Visual Voltage

a Design and Art Perspective from Sweden

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The World is Composed of Electric Charges

There are almost as many positive as negative charges around us, yet these charges and energies are so well balanced that we cannot see them and they become invisible to the eye and to our understanding. Though thunder and lightning has been present since the dawn of time, it took a substantial period of human history in order for Humankind to understand, and come to terms with, what electricity is.

The exhibition **Visual Voltage** makes this magical power – the power that creates the fundament in our society, which has improved our living and given us heating and light, trams and escalators, telephones and computers – visible.

Still there is a dark side to everything. Electricity is produced through transformations of other forms of energy. In Sweden, we are well favoured with many rivers providing us with hydroelectric power while wind power is expanding. Many other countries depend on fossil fuels to produce electricity: more than fifty percent of the global electricity is based on coal, oil and gas.* It is therefore interesting that in contradiction to cleaner and environmentally sustainable power production, coal power production is actually increasing. We know that carbon dioxide, discharged into the atmosphere when fossil fuels are incinerated in power stations, has a negative effect on the climate. This is a global problem which requires a global solution. And as we know, awareness comes before change. It is only when we reach the insight that the energy consumption model we have today is not sustainable, that we will begin to see a paradigm shift in regard to our thinking of energy.

In 1992, Sweden and 179 other countries, signed **Agenda 21**, a programme run by the United Nations (UN) related to sustainable development. **Visual Voltage** is a means and way to show that designers and artists also have an important part to play in creating awareness and debate around this vital issue. The exhibition **Visual Voltage**, based on the cross-disciplinary research of the Interactive Institute, is one of the contributions of the Swedish Institute to the sustainability field.

Olle Wästberg
Director-General, Swedish Institute

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	TWh	%
Global electricity production 2005	**18,200**	
Of which		
Fossil fuel	**12,100**	66
Hydroelectric power	**2,900**	16
Nuclear power	**2,800**	15
Other	**400**	2

The Swedish Institute (SI) is a public agency that promotes interest in Sweden abroad. SI seeks to establish cooperation and lasting relations with other countries through strategic communication and cultural, educational and scientific exchanges.

Unexpected Energy

For **Visual Voltage**, the Interactive Institute presents new perspectives on energy. The exhibition presents concepts, design prototypes and artworks that have been developed by artists and designers within the Interactive Institute's cross-disciplinary tradition over the past four years.

The global focus on energy, the environment and sustainability has increased tremendously. It is clear that contemporary consumer culture is consuming the Earth's resources to such an extent that we now find ourselves confronted with the vital need to explore and develop solutions, technologies and consumption habits in order to avoid a looming and foreseeable global catastrophe. How can mankind adapt to this new situation, how can living patterns be changed whilst still maintaining a comfortable lifestyle and increasing opportunities for populations living outside the industrialised world? To find answers, more creative perspectives and ideas need to be explored. We believe artists and designers can offer these new perspectives.

The Interactive Institute, collaborating with some of the most well known artists and designers in Sweden and bringing them together with engineers, technical know-how and environmental consideration, aims at actualising concepts and applications in order to look at the horizon of new perspectives, within the energy field.

The group brought together for this exhibition has worked with ideas concerning energy in the everyday domestic environment to explore the very concept of energy and its concentration and ubiquitous nature in contemporary life. The aim is to make visible what is normally invisible: wires, cables, sockets, electricity meters as well as the hidden ideas of the powers of this energy. This research has resulted in a number of groundbreaking concepts that have already gained a lot of media attention around the world.

Whilst the design research outcomes have resulted in practical solutions on how to make energy consumption visible in our homes, the artists have been working with a more general approach to the theme. The result offers some unexpected and visionary comments on what energy is, and makes aspects that are normally considered as invisible, visible.

As a whole, the **Visual Voltage** exhibition communicates an understanding of energy in a broader sense that aims to increase the interest in energy consumption and environmental questions.

The audience is invited to explore the **Visual Voltage** exhibition, energy in different forms, and to experience and reflect on energy consumption.

Staffan Truvé

CEO, Interactive Institute

The Interactive Institute, established in 1998, is a Swedish world leading IT-research institute with an aim to challenge traditional perspectives through combining art, design and technology in experimental research projects. By exploring these areas the institute contributes to innovation and sustainable development. The Interactive Institute is working in the forefront of IT-research and is a place where cutting edge technology meets the creativity of artists and designers aiming to cross boundaries.

