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STATIC! The Aesthetics of Energy in Everyday Things

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Introduction

In addition to established approaches to promoting energy conservation in everyday life, such as marketing campaigns and engineering more efficient systems, there is an increasing interest in how design might affect people's awareness and choices. More specifically, examining the design of products and people's interaction with them enables another perspective on how form and form-giving influence perceptions and use of energy in everyday life. Design is what forms these products to new, attractive and desirable objects that we fill our homes with. Besides being a useful tool in product development and marketing, design is literally what shapes the material environment of our everyday life thus enabling or disabling human activity and behaviour (Ilstedt Hjelm 2004).

Environmental and societal ethics have long been topics within design – since the advent of modernism, there has been a concern with how the forms of design, technology and society influence and determine one another. Typically, industrial and product design have entailed a commitment to mass-production and its material, technical and market logics. The apparent 'democracy' of market choice entail that designers and users must, literally, buy into the preoccupation of design with engineering and manufacturing issues (Margolin 1995). Designers and consumers, irrespective of their own intentions, are thus limited as to the space for action. Some responses to such limits include disengagement from consumer culture evident in ecological movements of consumption and design (Burkhardt 1988) and sustainability relegated to an identity and brand issue best left to the persuasive power of marketing (Dobers and Strannegård 2005). Common to these is the focus on sustainability as an issue of production or packaging, with the choices for designers and users reduced to their interactions with large systems rather than interactions with respect to products themselves.

Interaction design deals explicitly with such choices made through products. As Richard Buchanan puts it, "the designer, instead of simply making an object or a thing, is actually creating a persuasive argument that comes to life whenever a user considers or uses a product as a means to some end" (Buchanan 1989, p. 95-96). Such

interactions take place not once but each time a product is used and are related directly in and through the energy-consuming product. Given the power of design to affect and change not only our individual relations to everyday things but societal trends, interaction design has the particular possibility of enabling people to relate more deeply and in an ongoing manner to their own choices and, by extension, those of society.

Considering energy in design requires not only considering the sustainability of products in design but products in use. On one hand, objects such as lamps, domestic appliances and electronic devices require energy to run, long-term costs and choices as to which may be more or less considered in design. Certain objects, such as cars (fuel) and laptop computers (batteries), incorporate the design of ongoing feedback and means of adjustment with respect to energy consumption in use. On the other hand, the choices and trade-offs in use may involve entirely different notions of value. Some objects may sustain or grow in personal or cultural value over time whereas others may rapidly become obsolete. Design objects considered in terms of a 'persuasive argument' involve not only choices by designers but choices by users, as people incorporate such objects into their life worlds and in relation to their evolving awareness and purposeful actions over time.

If we recognize that designers and users are both world and self-aware, there is the potential to rethink the roles of both not as mere products of the situation but as active and critical agents in it. Perhaps it is time to rethink design products in terms other than those limited to the terms of production, marketing and persuasion of the status quo, but as a powerful and critical practice. As such, we might understand that the power of design in enabling and disabling forms of behaviour carries not only the possibility but the responsibility of exposing choices, alternatives and consequences – in other words, enabling critical reflection in use. Drawing on ideas from such diverse areas as sustainable and critical design, this paper describes how the Static! project was conceived and carried as an approach to interaction design as a means of increasing awareness of energy use.

Design Research Program

Static! is a design research program funded by the Swedish Energy Agency. Based on previous experiences of developing new applications combining traditional design with emerging technologies, Static! was structured to create a palette of examples to illustrate the space of design possibilities in terms of both concrete designs and methods.

The research approach in Static! builds on two main ideas: the idea that we can work with energy not only from a technical but also from an aesthetic point of view, thereby integrating what often become the rather separate areas of design and engineering; and the idea that use need not only be about utility and ease of use, but also about critical reflection through objects at hand.

Aesthetics of Energy

Some time ago, Borgmann made the following remark about the relation between aesthetics and engineering in design:

Aesthetic design becomes shallow, not because it is aesthetic, but because it has become superficial. It has been divorced from the powerful shaping of the material culture. Engineering has taken over the latter task. But it in turn conceals the power of its shapes under discreet and pleasant surfaces. If we are concerned to revive engagement, we must try to recover the depth of design, that is, the kind of design that once more fuses engineering and aesthetics and provides a material setting that provokes and rewards engagement. (Borgmann 1995 pp. 15f).

