How can you convince citizens to change their energy *use?*

Robert Elbrink, City of Eindhoven

Lenneke Kuijer, Eindhoven University of Technology

The Netherlands

EU Design Days, Brussels, 26 November 2019

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

EINDHOVEN

Sustainably Unpersuaded: How Persuasion Narrows Our Vision of Sustaina

Hrönn Brynjarsdóttir[1], Maria Håkansson[1], James Pierce[2], Eric P. S. Baumer[1], Ca
and Phoebe Sengers[1]

[1]Cornell University
Ithaca, NY 14850, US
{hb47, mch267, ericp
pjs54}@cornell.edu

ABSTRACT
In this paper we provide a crit
sustainability research from 200
sociological theory of modernis
is based on a limited framing o
havior, and their interrelationsh
sustainability easier, but leads t
breakdown. We then detail prob
narrowing of vision, such as how
ity as the optimization of a simp
gies incorrectly as objective arbi
sustainability. We conclude by
proaches to move beyond these p

Author Keywords
Persuasive sustainability; sustain
critical reflection; modernism

ACM Classification Keywords
H.5.m.[Information interfaces an
Miscellaneous;

INTRODUCTION
Environmental sustainability is
search, and one that is frequently
sion. 86 papers contain the terms
tainability" in CHI 2009-2011;
also include the term "persuasiv
similar emphasis; persuasive su
of their sustainable HCI corpus
that 56 of 139 sustainable HCI
genre of eco-feedback [21].Give

Curiosity to cupboard- self
energy use fee

Stephen Snow Laurie Buys

Queensland Unive
2 George St,
steve.snow | l.buys | p.ro

ABSTRACT
This paper discusses findings made during a study of energy use feedback in the home (eco-feedback), well after the novelty has worn off. Contributing towards four important knowledge gaps in the research, we explore eco-feedback over longer time scales, focusing on instances where the feedback was not of lasting benefit to users rather than when it was. Drawing from 23 semi-structured interviews with Australian householders, we found that an initially high level of engagement gave way over time to disinterest, neglect and in certain cases, technical malfunction. Additionally, preconceptions concerned with the "purpose" of the feedback were found to affect use. We propose expanding the scope of enquiry for eco-feedback in several ways, and describe how eco-feedback that better supports decision-making in the "maintenance phase", i.e. once the initial novelty has worn off, may be key to longer term engagement.

Author Keywords
Eco-feedback; engagement; long-term; discovery;

COVER STORY

XXI.4 July + August 2014
Page: 24
Digital Citation

SMART ENERGY IN EVERYDAY LIFE: ARE YOU DESIGNING FOR RESOURCE MAN?

Authors:
Yolande Strengers

With the introduction of smart grids, meters, and associated technologies, electricity systems are going through an ICT transformation. The aim of this endeavor is similarly transformative: to decarbonize the electricity grid and reduce or shift peaks in electricity demand. Humble household energy consumers are set to play a key role in this transformation, where they, too, are being asked to become "smart."

Harper-Slaboszewicz et al. sum up the vision for this new energy consumer as follows: "The goal isn't to move utilities into our living room—rather, it's to *allow consumers to take advantage of some of the same technologies utilities are finding useful in smart metering and monitoring/managing the distribution grid*" [1]. In other words, the aim is to transfer electricity utility management knowledge, expertise, and tools into the heart of the home. This implies that smart technologies are designed for a smart consumer or user—one who is interested, immersed, and engaged in managing their energy demand, and willing and

