



TOUCH POINTS AND PRACTICES IN THE SMART GRID

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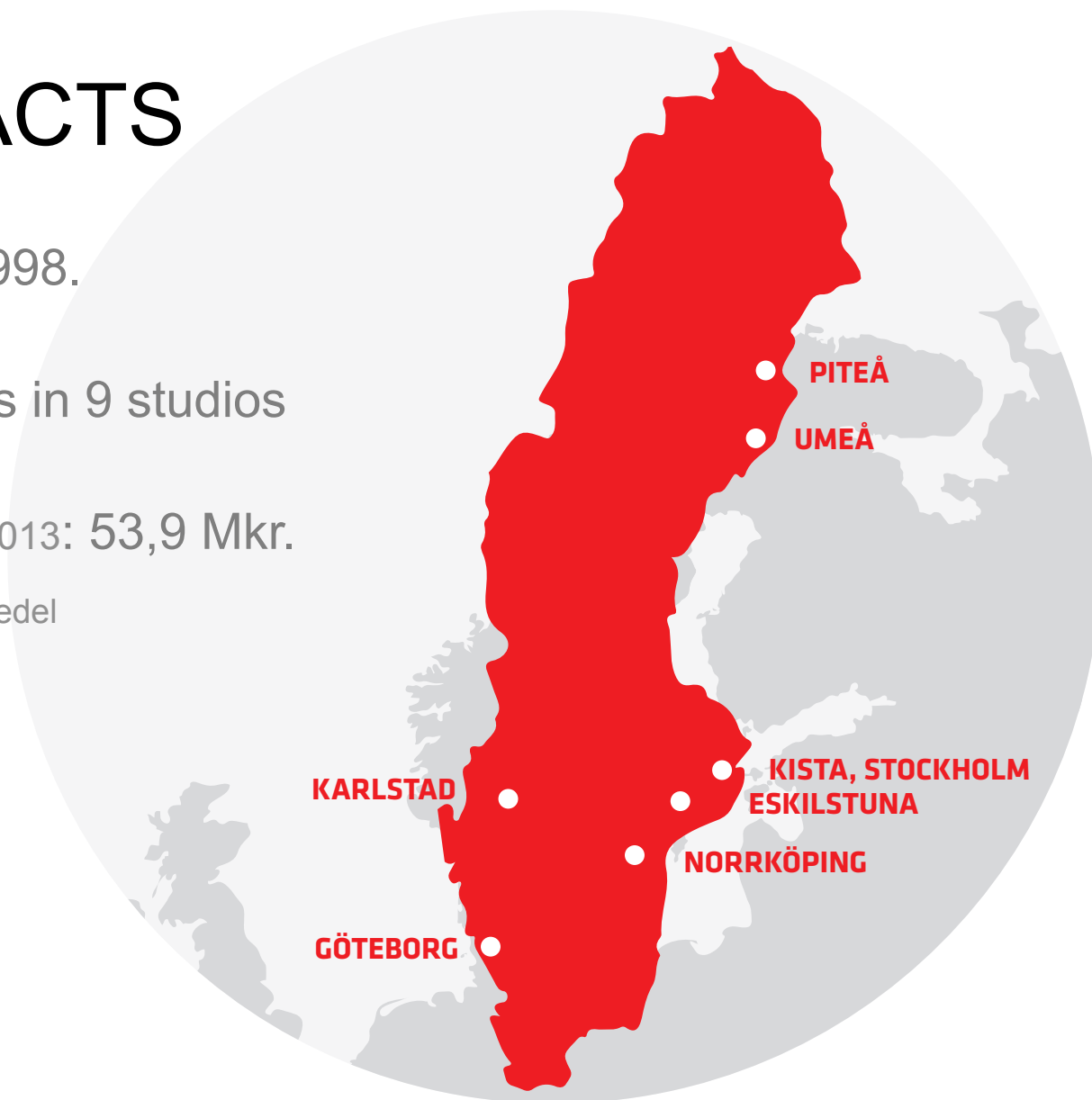
WHO ARE WE?



- Interactive Institute Swedish ICT is an **experimental IT & design research institute** conducting applied research and innovation.
- We create groundbreaking user experiences and offer **expertise in interaction design, visualization, user behavior, sound design, games and entertainment.**

SOME FACTS

- Founded in 1998.
- 60 employees in 9 studios
- Omsättning 2013: 53,9 Mkr.
- 42% forskningsmedel
33% näringsliv
15% statlig
10% EU





DELIBRETRO
What should an
apartment contain to
encourage me as a



**SURE! NORDIC BUILT
FOR SUSTAINABLE
RETROFITTING**
SURE! NORDIC BUILT

Energy Design, Eskilstuna



**TASK 24 - CLOSING
THE LOOP -
BEHAVIOUR CHANGE
IN DSM, FROM**



**DESIGN FOR
SUSTAINABLE
CHOICES ON INDOOR
CLIMATE**



**FUTURE ALLEY -
SUSTAINABLE
LIFESTYLES**
The overall purpose of



FLEXIBEL
The project Flexible inten
experience of small scale

<https://www.tii.se/groups/energydesign#projects>



**OPEN ENERGY
PLAYGROUND**
Open Energy
Playground focuses on



SMART CITY SRS
Interactive Institute is
developing an
Augmented



**TRIBE - TRAINING
BEHAVIOURS
TOWARDS ENERGY
EFFICIENCY: PLAY IT!**



**ENERGY IN A BOX AT
KOMTEK**
The need of new
methods and tools to be



FÖRSKOLEVIS
FörskoleVis is a joint



**CELSIUS: COMBINED
EFFICIENT LARGE**

Vad är smarta elnät?