The Interactive Institute currently employs about 60 people, organised in different research groups located all over Sweden.

The Return of Fairy Electricity

In the '70s, during a moment of awareness of the dangers of the country's dependence on foreign oil, U.S. President Jimmy Carter had solar panels installed on the roof of the White House, he had a wood stove in his living quarters and wore sweaters for good measure. He even requested that Christmas decorations remain dark in 1979 and 1980. In the '70s my father's car sported a proud "Let's Save Energy" sticker.

In the '80s, the Reagan administration put a stop to all this eco-fuss, the panels and all their symbolic power were torn down and the budget dedicated to finding solutions to save energy was curtailed by 90 percent. How about my dad? He could no longer see the sticker on his back window: he had just bought a bigger, faster car. When and why did we stop caring about our consumption of energy?

More than 25 years later we are slowly getting to grips with the intricate, complex and disheartening mess we've been so keen to create on the planet. A natural reaction in the face of an alarming situation is to just bury our head in the ground and wait till the tempest calms down. This time, however, the media machine is hard at work to remind us again and again that the alert is so acute we can no longer afford to ignore it.

The bummer is that there are at least two problems in the current handling of emissions' offsetting, food miles, global warming, toxic dumping, ecological footprints, and other eco-conscious issues.
The first one is that being aware of the current environmental crisis doesn't mean that it is a piece of cake to recognise its extent and complexity.

The second one is that sustainability today is a hype. Something nice and stylish you can buy at the supermarket or at the design shop. We sleep in organic cotton bed linen, recycle glass, bring our own bags to the supermarket and take our shiny new bike to go to the hairdresser. That's not enough and we know it. Some of us have become cynical; maybe worse, we have become sceptical.

What if we could get our hands on objects and projects so beautiful and efficient that we will want to surround ourselves with them, whether they are hype or not? What if the same objects could make meaningful and self-explanatory patterns emerge from a mass of environmental and energy consumption data?

Fortunately, over the past few years some artists and experimental designers have been busy addressing the new sustainability challenges, bridging the gap between perceptions and understanding and behaving like the avant-garde they claim to be.

None of them will bring you on a silver tray the solutions to our planet's problems, but each project they have worked on is a stimulating and often playful invitation not to stand back and stay idle. We won't bring back the Blue Planet to its pristine state but we can limit the damage if we are given the right tools and the spark of enchantment that will make them pleasurable to handle.

The prototypes developed by the designers at the Interactive Institute's eco-chic research project, inevitably call to my mind one of the largest paintings that French artist Raoul Dufy has ever done: La Fée Electricité (The Fairy Electricity). The masterpiece, made for the pavilion of electricity at the 1937 International Exposition in Paris, narrates the history and significance of electricity from the earliest philosophers to the 20th century. Today you have to travel to the Museum of Modern Art in the French capital to be reminded that electricity can be anything as seductive and magical as a fairy. It takes a fraction of a second to turn on the light, the toaster or the shaver, energy has become a commodity as available as another famously intangible element, the air. But another look back shows us that even what is impalpable and invisible shouldn't be taken for granted, WW1 soldiers realised how precious air was when chlorine gas was thrown at them in Ypres.

With objects like the Energy AWARE Clock, the Power Aware Cord and the Flower Lamp, energy suddenly becomes less abstract. Understanding the amount of energy our everyday appliances consume is empowering. It has nothing to do with an eco-fad, neither is it an experience that belongs to the gloomy spirit of guilt that often surrounds the sustainability cause. These devices give us the feeling to see energy flow as much as it glows; bringing back the abracadabra factor that energy had lost over the years.

And what if the most mundane trace of electricity, the most vilified and abhorred, the power lines, could gain some of the dignity that has never really been bestowed upon them? Artist Nils Edvardsson has done just that by turning the sound generated by the high voltage power line into a sound work he calls The Spirit of High Voltage. Nature itself has given a helping hand to the project with wind, birds and insects influencing the timbre of the piece.

I recently heard Bruce Sterling say that artists are five to six years ahead of the industry. And who am I to contradict a famous visionary? I don't know how much ahead of their time the projects in this exhibition are, but I sure know that we need some of the poetry and sense of social responsibility they foster right now and right here in our lives.