Special Issue: Energy & Society

Theory Culture & Society

Theory, Culture & Society
2014, Vol. 31(5) 41–58

DOI: 10.1177/0263276414536746
tcs.sagepub.com

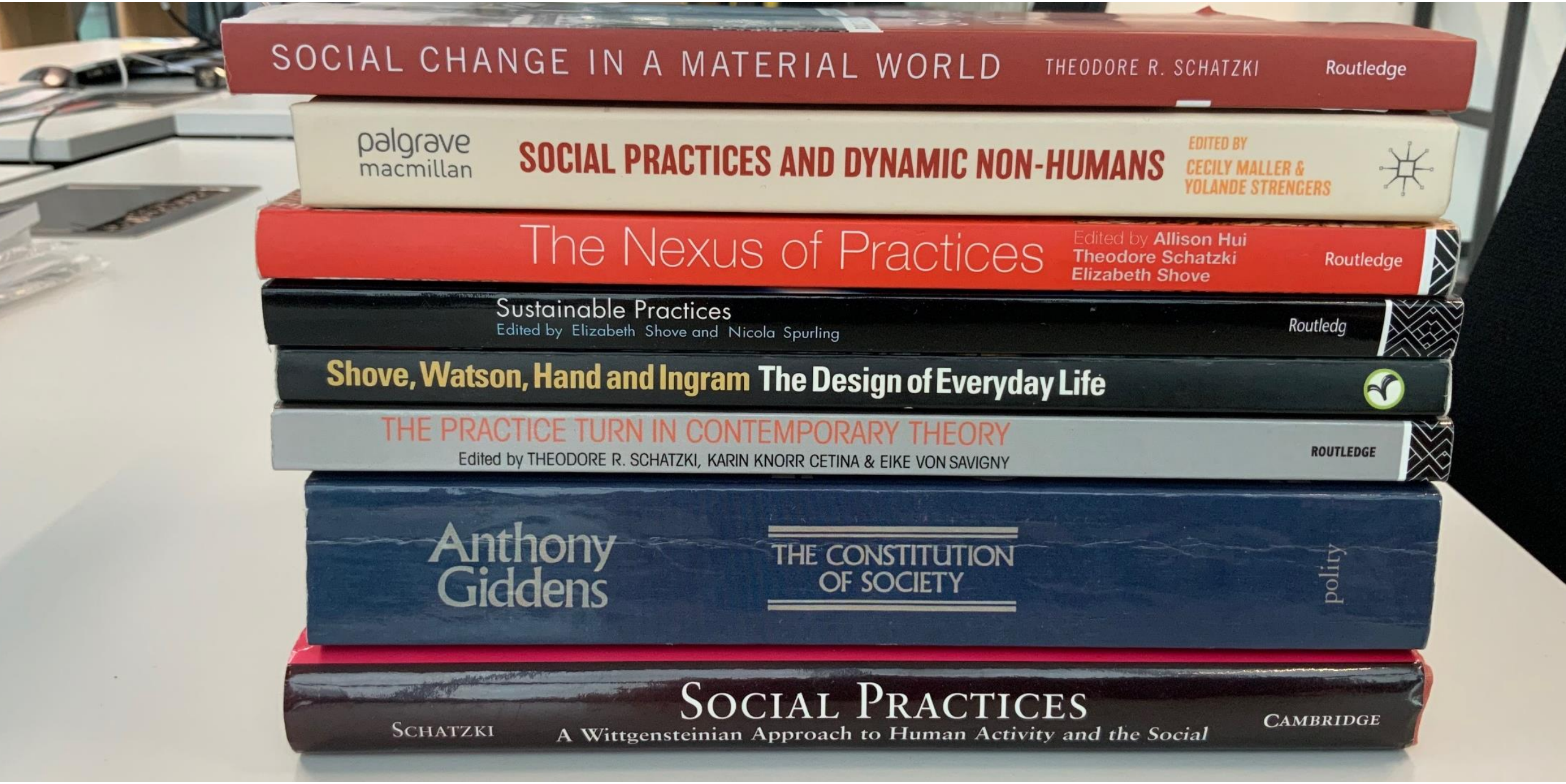
SAGE

What Is Energy For? Social Practice and Energy Demand

Elizabeth Shove and Gordon Walker
Lancaster University

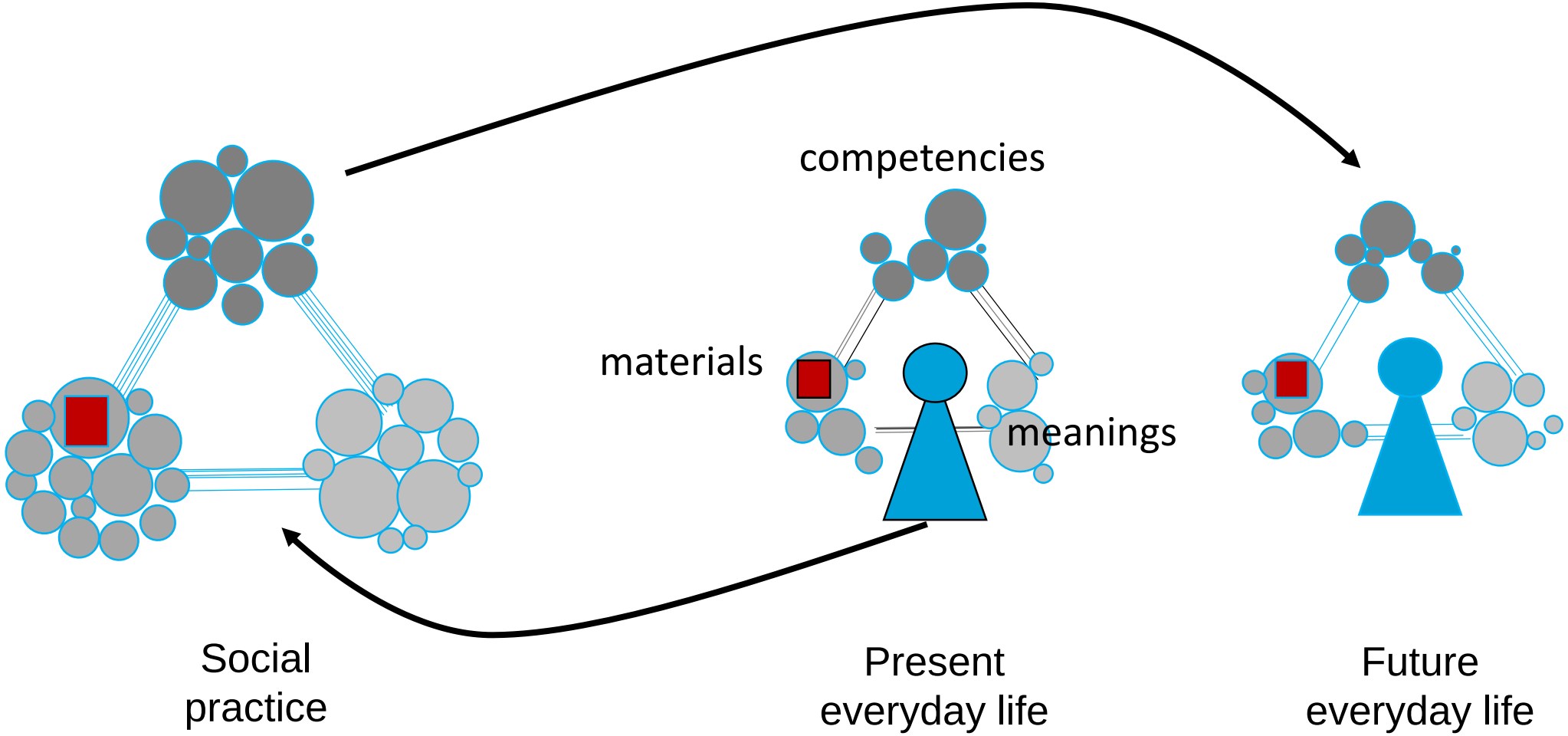
Abstract

Energy has an ambivalent status in social theory, variously figuring as a driver or an outcome of social and institutional change, or as something that is woven into the fabric of society itself. In this article the authors consider the underlying models on which different approaches depend. One common strategy is to view energy as a resource base, the management and organization of which depends on various intersecting systems: political, economic and technological. This is not the only route to take. The authors develop an alternative approach, viewing energy supply and energy demand as part of the ongoing reproduction of bundles and complexes of social practice. In articulating and comparing these two positions they show how social-