Från traditionella till smarta elnät

Framtidsmöjligheter med smarta elnät

Smarta elnäts roll för elmarknaden

Aktörerna på elmarknaden

Underlagsrapporter

Smarta elnäts roll för slutkunderna

Underlagsrapporter

Tekniska möjligheter

Underlagsrapporter

Säkerhet och integritet

Underlagsrapporter

Intressanta exempel

Hyllie

Kraftsamling smarta nät – Västra
Götalandsregionen

Norra Djurgårdsstaden

Smart grid Gotland

Det aktiva huset



Vad är smarta elnät?

Smarta elnät är ett mycket brett begrepp som omfattar hela fältet från kraftelektronik och ny teknik i transmissionsnätet till nya produkter och tjänster baserade på informationsteknik, kunskap om energiflöden och styrmöjligheter ute hos slutanvändarna. Samarbetsorganisationen mellan EU:s tillsynsmyndigheter för energimarknaderna ERGEG har definierat smarta elnät som:

Final report and national
action plan for development
of SG in Sweden
2015-2030



Where do smart grids meet people and vice versa?

SG TOUCH POINTS TO PEOPLE

DYNAMIC PRICING

VISUALIZING ELECTRICITY USE

FLEXIBLE BEHAVIOUR

THE AUTOMATED HOME

APPLIANCES CONNECTED TO INTERNET

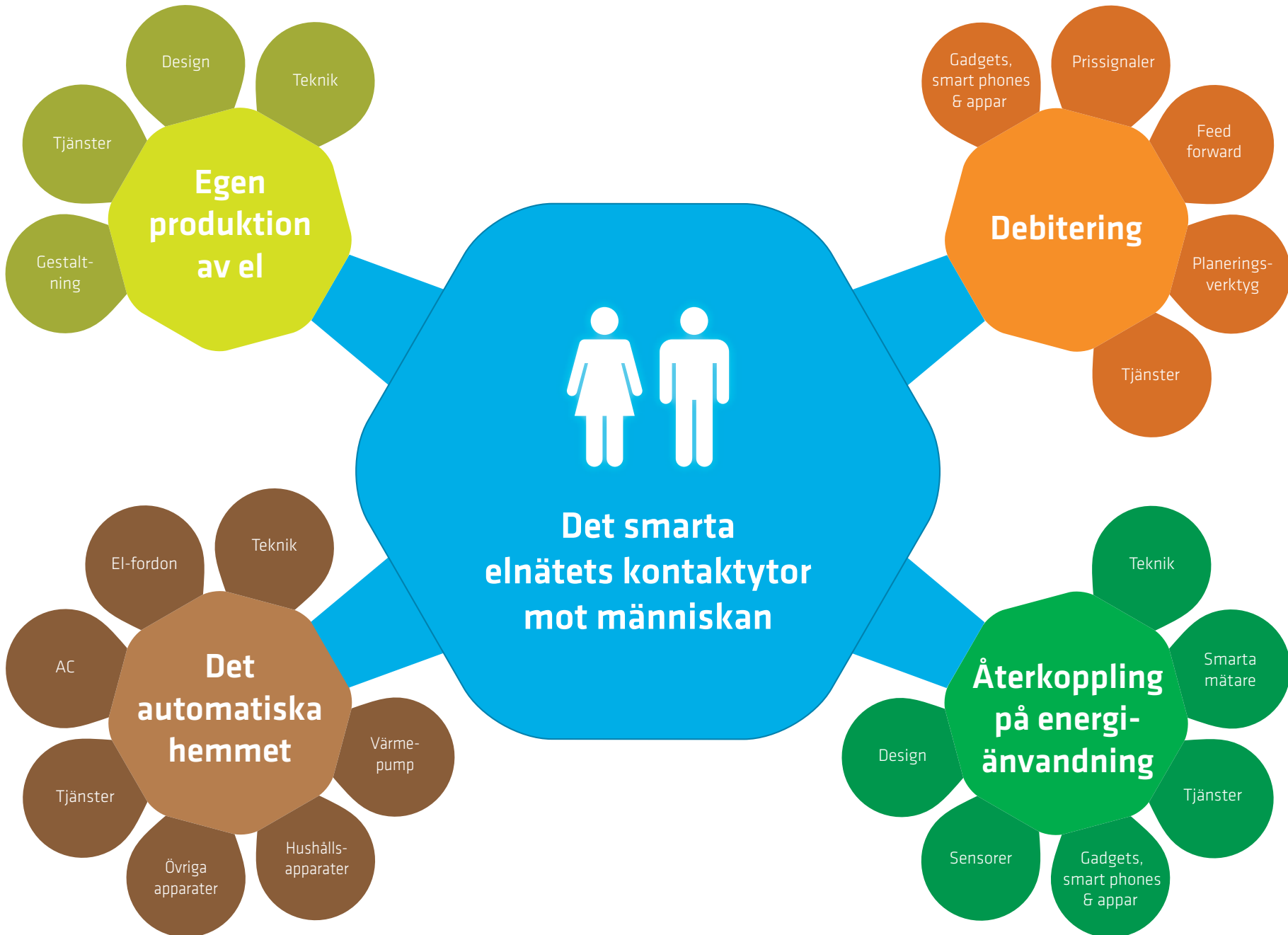
MICRO PRODUCTION OF ELECTRICITY

HOME AUTOMATION SYSTEM FROM GREENWAVE REALITY (GWR)



Fig. 1 The GWR equipment (image from antropologerne.com)

