static! by shifting focus beyond discrete people-product interactions. In Switch!, we take an architectural and urban scale to investigate the intersection of material, social, and technical systems that effect values around energy use within a locality over time. We have tried to capture this interplay of issues within the term 'energy ecologies', which relates to our investigation of 'social ecologies' in the domestication study of Static!

The term 'ecologies' relates not only to theories from sustainable design and environmental science, but we are also exploring relations of design to ecological thinking in relation to perception, psychology, ecosophy and sociology, thus regenerating our 'knowledge regime' based on our finding from Static! Switch! also makes an explicit intention to understand – and design – prototypes as arguments, triggers or teasers, prompting not only self-reflection within situations of use but also reflection on local value systems and wider social norms around energy and energy consumption. This research program started in April and will finish in 2009. Future work will involve the development of experimental design prototypes and designing experiments in which these prototypes are situated in analytic, debate, and idea-generation forums with local communities, designers, and public sector stakeholders.

## Concluding remarks

This paper presents an approach to the challenges that sustainability poses to design practice and discourse. Within design history, there are aesthetic and formal strategies in and around questions of responsibility, accountability, and criticality. As discussed, conceptual and critical tendencies in architecture and design open up the possibility for operating at a 'critical distance' from conventional notions of design production and consumption. I might even argue, as Silveti does, that such critical voices and dissenting examples are necessary for developing a disciplinary discourse. However, within a diverse and critical discourse, there is also a need for building common ground(s), even on a provisional and local basis, such that multiple disciplines and divergent perspectives can develop and exemplify ideas together. Through 'research programs' and 'experimental design', critical practice might move from debating critical terms and designing critical objects to learning from making and using of these within constructive and collaborative practices.

This paper traces a trajectory through a 'history of ideas' in art and design to the experimental design of forms that embody and exemplify different theories. Building such an account exposes that our work has some relation to research *into* design but, also, research *for* design. Furthermore, to the extent that our prototypes embodying various theories for design were not intended as final or closed products, but were further mobilized and staged in experiments in households, exhibitions, and other forums, it might be said that we have been conducting research *through* design, in which artifacts act as vehicles for further inquiry and further projects. This latter approach has been less present in *Static!*, since the domestication study happened quite late and with an expert in the social sciences engaged expressly for this purpose. As we frame *Swich!*, however, to further consider the social aspects, we are incorporating expertise from design ethnography and participatory design directly into the program, in which the development of experimental design prototypes and methods for designing experiments with stakeholders becomes integral to the process.

Attempting to describe our work through these prepositions is not to simplify, but to articulate the complexity, of doing design research. Design research is made up of multiple practices – the personal practices and associated communities of practice of social scientists, designers, engineers, philosophers, and so forth. The additional domains of knowledge and systems of production relevant to sustainability further complicate the picture. However, this expansion in the factors that must be considered within contemporary design serves to highlight the need for deepening the intellectual and ideological basis within the field. We need to further develop a basis for relating critically and rigorously to the knowledge and expertise external to but circumscribing design. From such a basis, it also becomes possible to act, react, and interact with a range of continually shifting players within the field. Within and across the foundations of different disciplines, design research might play an important role in constructing the conditions for critical practices that are also reflective and generative, agile and regenerative.