SOCIAL CHANGE IN A MATERIAL WORLD
THEODORE R. SCHATZKI
Routledge
palgrave
macmillan
SOCIAL PRACTICES AND DYNAMIC NON-HUMANS
EDITED BY
CECILY MALLER &
YOLANDE STRENGERS
The Nexus of Practices
Edited by Allison Hui
Theodore Schatzki
Elizabeth Shove
Routledge
Sustainable Practices
Edited by Elizabeth Shove and Nicola Spurling
Routledg
Shove, Watson, Hand and Ingram The Design of Everyday Life
THE PRACTICE TURN IN CONTEMPORARY THEORY
Edited by THEODORE R. SCHATZKI, KARIN KNORR CETINA & EIKE VON SAVIGNY
ROUTLEDGE
Anthony
Giddens
THE CONSTITUTION
OF SOCIETY
polity
SOCIAL PRACTICES
SCHATZKI
A Wittgensteinian Approach to Human Activity and the Social
CAMBRIDGE

Maller and Strengers, 2019
Schatzki, 1996, 2019
Shove et al., 2012
Giddens, 1991
Bourdieu, 1977

Social practice theory



Everyday life: threats

- Lifestyle changes
- Balancing patterns of supply and demand

Geld en Werk

Run op airco en ventilator: 'Na vandaag zijn we door voorraad heen'

26 juli 2018 17:24
Aangepast: 27 juli 2018 18:01

Freezing in the office? It's because air conditioning standards are sexist

Tuesday 28 February 2017 12:07PM
Dr Karl Kruszelnicki

IMAGE: A COLD OFFICE EXPERIENCE IS COMMON FOR MANY WOMEN (GETTY IMAGE

For 50 years air conditioning in com
been set using the Standard 55 guide
workplaces aren't staffed solely with
in 60s business suits, and that's left v
Dr Karl Kruszelnicki argues.

nrc.nl abonneer

Meer stroom nodig in Zuid-Europa door warmer klimaat

Airconditioning Door de opwarming zal de vraag naar elektriciteit in Europa veranderen: meer in de zomer, minder in de winter.