Breaking down areas where people and SG meet



Communication: Electrical bill,
gadgets, smart phones, apps, etc

Price signals

Feed forward

Tools for planning

Other services linked to billing

Dynamic
pricing

Gadgets,
smart phones
& appar

Prissignaler

Feed
forward

Planerings-
verktyg

Tjänster

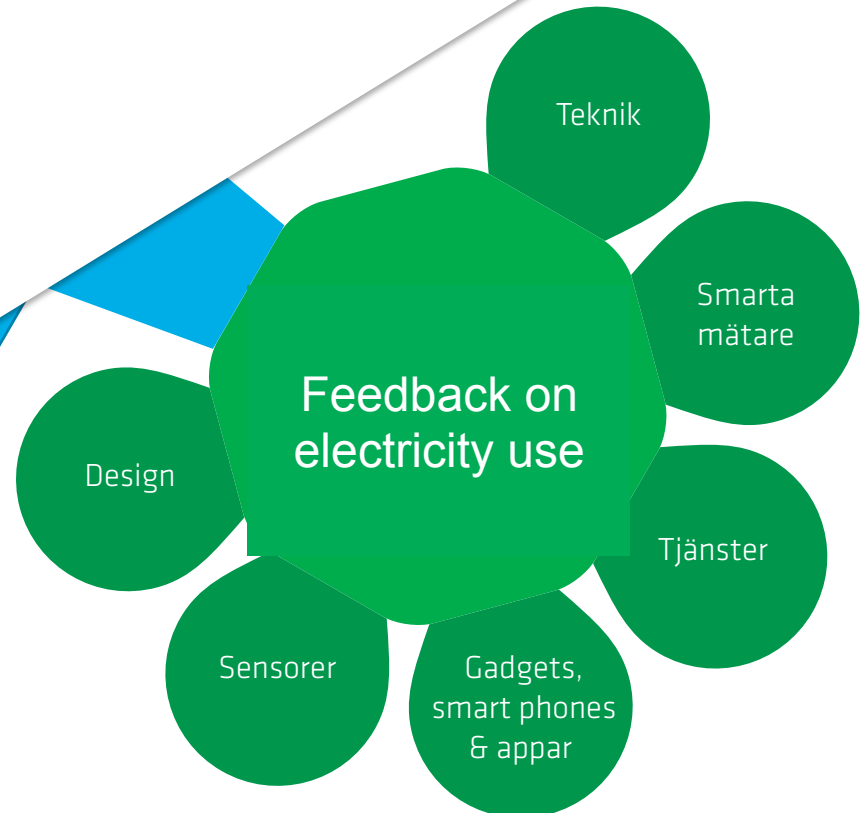
Smart meters

Sensors

Technology, Internet of things

Gadgets, smart phones, apps

Services



MOTIVATION AND ENGAGEMENT IN DESIGN

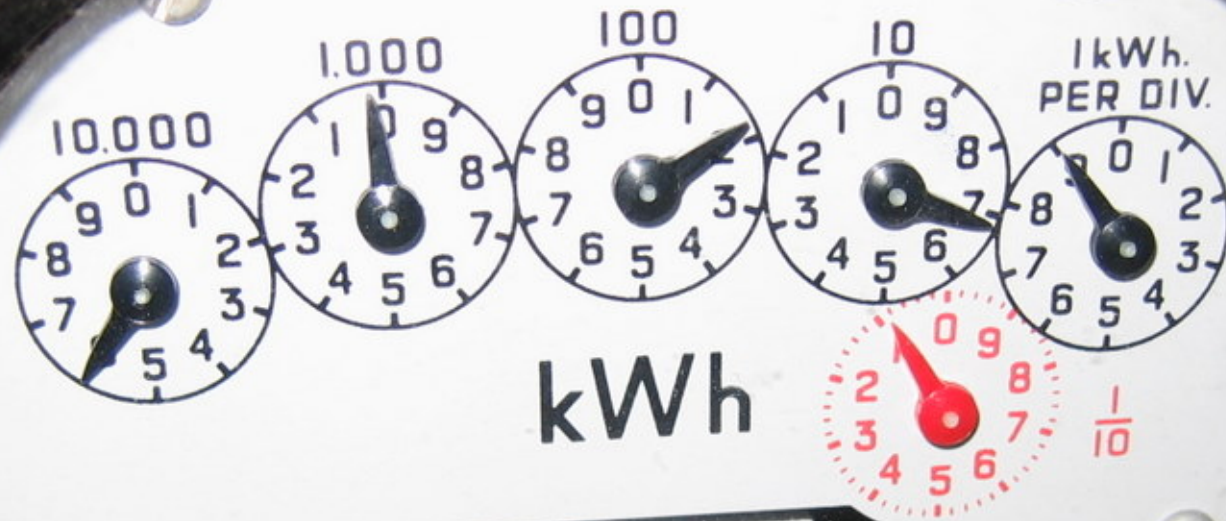
KNOWLEDGE

FEEDBACK

AESTHETICS

PLAYFULNESS

Electricity is invisible



kWh



240 V 40A MAX S 200-16 250 revs/kWh
WATTHOUR METER IPH 2W
SANGAMO WESTON LTD ENFIELD MIDDX ENG
AF 68771 1965
THIS METER IS THE PROPERTY OF EAST MIDLANDS ELECTRICITY
S30FC FLTON® MAGNETIC BEARING