Still valid, this remark is certainly relevant with respect to how we treat issues of energy use. Consider, for instance, how the 'design problem' of providing artificial light using lamps is split between the shaping of things like lampshades and fixtures on one hand and the systems for producing and distributing power on the other. If we do not want to hide energy consumption under "discreet and pleasant surfaces", but instead expose issues such as sustainability as an integral part of an object, we somehow need to make energy itself more present in the design of the thing itself and the design of interacting and living with such things. To find new ways of working with energy in design, we need to rethink this distinction between aesthetics and engineering as to make way for a more general understanding of energy as material in design (cf. Redström 2005).

Reflective Use, Critical Design

With respect to how design might enable alternative modes of engagement, there are a growing number of approaches to design for reflection and participation. For instance, radical design movements in the 1960's and notions of conceptual and critical design in the last decade have promoted a range of more open, critical and situationist tactics in use.Dunne and Raby's critical design projects explore, among other things, users as protagonists and subversive anti-heroes, evolving their own 'psychosocial narratives' through the interplay of design, desire and fiction in use (Dunne 1999, Dunne and Raby 2001).

Such approaches, Blauvelt points out, may appear 'strangely familiar' (Blauvelt 2003), drawing on or redesigning the familiar forms of everyday products. Conceptual designs such as those by the Swedish design group Front, play with expectations, employing tactics from conceptual art and poetic devices such as defamiliarization to introduce moments of reflection into familiar objects and routines of interaction (Emilson 2005, Cornell 2005). Design objects by Droog, like later works of Memphis, appear not only on only on the market but also in art galleries and in the media, where they function (more or less) as utilitarian objects but with additional emotional, ironic and playful aspects aimed at provoking reflection, raising questions and critiquing expectations among multiple types of audiences, or 'users'. Exposing ethical and social implications of design practice and use, "design is seen as a form of socio-aesthetic research towards the integration of aesthetic experience and everyday life through the development of conceptual products rather than working prototypes or models." (Seago and Dunne 1999, p 14). In such work, design objects act as a 'material thesis' in which the object becomes a physical critique of existing approaches to production and consumption.

These examples of experimental approaches to design, while seemingly quite far from the often utilitarian concerns typically dominating sustainable design, illustrate alternatives that are highly relevant to developing

strategies for how to involve people and invoke engagement. On one hand, such approaches deal explicitly with the materials, forms and production of design objects, though exploring alternative notions of the role, actions and responsibility of designers and users. Rather than displacing discussion and action with respect to difficult ethical issues onto large and abstract systems, these approaches attempt a 'critique from within' existing design practice and products.

Design Examples - Poetic Objects for Everyday Life

In what follows, we describe the first set of design examples developed in Static! They represent different approaches to how energy related issues could be made more present through form. In seeking alternatives to typical information campaign, the starting point explicitly was to explore *aesthetic* possibilities.

Each design example therefore acted as a probe into the possibilities, exploring spatial and temporal parameters and embodying both individually and collectively a range of questions as to how we might understand the aesthetics of energy through everyday things. For instance, how might instant feedback or dawning awareness be expressed in everyday things and activities? How might the expression of energy relate to cycles of seasons and daily household rhythms?

While some designs are more poetic reflections on energy and how it might be visualised in the home, others are directed towards more active engagement. The design examples created can be seen as exploring different aspects of energy as a design material in everyday objects, primarily through reinterpreting basic functionality of familiar objects. Together they create a design space, a new territory of design that we have begun to map out.

The Energy Curtain

The Energy Curtain (Figure 1) collects energy when the sun shines on it, saving and storing energy during the day (to the extent that it is drawn down) for lighting up the room when the sun goes down. It is a reinterpretation of the familiar relation to curtains as a means of controlling the light in a room – but by requiring a user to make a trade-off between letting the light in during the day or drawing the curtain to save the light for later, it introduces a conceptual twist and requires that a user act tangibly on the choice between consuming or saving energy on a daily basis.

Figure 1: The Energy Curtain.

Several version of the Energy Curtain have been built, including versions fashioned as a horizontally-folding Roman blind or as separate vertical Lamellae panels. The technical principle of all the prototypes is based on solar panels, small batteries, LEDs and optical fibres. These materials are integrated into the physical construction and even into the textile weave, integrating technical and traditional materials into an aesthetic and familiar form. When insufficient light is sensed as the sun sets, LEDs, which are powered by the batteries that were charged by the solar panels during the day, causing light emissions along optical fibres woven into the textile pattern. In addition to the static aesthetics of the curtain's construction and the textile design, the object gains a dynamic, glowing aesthetic pattern in the evening.