Régine Debatty

Régine Debatty (BE/DE) writes about the intersection between art, design and technology on her blog www.we-make-money-not-art.com as well as in design and art magazines such as *Art Review* (UK). She is also a curator and a lecturer on the way artists, hackers and interaction designers (mis)use technology.

Watching Daily Energy Rhythms

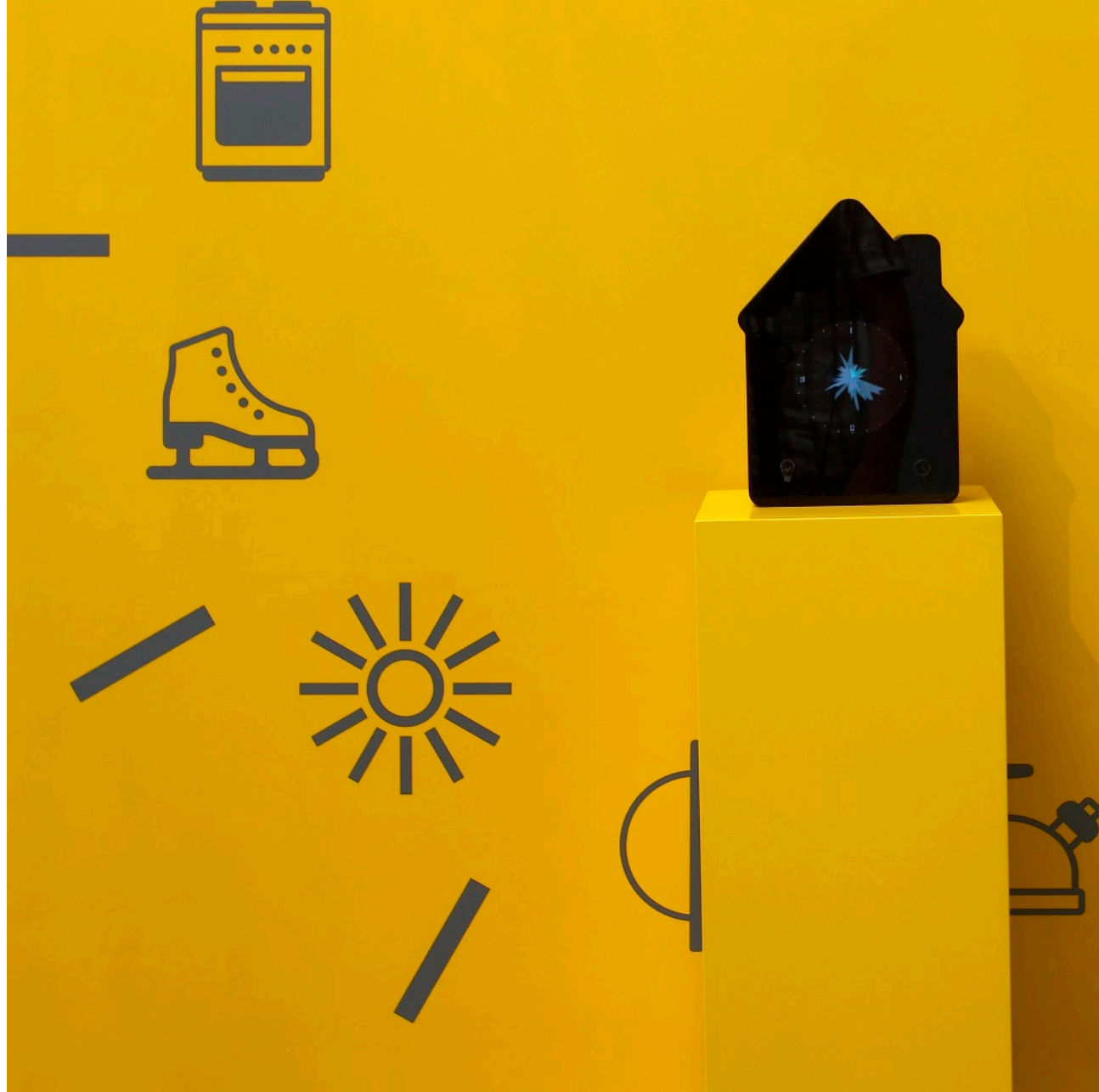
Energy AWARE Clock is an electricity meter that resembles an ordinary kitchen clock

Energy AWARE Clock is designed to make energy awareness a part of everyday life. The clock visualises the daily energy rhythms of the household and reminds us of the ordinary kitchen clock, both in form, place and use. Take a glance at your Energy AWARE Clock - in the same way you glance at the clock every now and then – and be enlightened.