Relation to energy use



STRÖMS TRYCKS
ING • 1FI 0510-2

ABLE COLOR TV-RADIO

OR
KE



LEVISION
DIO
PLY:
ATTERY/10"D-CELLS

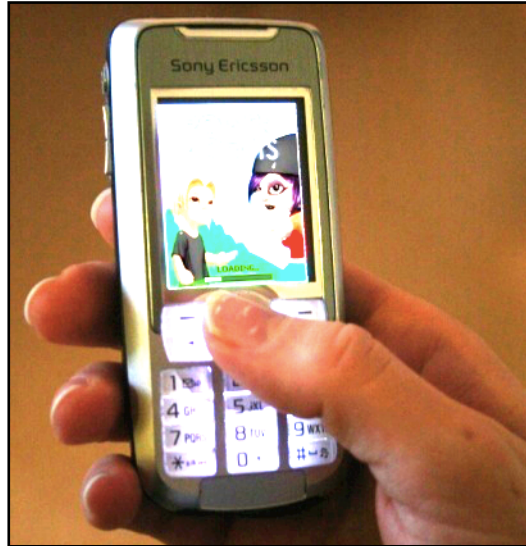


2005: Power House



Intervjustudie: 10 ungdomar från en ort

2006-2007: Power Agent



Fältstudie: 6 ungdomar från två orter

2007-2009: Power Explorer



Fältstudie: 18 ungdomar från en ort

2009-2010: A.A.P.W



Fältstudie: 127 ungdomar från en ort

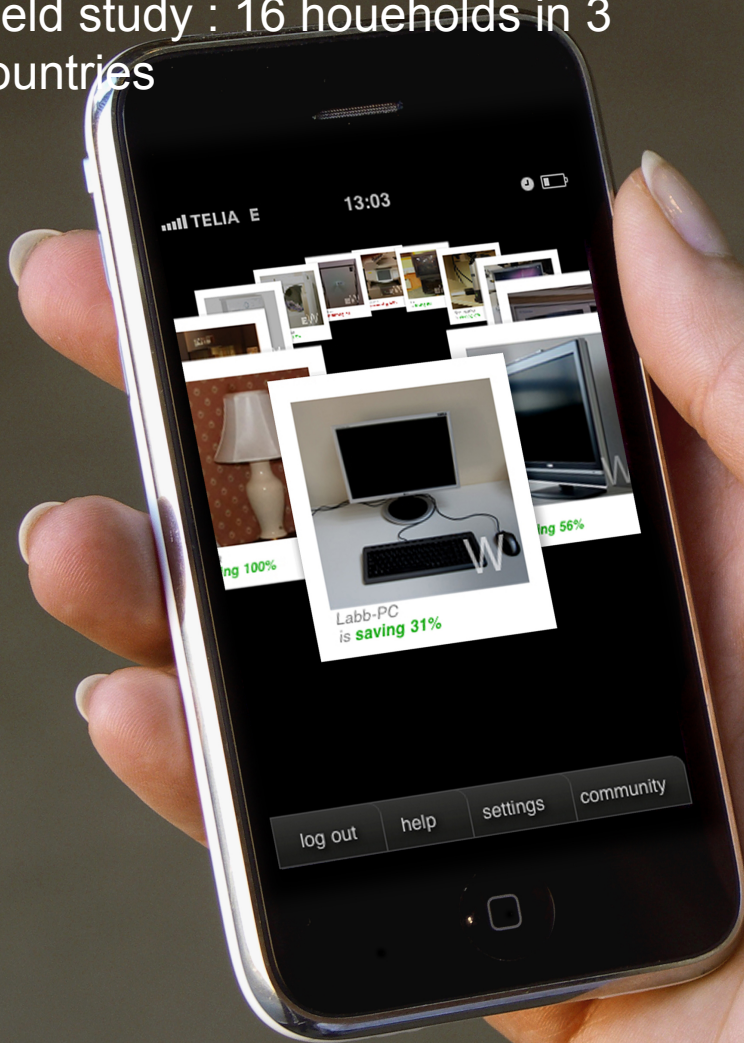
Engaging games

2008-2009: EnergyCoach
Participatory design
Field study: 18 households



User participation

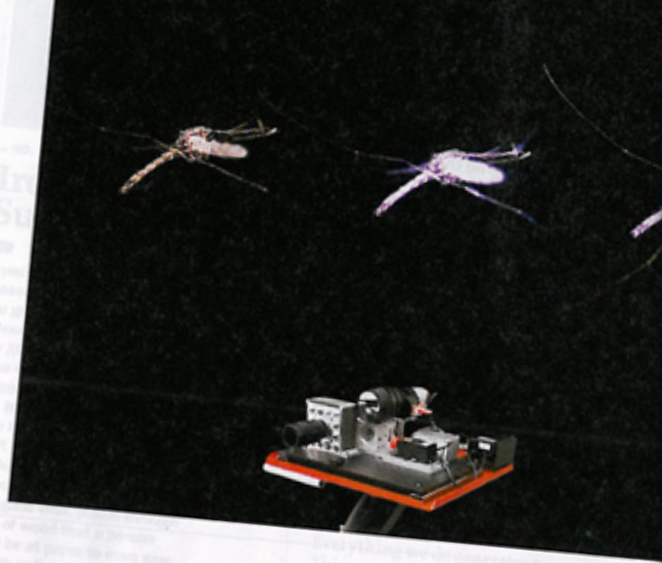
2008-2011: BeAware
Field study : 16 households in 3
countries



Technology as an enabler



Power Aware Cord



NO. 47

Power-Aware Cord

We'd all like to be more energy-efficient. But watching the meter doesn't intuitively show how much juice is being used minute to minute. The Interactive Institute, a Swedish nonprofit that explores technology and design, had an idea: what if you could actually see the electricity flowing into your

BEST JUICE GAUGE

machines? The Power-Aware Cord embeds wires around a cable that pulse light in relation to how much electricity is being drawn off the grid. The more current, the brighter and faster the blue light spirals. In testing the device, researchers found that making the invisible visible tuned consumers in to their bad habits, nudging them to power down and offering some surprising appliance insights: when a radio broadcasts drumbeats and bass riffs, its electricity consumption jumps. Talk about being plugged in.



SPECIAL DOUBLE ISSUE

NOVEMBER 22, 2010

Marijuana:
Mainstream
in the U.S.

India:
Roads to
the future

Diamonds:
Zimbabwe's
blood stones

Haiti:
The killer
cholera

TIME

The 50 Best Inventions Of 2010

Jet pack
Teacher robot
Lab-grown lungs
Car-part incubator
Malaria-proof mosquito
Spray-on fabric
Beef-powered train
Blast-protection wallpaper
Flipboard
Sarcasm detector
Power-aware cord
Plastic-fur coat
Earpiece video camera
Synthetic cell
Driverless car