In sustaining the daylight through integrated technology, the object's aesthetic expression is transformed. The Energy Curtain is thus a self-sustaining design object, in which engineering and aesthetics are closely interwoven and interdependent. In this way, energy is a material in both the technical and the aesthetic expression of the object (Ernevi et al 2005a).

The Element

The Element (Figure 2) is a radiator reinterpreted as an array of light bulbs. The object has evolved out of a user-centred design process. The idea of using light as a source of heat was first raised in a series of interviews with people about use of energy in their homes. It is evident that lamps play an important role for Swedish people and many of our informants told stories about lamps or mentioned a lamp as their favourite object in the home. Lamps were left turned on because, as one house owner expressed it: "lamps also generate heat so it is not a waste at all".

Figure 2: The Element.

The Element is constructed from 35 light bulbs that were attached in a metal frame between two panes of tempered glass. 60-watt lamps were chosen to obtain the same heating effect as a conventional electrical radiator (approximately 2000 watts). The casing contains control electronics and a set of internal and external heat sensors – attached via a cord – and they determine the temperature. A dimmer circuit connected to a microprocessor controls the intensity of the lamps. When the appliance is turned on, it slowly starts to glow increasingly brighter and the temperature in the room will rise to the value of the control wheel settings. If the

temperature in the room suddenly drops or the control wheel is altered to raise the temperature even more, the Element attempts to balance this by emitting more light. The Element, thus, constantly adjusts in brightness, reflecting the negotiation between heat and light in maintaining a constant room temperature.

The idea of the object draws on the physical law of energy conservation which we interpret as an energy recycling concept. The law states that energy can never be destroyed but can only change form. In the Element, electricity into the device is transformed into about 70% heat and 30% light. As the light is absorbed by surrounding objects in the domestic context, it is eventually turned into heat as well. The element will, in other words, ultimately produce 100% heat as well as 30% light, with some of the input energy used twice as both heat and light. Thus, the familiar domestic form of the radiator is reinterpreted as light and heat are explored as material qualities and as aesthetic expressions of energy.

The Erratic Appliances

The Erratic Appliances are household appliances that in one way or another change their behaviours in relation to changes in overall energy consumption. As energy consumption increases, their behaviour becomes erratic forcing the user to turn off appliances to keep the balance as other things are being turned on. The idea with these appliances is that they should embody various consequences of over-consumption, i.e. that we do not really know what will happen as we use ever more energy. But instead of having unforeseen effects happening long after our actual actions have been taken, these things react rather immediately, creating a tighter and more local relation between actions and reactions.

Based on a series of sketches and scenarios of how different appliances could become 'erratic', we developed the Erratic Radio (Figure 3). (Ernevi et al 2005b) In terms of basic functionality, a radio is a device that enables the user to tune in on a specific frequency to listen to something. The erratic radio adds another layer of such 'listening', namely an additional receiver that listens to frequencies around 50Hz, i.e. frequencies emitted by electric appliances. This second receiver then controls the normal one in the sense that when the radio detects an increase in the electrical field surrounding it, it will detune to make the radio slightly loose its channel. In practice this means that in order to listen to the radio, one needs to carefully balance the amount of electricity used in its vicinity – or it will gradually loose its channel as energy consumption increases.

Figure 3: The Erratic Radio.

The Power-Aware Cord

The Power-Aware Cord (Figure 4) is a re-design of a common electrical extension strip which aims to make the levels of electricity flowing through it visible in use. Most people already have a motivation to lower their energy consumption, but the invisibility of electric energy makes it hard for them to make the connection between behaviour and consumption. The Cord may be used as a sort of 'tool' for people to rediscover energy in their homes as well as an 'ambient display' for people to see at a glance the energy consumption at any given time (Gustafson and Gyllenswärd 2005). With the Cord, people can learn about the amounts of energy consumed by their different home appliances, for instance plugging in and out appliances for instant feedback, correlating volume in stereo equipment with energy consumption, and revealing appliances that are silently stealing electricity on standby.

Figure 4: The Power-Aware Cord.