Energy AWARE Clock shows electrical utilisation of its environment in real time. If the dishwasher is switched on it shows immediately on the display of the unit. Yesterday's graphs fade away slowly and today's consumption is drawn on top of previous days, making it possible to compare your energy use for several periods.

project
AWARE – Design for Energy Awareness, Interactive Institute, 2006–2008

project team
Loove Broms, Karin Ehrnberger, Sara Ilstedt Hjelm, Erika Lundell, Jin Moen



Creating a Personal Expression

AWARE Laundry Lamp is a combined drying rack and a lamp

AWARE Laundry Lamp is an attempt to combine positive symbols and activities such as hang-drying your clothes outside in the sun, with designing your own lampshade. Go even further, and make a statement with the kind of laundry you put on display. Switching on the lamp helps in drying the clothes even faster as well as adding ambience to the room. Through this feature, the design comments on the fact that 95 percent of the electricity used in a traditional light bulb is transferred to heat, and only 5 percent to light.

The design of the lamp encourages hang-drying instead of tumble-drying clothes, an alternative that drastically reduces electricity consumption on a large scale.
Tumble dryers are one of the greatest consumers of electricity at home.

project
AWARE – Design for Energy Awareness, Interactive Institute, 2006–2008

project team
Loove Broms, Karin Ehrnberger, Sara Ilstedt Hjelm, Erika Lundell, Jin Moen

Shaping Everyday Objects through Energy

The Flower Lamp builds on an increasingly prevalent technology – remote energy metering – to visualise electricity used in the household as a whole

It is not just the light of the Flower Lamp – but its actual form – that reflects energy consumption in the home. Rather than showing how many watts are consumed at any given time, its shape is responsive to the overall trend in consumption. With a decrease in household electrical use, the Flower Lamp slowly opens up and appears to 'bloom'. If, on the other hand, energy consumption increases, the lamp closes into a more contracted form, which also affects the quality of light emitted. Thus, both the light and form of the lamp reflect behavioural tendencies within a household. In order to make the Flower Lamp more beautiful, a collective change in behaviour is needed.

project
Static! – Design for Increased Energy Awareness, Interactive Institute 2004–2006

project team
Sofia Lagerkvist, Charlotte von der Lancken, Anna Lindgren, Katja Sävström, Göran Nordahl

Technical modifications
Anton Gustafsson, Fredrik Kronqvist

Interacting with Daily Light Cycles

The Energy Curtain is a window shade woven from a combination of textile, solar-collection and light-emitting materials

The Energy Curtain reinterprets our familiar relation to curtains as a means of controlling the light in a room – but with a conceptual twist. The curtain must be drawn shut to collect light, and the amount and duration that is drawn during the day determines how much light is collected for the night. Users must make a choice – whether to open the curtain and enjoy the daylight, or to close it and save energy for later. Thus, even the mundane act of opening or closing the curtain embodies the trade-off between consuming and conserving energy. Each and every day, it requires that its users reflect and act upon this trade-off – literally placing the cyclical transformation of energy into their hands.

project
Static! – Design for Increased Energy Awareness, Interactive Institute 2004–2006

project team
Anders Ernevi, Margot Jacobs, Ramia Mazé, Carolin Müller, Johan Redström, Linda Worbin

In collaboration with
Swedish School of Textiles at the University College of Borås, Ludwig Swensson AB

Be Enlightened

The Power Aware Cord is designed to visualise the energy of the current use of electricity of the appliances connected with it through glowing pulses, flow, and intensity of light