... and 35 more



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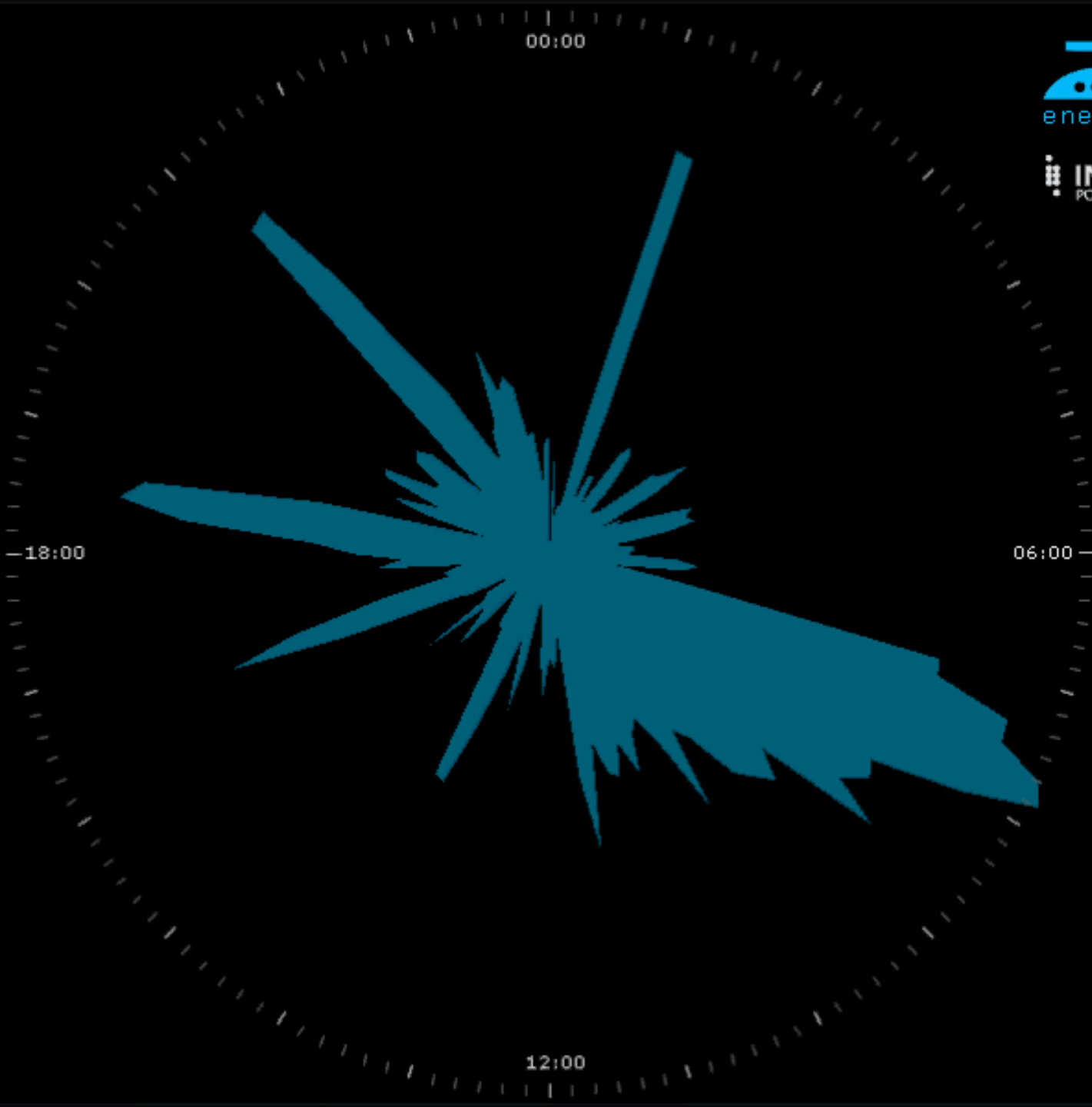
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UGANDA: 44 20 65
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ZIMBABWE: 44 20 65

www.time.com

The Energy AWARE Clock