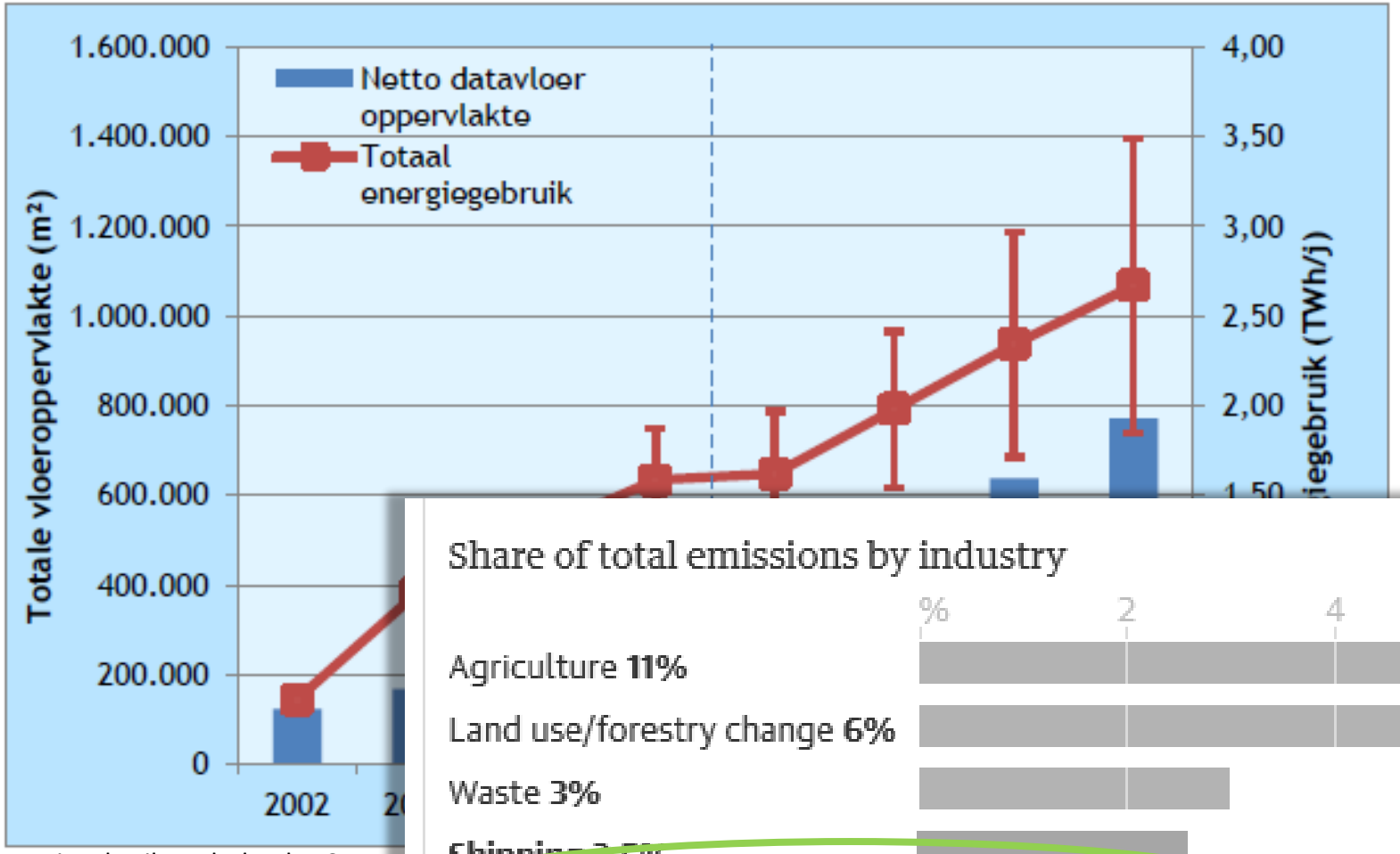
Hester van Santen 29 augustus 2017 Leestijd 1 minuut

In Zuid-Europa moet de airconditioning steeds harder werken door de opwarming van het klimaat. De vraag naar elektriciteit zal daar de komende decennia merkbaar toenemen, berekenen Duitse klimaatwetenschappers

Effect klimaat op elektriciteits-verbruik tot 2099, in procenten

-6 -4 -2 0 +2 +4 +6 +8

Photo: pmorgan /Flickr



Energiegebruik Nederlandse Comme

CSIRO ScienceImage 11313 The CSIRO GPU cluster at the data centre (Wikimedia commons)

https://www.hepburnadvocate.com.au/story/5953808/pampered-pets-may-burden-energy-supplies/

MARCH 14 2019 - 3:30AM

Pampered pets may burden energy supplies

Christine McGinn National

A study shows that use of electricity for pets is often a factor in higher energy demands.

Pampered pets afforded human comforts need to be factored into Australia's future energy needs, a Victorian study warns.