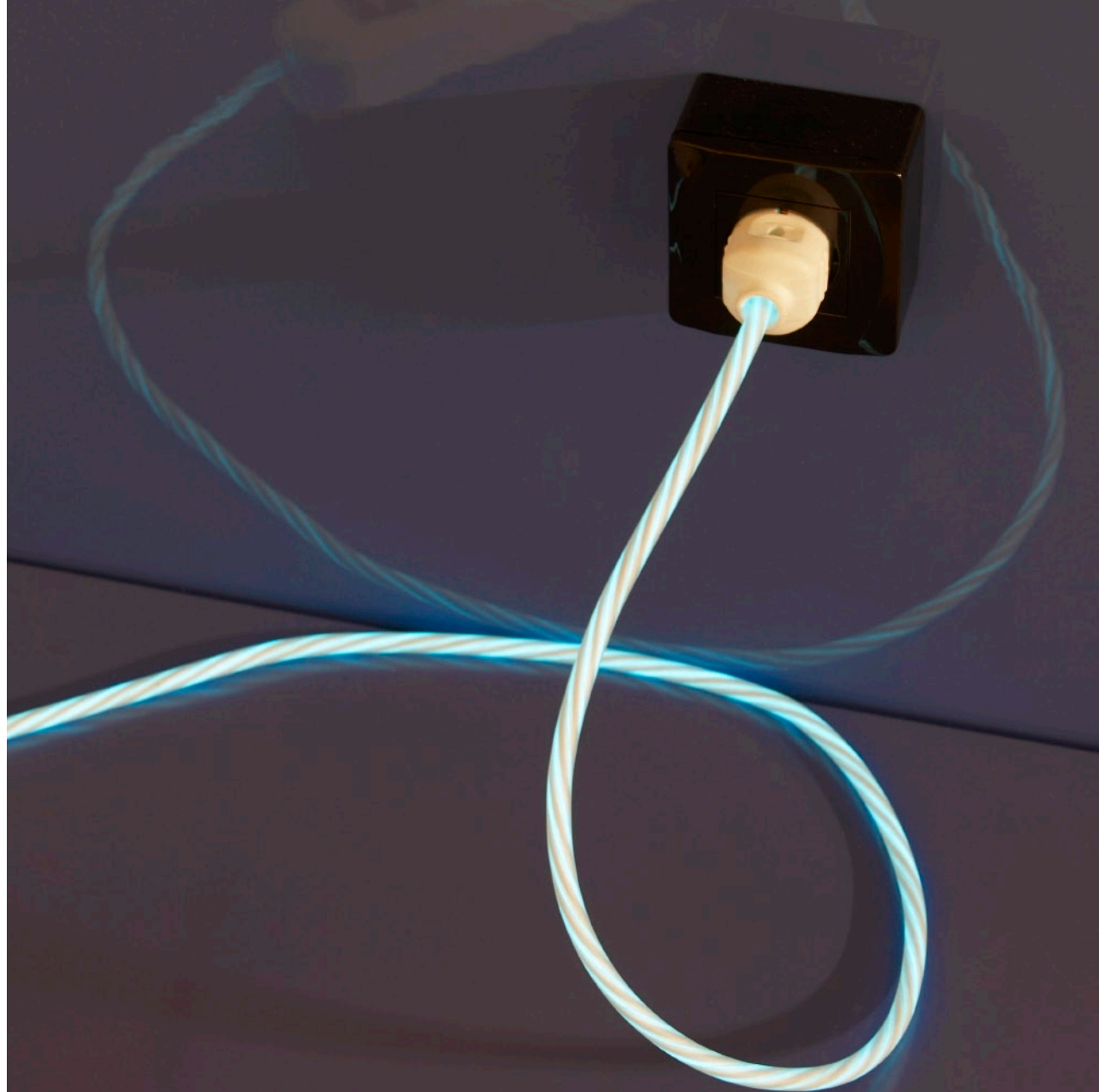
In everyday life we are surrounded by energy at all times. The TV set might be using electricity all night long without us noticing. The mobile phone charger is an energy thief that is easy to forget.

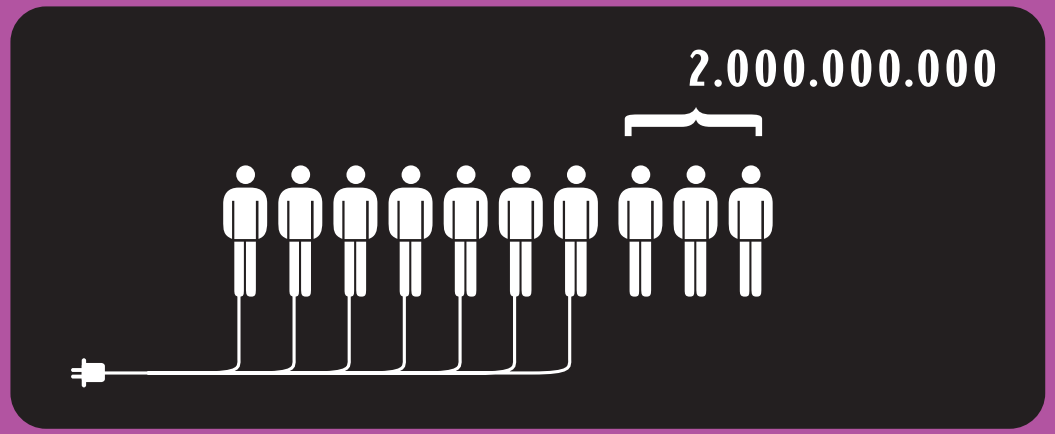
The Power Aware Cord may be used as a 'tool' for people to rediscover energy in their homes as well as an ambient 'display' to see energy consumption at a glance at any given time. For instance, the effects of changing the volume on stereo equipment becomes immediately and dramatically apparent – as do appliances that are silently stealing electricity while on standby.