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## References

- Allen, Stan. 2000. *Practice: Architecture, Technique and Representation*. Amsterdam: G+B Arts International.
- Backlund, Sara, Anton Gustafsson, Magnus Gyllensvärd, Sara Ilstedt-Hjelm, Ramia Mazé, and Johan Redström. 2006. *Static! The Aesthetics of Energy in Everyday Things*. In *Proceedings of the Design Research Society conference (Wonderground)*. Lisbon, Portugal: IADE.
- Baird, George. 2005. 'Criticality' and its Discontents. *Harvard Design Magazine*, no. 21: 1-6.
- Bell, Jonathan. 2003. *Ruins, Recycling, Smart Buildings, and the Endlessly Transformable Environment*. In *Strangely Familiar: Design and Everyday Life*, ed. Andrew Blauvelt, 72-88. Minneapolis, MN: Walker Art Center.
- Betsky, Aaron. 2003. *The Strangeness of the Familiar in Design*. In *Strangely Familiar: Design and Everyday Life*, ed. Andrew Blauvelt, 14-37. Minneapolis, MN: Walker Art Center.
- Binder, Thomas, and Johan Redström. 2006. *Programs, Experiments and Exemplary Design Research*. In *Proceedings of the Design Research Society conference (Wonderground)*. Lisbon, Portugal: IADE.
- Blauvelt, Andrew, curator and ed. 2003. *Strangely Familiar: Design and Everyday Life*. Minneapolis, MN: Walker Art Center.
- Buchanan, Richard. 1989. *Declaration by Design: Rhetoric, Argument, and Demonstration in Design Practice*. In *Design Discourse*, ed. Victor Margolin, 91-109. Chicago, IL: University of Chicago Press.
- Burkhardt, Francois. 1988. *Design and 'Avant-Postmodernism'*. In *Design After Modernism*, ed. John Thackara, 145-151. New York: Thames and Hudson.
- Chapman, Jonathan. 2005. *Emotionally Durable Design: Objects, Experiences and Empathy*. London: Earthscan.
- Dunne, Anthony, and Fiona Raby. 2001. *Design Noir: The Secret Life of Electronic Objects*. Basel, Switzerland: Birkhäuser and August Media.
- Frayling, Christopher. 1993/4. *Research in Art and Design*. *Royal College of Art Papers* 1, no. 1, 1-5.
- Hallnäs, Lars, and Johan Redström. 2006. *Interaction Design: Foundations, Experiments*. Borås, Sweden: Interactive Institute / Swedish School of Textiles.
- Hays, K. Michael, ed. 1999. *Oppositions Reader: Selected Essays 1973-1984*. New York: Princeton Architectural Press.
- Hays, K. Michael, ed. 2002. *Architecture/Theory/since 1968*. Cambridge, MA: MIT Press.
- Hays, K. Michael. 1984. *Critical Architecture: Between Culture and Form*. *Perspecta*, no. 21, 4-29.
- Kristoffersson, Sara. 2003. *Memphis och den italienska antidesignrörelsen*. PhD Diss., Göteborg University, Sweden.
- Lang, Peter, and William Menking. 2003. *Superstudio: Life Without Objects*. Milan, Italy: Skira Editore.
- Manzini, Ezio. 1995. *Prometheus of the Everyday: The Ecology of the Artificial and the Designer's Responsibility*. In *Discovering Design: Explorations in Design Studies*, ed. Richard Buchanan and Victor Margolin, 219-244. Chicago, IL: University of Chicago Press.

- Mazé, Ramia and Johan Redström. 2007. *Difficult Forms: Critical Practices in Design and Research*. In *Proceedings of the conference of the International Association of Societies of Design Research*. Hong Kong: IASDR.
- Mazé, Ramia, and Johan Redström. 2007. "Difficult Forms: Critical Practices in Design and Research." In *Proceedings of the conference of the International Association of Societies of Design Research*. Hong Kong: IASDR.
- Mazé, Ramia. 2007. *Occupying Time: Design, Technology and the Form of Interaction*. PhD Diss., Malmö University / Blekinge Institute of Technology. Stockholm: Axl Books.
- McDonough, William. 2002. *Cradle to Cradle: Remaking the Way We Make Things*. New York: Northpoint Press.
- Redström, Johan, Maria Redström, and Ramia Mazé, eds. 2005. *IT+Textiles*. Helsinki: IT Press / Edita.
- Redström, Johan. 2001. *Designing Everyday Computational Things*. PhD diss., Department of Informatics, Göteborg University, Sweden.
- Redström, Johan. 2005. *On Technology as Material in Design*. *Design Philosophy Papers: Collection Two*, ed. Anne-Marie Willis, 31-42. Ravensbourne, Australia: Team D/E/S, 2005.
- Redström, Johan. 2006 *Persuasive Design; Fringes and Foundations*. In *Proceedings of Persuasive Technology (PERSUASIVE)*, ed. Wijnand IJsselsteijn et al., 112-122. Berlin: Springer, 2006.
- Rendell, Jane, Jonathan Hill and Murray Fraser. 2007. *Critical Architecture*. London: Black Dog.
- Rendell, Jane. 2004. *Architectural Research and Disciplinarity*. *Architectural Research Quarterly* 8, no. 2: 141-148.
- Robach, Cilla, curator and ed. 2005. *Konceptdesign*. Stockholm: Nationalmuseum.
- Routarinne, Sara and Johan Redström. 2007. *Domestication as Design Intervention*. In *Proceedings of the Nordic Design Research conference*. Stockholm: Konstfack / NORDES, 2007.
- Seago, Alex and Anthony Dunne. 1999. *New Methodologies in Art and Design Research: The Object as Discourse*. *Design Issues* 15, no. 2, 11-17.
- Shove, Elizabeth. 2003. *Comfort, Cleanliness and Convenience: The Social Organisation of Normality*. Oxford, United Kingdom: Berg.
- Silvetti, Jorge. 1977. *The Beauty of Shadows*. *Oppositions* 9: 43-61.
- Thackara, John. 1998. *Beyond the Object in Design*. In *Design after Modernism*, ed. John Thackara, 11-34. New York: Thames and Hudson.
- Verbeek, Peter-Paul, and Petran Kockelkoren. 1998. *The Things that Matter*. *Design Issues* 13, no. 3 (1998): 28-42.