Article

Journal of Consumer Culture
2016, Vol. 16(3) 761–780

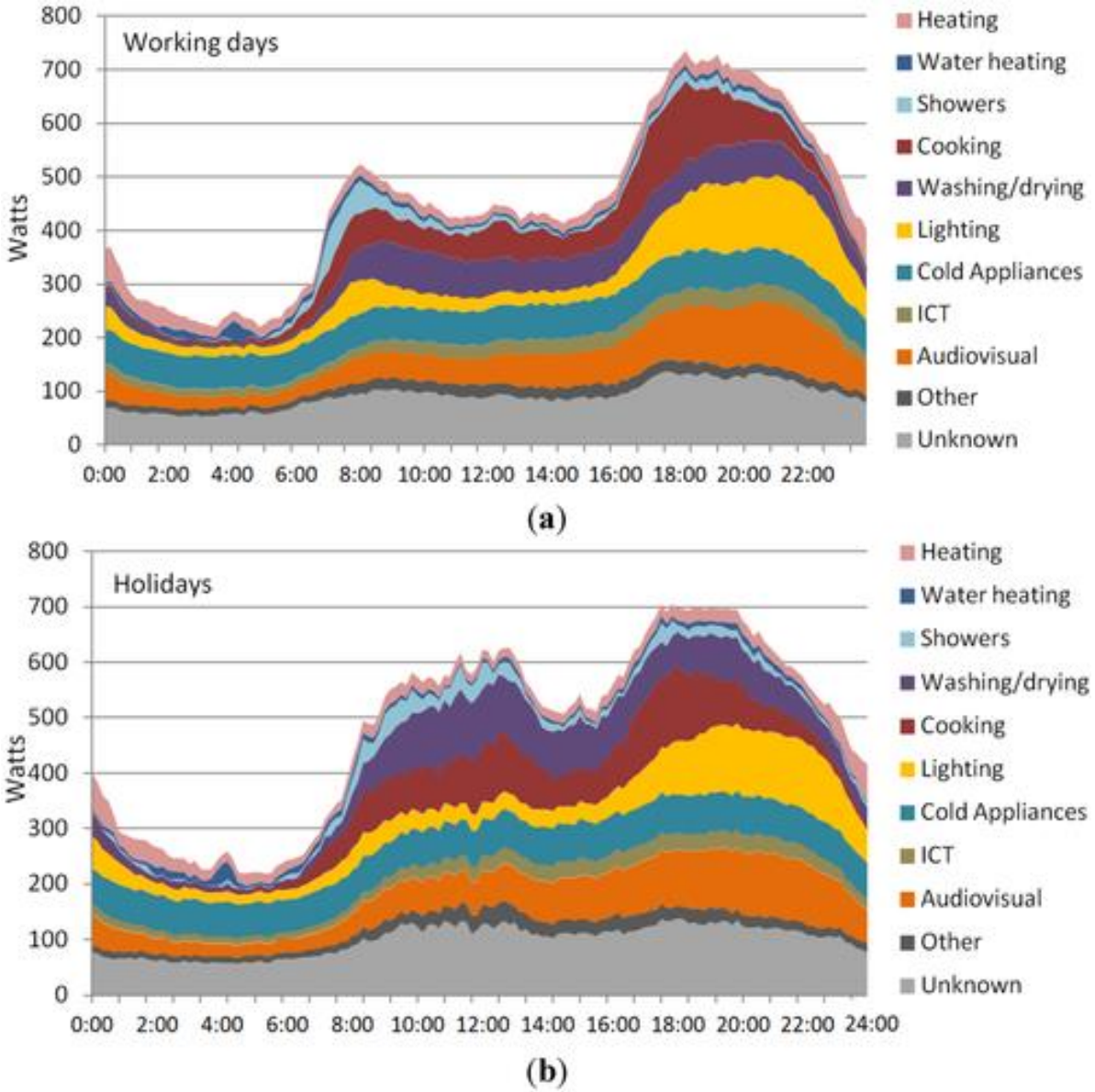
DOI: 10.1177/1469540514536194
joc.sagepub.com
SAGE