project
Static! – Design for Increased Energy Awareness, Interactive Institute 2004–2006

project team
Anton Gustafsson, Magnus Gyllenswärd, Sara Ilstedt Hjelm, Christina Öhman

In collaboration with
ThinLight AB





Not for Everyone
Approximately two billion people worldwide live without electricity.

=1 X AA/min

Manpower
To power an average human being with batteries instead of food is equal to 60 volt AA batteries (2,000 mAh) per hour.

Nils Edvardsson

The Spirit of High Voltage

Recordings of high voltage power lines made with contact microphones and video documentation made at the recording sites

Sweden. The nature. The great resources of vast forests covering large parts of the country. The rivers meandering their way from the mountains in the west to the sea in the east. The industries and the population are gathered around the big city areas – the capital of Stockholm, and Sweden's other two main and populous cities, Malmö and Gothenburg.

This means that the power lines, which transfer the electrical power produced in the great waterfalls of the wilderness of the North, are drawn and flow all about and over the country. Looking at the ubiqutiy of the power line, covering both the rural and the urban, the cultivated and the wild in Sweden, the artist Nils Edvardsson began to regard these lines as an enormous string instrument and he set himself the task of recording the sounds that these lines produce in the transmissions and connections of this flow across the land. The result is a dynamic score where sounds of the electricity, the wind and the environment around the lines constitute the orchestra.

project team
Nils Edvardsson | artist
Fredrik Norrgren | sound engineer

Steven Dixon and Tore Nilsson

Mezzo

Digital photo frames, digital images, sensors and recordings of energy shifts on Venus and background radiation

What do you think of when you hear the word energy? Artists Steven Dixon and Tore Nilsson explore a large number of images they associate with energy and the many themes this has given rise to in the human mind and beliefs. On 24 small monitors images flicker, pause, return, creating an open fabric of the meanings of energy from the beginnings of the ideas of amber and static electricity to the electromagnetic pulse of the earth, and forming for the viewer an open field for a myriad reflections of what energy could be and what meanings it could yield.

When you approach the installation, audio is triggered becoming louder and stronger as one comes closer to the monitors. The kinetic energy of the viewer is translated into the power and clarity that the sounds are given. These sounds themselves reflect energy and its sonic representations. Varying from such divergent sources as the captured voices of ionic energy shifts on Venus to the largest sound of all created by the background radiation generated by the Big Bang, these sounds as well as the images which accompany them confront us with the vast possibilities of energy which we have only just begun to explore and understand.

Using this logic of the beginnings of our understandings the title **Mezzo** should be taken more as a temporal than as a separate spatial element. We only now, at this time, can begin an understanding of energy which may free us as opposed to constrain us.

project team
Steven Dixon | artist
Tore Nilsson | artist
Patrik Axelsson and **Gunnar Camner** from
Physical Interaction Lab | engineers

Tina Finnäs

Like There Was No Tomorrow

Plexiglas, electric lifts, plastic plants, carbon dioxide meters, computer, speakers