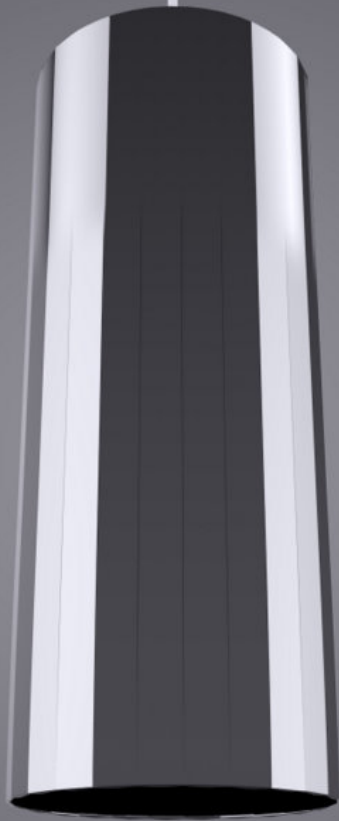


 **AWARE**
energy watch, version 0.2

 **INTERACTIVE INSTITUTE**
POWER ESKILSTUNA

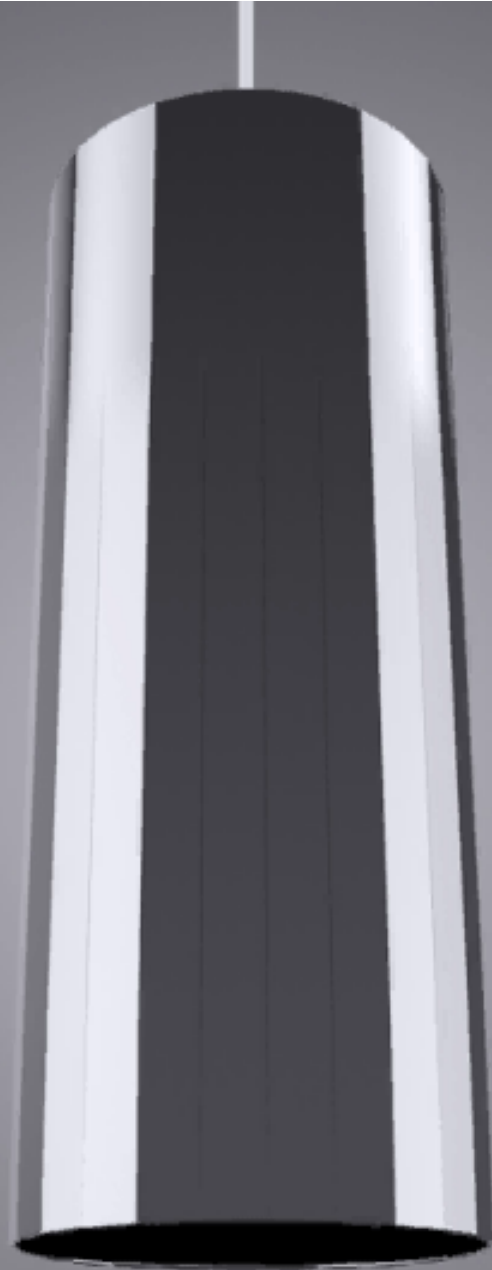
*“... nominated the STATIC Flower Lamp
as a candidate for TIME magazine annual
issue dedicated to the best and “coolest”
inventions of the year.”*