The Cord is the general shape and size of an extendable power strip, with the additional integration of voltage-measuring electronics and electroluminescent wire. The cable leading from the extra power sockets to the plug into a wall-socket is constructed from three electroluminescent wires bound together with ordinary copper wire for electric conduction. These additional wires contain a phosphor layer that glows with an intense blue-green light when an alternating current is introduced. Both the motion and intensity of the light are controlled to visually represent voltage amounts ranging (ideally) from 0-2000 Watts passing through the copper wires.

The intention was to make a user, to some extent, perceive the light as the actual electricity. While they may realize that the light is only a representation of the electric flow, the object will still express and reflect the actual properties of electricity, providing an instant and ambient awareness. Several prototypes have been deployed in households as part of an environmental initiative in Stockholm, where their effects on people's

perceptions and energy behaviours will be studied by long term studies as part of a doctoral study in sociology as a collaborating university.

Free Energy

Free Energy consists of conceptual design examples as a means of sparking public debate in common everyday situations about energy use. Borrowing from aesthetic and behavioural 'vernaculars' in public life, two prototypes were designed to make energy use or options explicit through means of placement, visibility, or additional choice. In order to investigate not only the aesthetics and use of energy in everyday life but the possibilities for designed objects to stimulate self-reflection and public debate, we staged a series of 'energy interventions' of the prototypes in public space.

Low-tech prototypes of the Energy Tap (Figure 5) and Kinetic Door were implemented for deployment in public interventions (Jacobs and Löfgren 2005). The 'Energy Tap' is a self-sustaining energy outlet for open use – anyone can crank and thus charge up any product for any purpose. Borrowing an interaction metaphor from the commercial crank radio, a module with a crank for generating energy set atop a stand or podium designed to blend into the street vernacular. The 'Kinetic Door' intervenes into a common energy choice in public buildings in Sweden, that of going through an ordinary door or a revolving door that conserves heat within the building. The prototype is in the form of a wheel that may be attached to any revolving door, sparking an aesthetic lighting pattern to reward door-pushers for making an extra energy-friendly effort. Unlike the Energy Tap, which operates as an open object without a fixed location, the Kinetic Door is a sort of 'redesign' or augmentation of existing objects.

Figure 5: The Energy Tap.

During a series of four interventions, we observed and captured responses and changes in user's behaviours. Physical reactions ranged from bewilderment to appropriation, and in some instances discussions among multiple passers-by. Responses ranged from the utilitarian to the utopian, for example: 'I would use it to recharge my car or my future car', and; 'I love the idea of free energy that is all about releasing energy into the world… with free energy, people would be more connected … maybe people would get out of their houses and throw parties in the street and get to know each other better.' Employing the objects into such situationist

interventions exposed possible reactions to alternative energy choices through design products – opening our design process to new ideas as well as sparking public debate.

Collaboration with an external design group

In order to expand the project team we started a cooperation with a young design group. Only a year after graduating from design school they had already been internationally recognised for their imaginative and inventive work. Front worked as a semidetached working unit, regularly meeting with the other researchers, but keeping their unique approach to design.

The Heat-Sensitive Lamp

This design example explores the theme "Design with energy". This theme was mainly directed towards designers who tend not to regard energy as a material in the same way as wood, textile etc. But energy is not as tangible as traditional material and manifest itself in various, ever-changing forms, that are not easily crafted. The work resulted in a range of experimental prototypes.

"The heat sensitive lamp" (Figure 6) highlights electricity as an essential material in the design of a lamp – in fact, energy itself participates in the design of the form of the object. The lampshade is made of a heat sensitive paper-like material, usually used in relief wallpaper. When the lamp is turned on for the first time, the heat that is generated from the bulb causes the lampshade to change form. Bubbles start to grow from the previous flat shade and a moonlike landscape appears. Depending on the amount of heat that is generated, (that is the watt and the form of the bulb) the lampshade takes various forms. A bulb with lower watt will cause an even structure of smaller bubbles, whereas a higher watt will create a more explosive landscape with large bubbles. The end-user can be involved in the design process by using the bulb as a brush, moving along the lampshade, thus "painting" the structure of the shade, or just keeping it still on one place.

Figure 6: The Heat Sensitive Lamp.

The Appearing Pattern Wallpaper

While the heat sensitive lamp is an example of a hands-on and quick way to create form with heat, other experiments are based on very slow, long-term changes. Ongoing natural cycles such as sunlight, represents forms of energy that has a significant, but slow, change of behaviour over time.