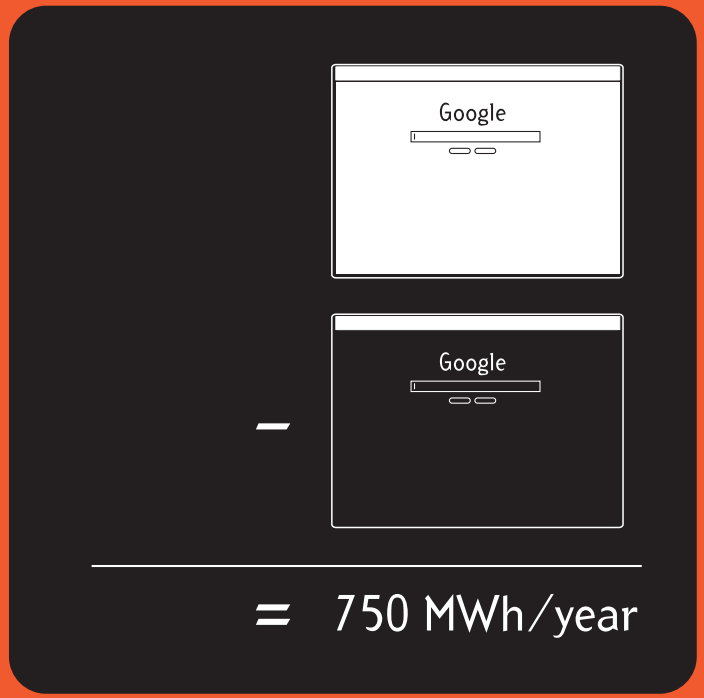
Four plexiglas modules, artificial plants and a sun. Together they create an oasis where a small, pulsing activity can be discerned. The activity might be more intense, since the installation constantly gets input from a carbon dioxide meter. The more carbon dioxide in the room the more activity – the plants will grow and the light will be more intense.

Tina Finnäs' work always has a "good feeling", she looks for the beauty. **Like There Was No Tomorrow** visualises life and eternity, a dawn when everything is born and dusk when the sun sets. The installation follows this cycle, from sunrise to sunset, to the tones of Lou Reed's **Perfect Day**.

Finnäs still wants to remind us that this is a fragile beauty. The Earth is a resource we borrow but also rapidly consume.

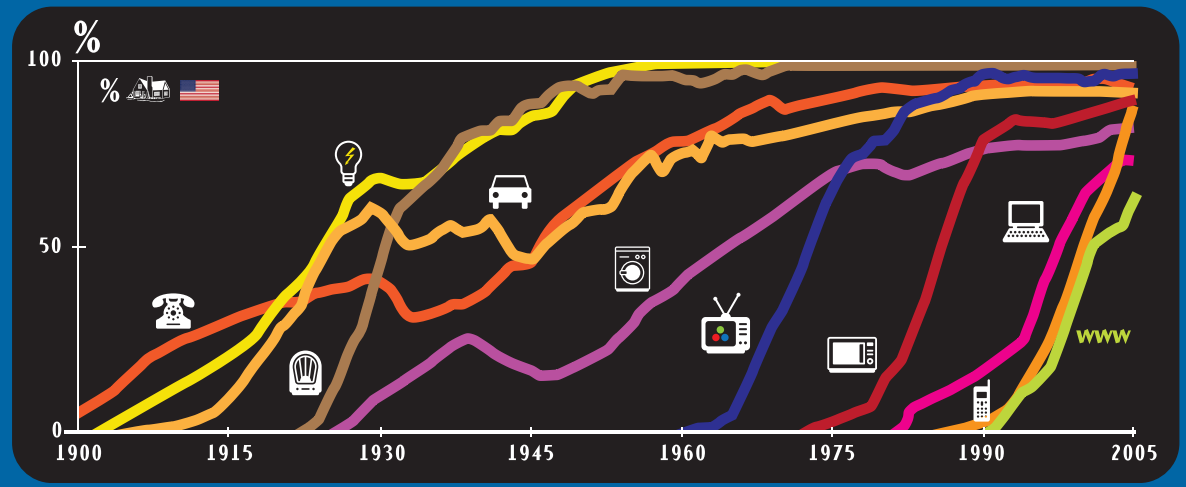
project team
Tina Finnäs | artist
Erik Sjödin | engineer
Henrik Berggren and **Rouzbeh Delavari** from
Physical Interaction Lab | engineers

In collaboration with
Johan Strandahl, Klajdi Shoshi, ELFA and **SenseAir**



A Matter of Colour

Since a white web page uses about 74 watts to display, while a black page uses only 59 watts; savings of 15 watts of energy can be done by a simple change of colour from the light background to a dark one. Google for instance, gets over 200 million queries a day. According to Mark Ontkush a black Google page saves approximately 750 Megawatt-hours a year. Hence, Heap media started the blackle.com utilising this concept of energy compensation.



Consumption Spreads Faster over Time

The time from initial market introduction to mass consumption shortens proportionally over time. The example shows the development of the private consumption in the US (1900–2005).

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