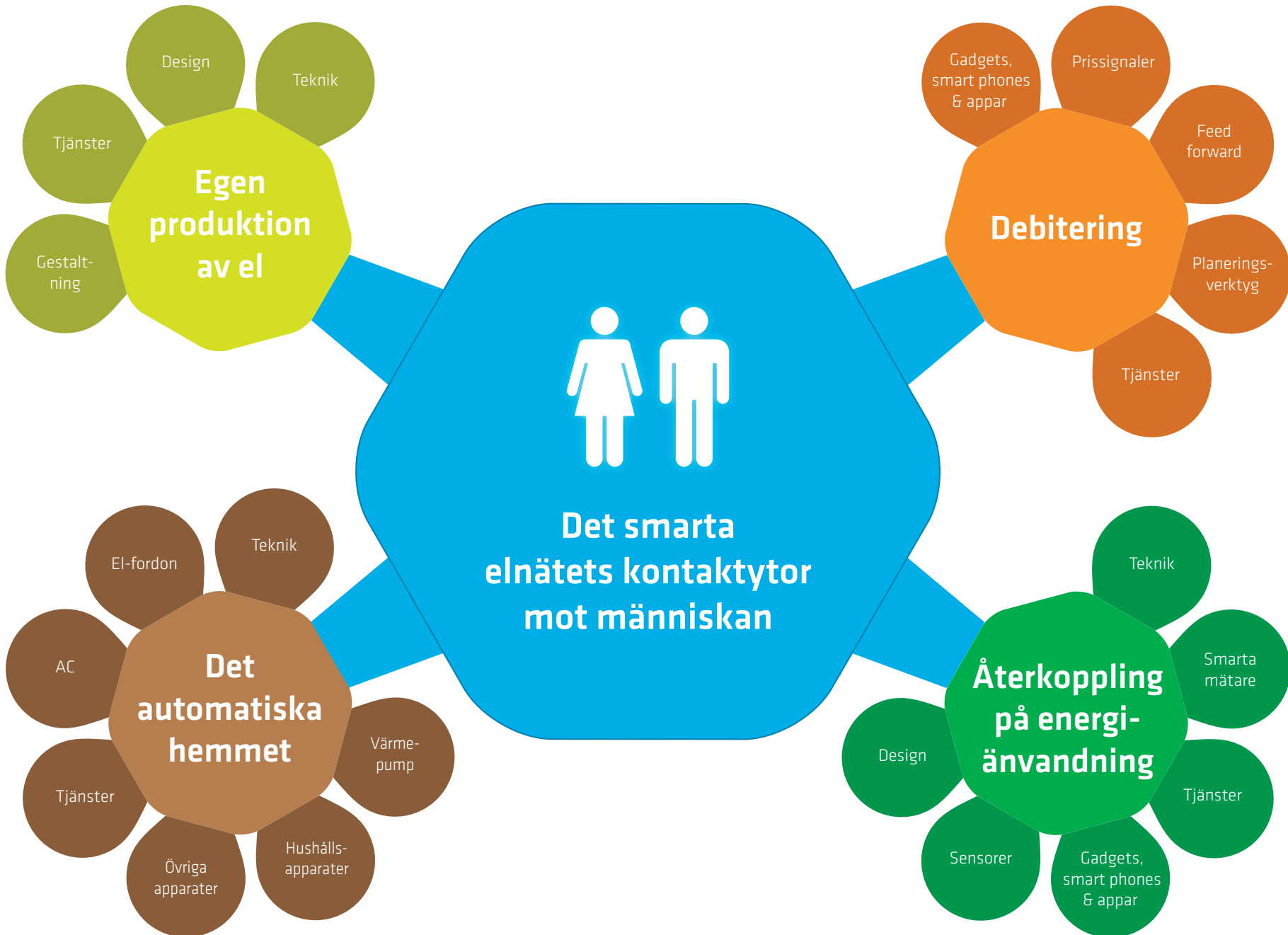




Design by Interactive Institute and Front
Design

Flower Lamp





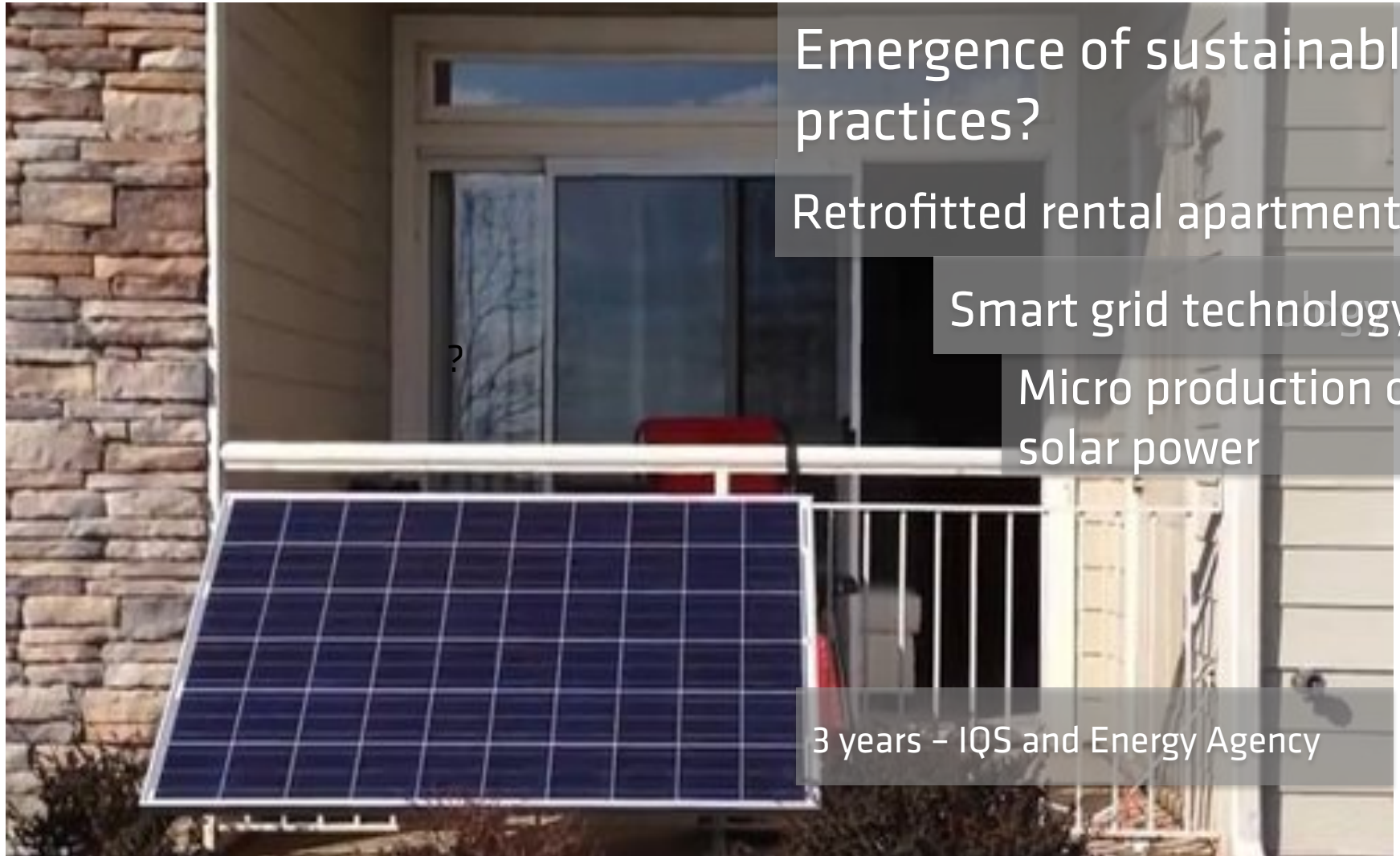
FUTURE ALLEY - SUSTAINABLE LIFESTYLES WITH SMART GRIDS



BACKGROUND

- Lack of knowledge about households' use of SG equipment in retrofitted rental apartments
- Use of SG-technology has mainly been studied in new residential areas

PURPOSE



Emergence of sustainable practices?

Retrofitted rental apartments

Smart grid technology

Micro production of solar power

3 years - IQS and Energy Agency

HOUSEHOLDS STUDIED FOR 3 YRS

PARTNERS INTERVIEWED
CONTINUOUSLY

PARTICIPATORY DESIGN

RECOMMENDATIONS

SCIENTIFIC PUBLICATION

framtidsgränd
VISNINGSLÄGENHET



RECRUITING HOUSEHOLDS



ENERGY USE IS GROUNDED IN EVERYDAY ACTIVITIES



- Live somewhere
- Eat, sleep, keep clean
- Socializing, leisure, entertainment
- Work, education
- Transportation

RESEARCH PROJECT 2014 - 2017





TACK!

WWW.TII.SE