"The Appearing pattern Wallpaper" (Figure 7) visualises aesthetic qualities of UV-light. Sunlight makes wallpaper and other UV-sensitive artefacts bleach or decay, which is regarded as a problem. Our approach was in contrast to use UV-light as a design factor, by designing qualities in the product that will appear after long exposure to sunlight. The UV-wallpaper is an ordinary monochrome wallpaper that a carries a secret. After a long time of UV-exposure the colour will bleach and a pattern will appear. So instead of ruining the wallpaper, sunlight will improve it and bring out an aesthetic quality. Shades in the room, objects covering the wall or curtains will affect the visualisation of the pattern. This is a poetic example of how the lifespan of ordinary things and everyday life maybe transformed in relation to instant energy conditions.

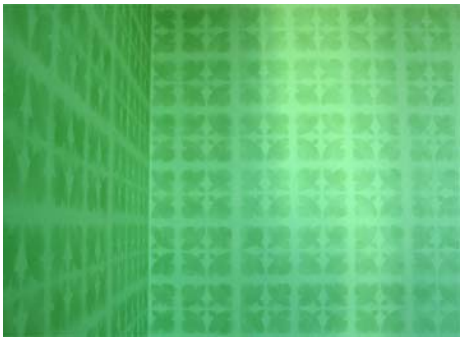

Figure 7: The Appearing Pattern Wallpaper.

The Flower Lamp

Another theme we explored was how design can encourage people to use less energy in their home. There are already examples of products with timers or thermostats that automatically turn appliances off. A rather recent product are electricity meters that measures the overall electricity consumption in the home and warns you when it reaches a level that is too high. We are often told to take shorter showers, have lower indoor temperature or wash our clothes less often. Saving energy is therefore regarded as something negative that make life less comfortable and enjoyable, and the means of displaying or controlling energy use are technically centred and aesthetically immature.

Household lamps typically have very basic functionality with respect to energy - expressed in lit states of 'on' or 'off'. In the 'Flower Lamp' example (Figure 8), it is not just the light of the lamp but its very form that reflects energy used. The 'Flower lamp' is actually a display for your electricity consumption, but it does not show how many watts you consume right now, but the overall trend in your consumption. If the household has a decreasing trend of electricity use, the Flower lamp rewards you by slowly opening up to "bloom". If, on the other hand, use is increasing, the lamp folds its petals together. Thus the lamp, both light and form, is

reflecting the cycles of local energy use in a subtle and poetic way that makes smaller sacrifices of heat and warm water, worth while. In order to make the lamp more beautiful, a change of behaviour is needed.

Figure 8: The Flower Lamp.

The Disappearing-Pattern Tiles

Heat is a form of energy that is often taken for granted, invisibly escaping from appliances, boiling water, lamps and radiators. Energy lost through heat may be visualized if artefacts communicate leakage in various ways. In the example 'Disappearing-Pattern Tiles' (Figure 9), bathroom tiles are decorated with patterns in a thermo-chromic ink that reacts to heat, fading away to reflect splashes and intensities of hot-water use. The longer the shower, the less decoration on the wall! The architectural surface acts as a subtle reminder of personal energy use over time, reflecting the duration and waste of water during a shower. In many countries hot water is an expensive and finite resource and we need to be reminded about this in a non-obtrusive manner. The 'Disappearing-Pattern Tiles' uses an approach similar to the 'Flower Lamp' to enjoy the pattern during the shower you have to mind the energy consumption.

Figure 9: The Disappearing Pattern Tiles.

Describing the Design Space

The design examples illustrate different approaches to how energy use can become more present in and through use. As mentioned earlier they can be positioned in a conceptual design space, as a means for framing certain alternatives in our research process. Roughly we might conceive of the design space can be seen as a matrix (Figure 10) where one axis represents temporal parameters ranging from instant to slow feedback, while

the other axis represents the activity of the user, ranging from passive contemplation to an active change of behaviour.

Figure 10: Design Matrix.

To the left we see the designs that explore energy in a poetic and contemplative way. These examples are not intended to cause much activity or change of behavior but rather a thoughtful engagement. The 'Disappearing pattern wallpaper' uses light from the sun to slowly evoke the pattern hidden in the monochrome paper. The full development of the color might take years to develop and is dependent on conditions such as windows in the room, curtains and shadowing of furniture. 'The heat sensitive lamp' on the other hand represents an instant reaction to energy; in this case the heat caused by light bulbs that change the form of the lampshade. The 'Element' changes intensity of light and warmth continuously depending on the heat in the room and the required temperature. A glance on the element and you know whether it is on or off, or whether there is a sudden change of temperature in the room. The 'Kinetic door' uses the waste energy of revolving doors to create a small 'reward' for choosing this door instead of the automatic one typically place on the side.