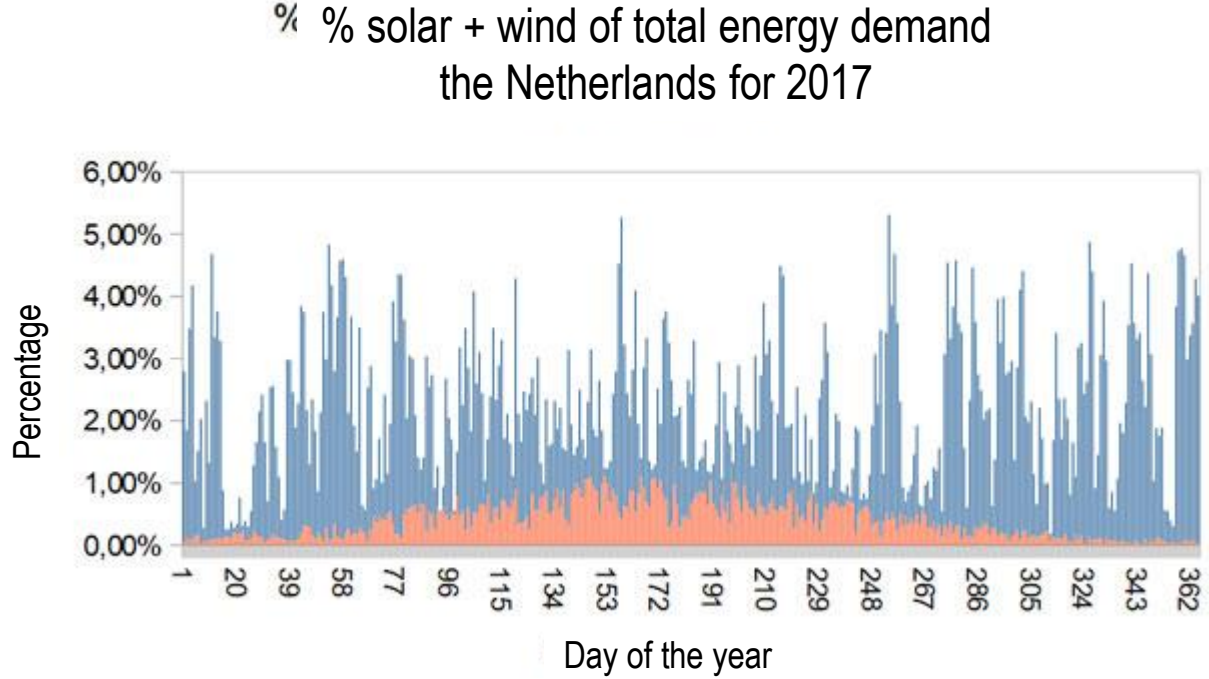
Curious energy consumers: Humans and nonhumans in assemblages of household practice

Yolande Strengers, Larissa Nicholls and Cecily Maller
Centre for Urban Research, RMIT University, Australia

Abstract
In international energy policy, programmes and consumer research, a dominant ideal consumer is emerging. This consumer is typically a human adult who has the agency to make autonomous, functional and rational decisions about his or her household's energy consumption. This article seeks to disrupt this dominant anthropocentric conceptualisation of the consumer and provide new ways of knowing and potentially intervening in the lives of energy consumers. Drawing on qualitative research conducted with householders living in Sydney, Australia, and theories of practice, materiality and agency from sociology and science and technology studies, we seek to understand consumers as human and nonhuman actants operating in distributed assemblages of practice. We explore the implications of conceptualising non-traditional consumers of energy, such as babies, pets, pests and pool pumps, as performers of or materials in practices that consume energy. Our analysis provides new ways of potentially intervening in patterns of energy consumption. We argue that policy makers need to refocus their attention on finding routes into assemblages of practice to achieve change. We conclude by calling for further exploration and recognition of the myriad curious consumers found in households.

Keywords
Consumers, energy consumption, distributed agency, social practices, assemblages