The other design examples use different modalities to encourage users to be more conscious and about there use of energy and actively change behavior. Here too, time of feedback is an important design factor. In the upper left corner we find examples that give an immediate feedback. 'The Disappearing Pattern Tiles' quickly reveals the heat of your shower. 'The Erratic Radio" is another example of immediate feedback on amount of appliances turned on in a room. 'The Power Aware Cord' gives instant feedback on the amount of electricity flowing through the cord; it displays such subtle variations as base tones in music when the loudspeaker is plugged in. The 'Energy Tap' is designed to stage 'energy interventions' and spark active discussion and debate in public spaces about access to energy.

Designed for a slower feedback are the design examples in the lower left square. The 'Energy Curtain' visualizes 24-hours cycle of light, when it collects sunlight during the day to display it in the night. The 'Energy Curtain' is in some respect a functional object, a sunshade during the day and poetic light during the dark hours. The 'Flower Lamp' is another familiar object with a double function. Besides being a nice lamp it is also a display showing the total amount of energy used over time in a household. A decrease in use over time will be rewarded by the lamp as it opens up its petals to 'bloom'. If the energy consumption increases, however, the 'Flower Lamp' will close.

There are naturally other ways to describe a design space than these parameters, we can of course think of complex multidimensional spaces that include many more aspects. Equally, we can evaluate more or less successful ideas and spark new ones based on overlaps or gaps identified. However, the idea of developing a palette of design examples, of spanning and even challenging the design space was not for the purposes of identifying, solving or analyzing specific problems. Rather, the aim was to generate new questions and to enable an inclusive and open-ended discussion within the multi-disciplinary design team and among various stakeholders.

The Role of the Prototype

When building physical prototypes and creating live scenarios, we illustrate an often abstract and complex concept, model or theory. The prototype becomes a bridging method with which we transfer the intangible chain of thought into an object in the physical world. By building a tangible, interactive object that embodies and concretizes the problem at hand, we create an inclusive arena and a basis for discussion that more people can relate to and have an opinion about. In the research process, the prototype becomes a 'translator of thought' on three levels; to us as designers, to individual users and to society as a whole through industry, education and media.

Within the project team, we use the prototypes to draw a physical map of the new design space to be able to orient ourselves and to create a mutual frame of reference in order to establish direction and relevance. By gathering theories and methods around an object, we get a more profound understanding of what it means to work with energy in design.

To the individual user, the prototypes from the project serve as examples of possible everyday scenarios hence giving them a reason to reflect upon their own habits and how they relate to energy and energy use in their own home. Since our prototypes are mainly reinterpretations of ordinary household products with respect to energy use, they have proven to work well at public exhibitions where we meet and talk to individuals with different backgrounds and different experiences and relations to energy. The prototypes suggest familiar situations of use and behaviour patterns that everyone can relate to, allowing us to discuss energy use and design from a common ground.

On the third level, we use the design prototypes as 'case studies' both within partner companies and within educational curricula, employing the Static!-platform as starting point for discussion and showing examples of

potential futures and new ways of thinking. Presenting new theories with the back-up of physical prototypes turns the object itself into a powerful argument possibly inspiring to new design processes, pedagogical models, or new products where sustainability is the foundation.

Through the use of prototypes, we try to enable a two-way communication process where feedback from individuals, companies and the general public can come back into the project in an ongoing iterative process. As a prototype makes it possible to use a variety of dissemination formats ranging from public exhibitions to field studies in people's homes, we gain feedback beyond what can be obtained from the typical user test.

Concluding Remarks

In this paper, we have presented the Static! project in terms of both design program and examples. The project is still under way, and so the analyses and results presented are in some sense preliminary. For instance, while the prototypes have been presented in exhibitions and to some extent also in user studies, it is more recently that we initiated long-term field studies of what happens as they are used in a home environment. Such studies will address questions such as what happens after a month or two when the object no longer is a 'new' and perhaps 'cool' thing, but just a part of our daily life. And so, where this story about a design approach ends, another one about its eventual use will begin.

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