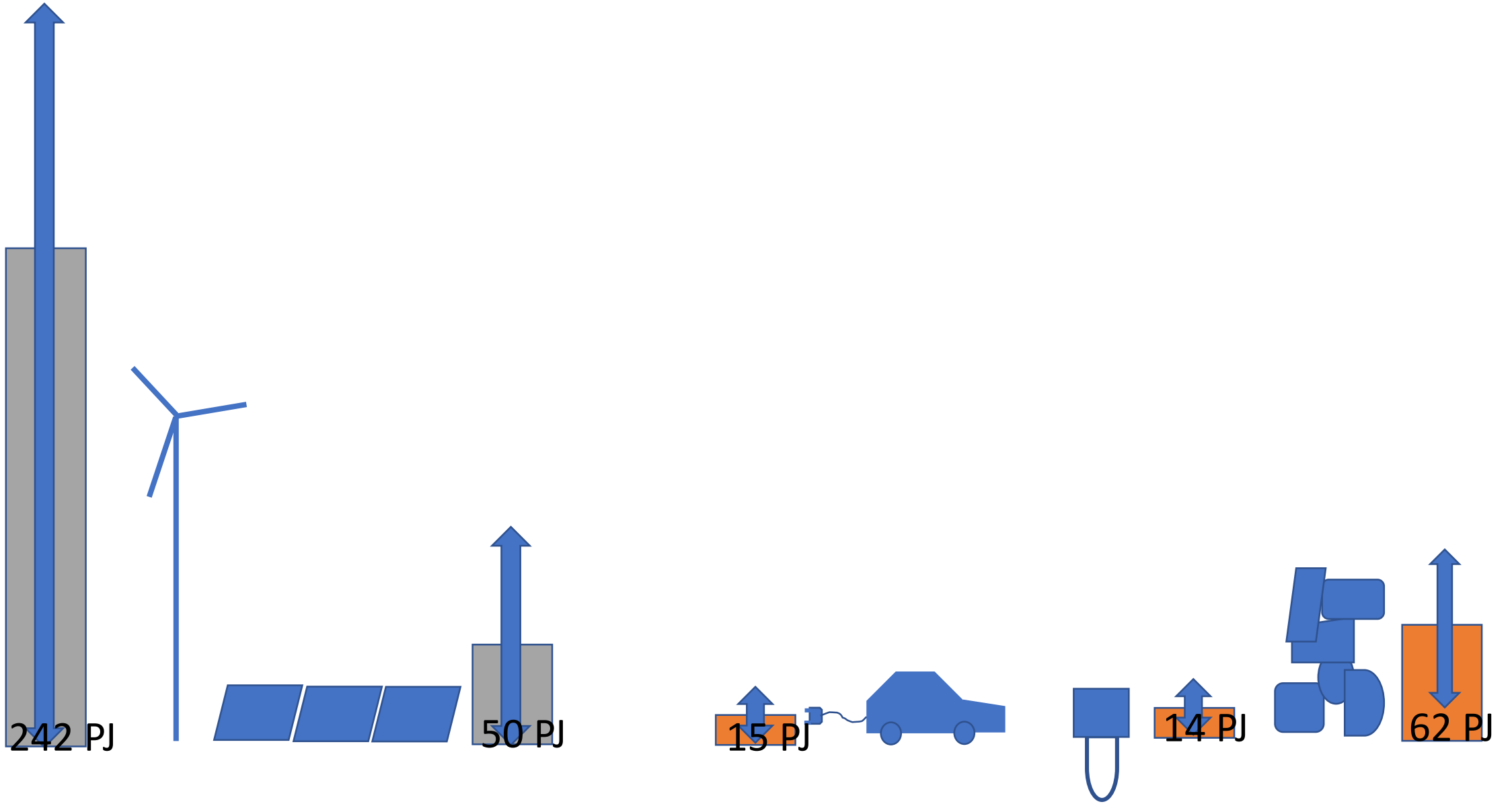




Godoy-Shimuzu et al. 2014

De Groene Rekenkamer 2018

Prognosis 2030 Netherlands, based on ECN, 2017



Everyday life: opportunities

- Lifestyle changes
- Balancing patterns of supply and demand

© KTH Green Leap project, Sweden

DRS2016
Design + Research + Society
Future-Focused Thinking

50 2016 Design Research Society
50th Anniversary Conference
27-30 June 2016, Brighton, UK

Give car-free life a try: Designing seeds for changed practices

Mia Hesselgren[a*], Hanna Hasselqvist[a]

[a]KTH Royal Institute of Technology
*Corresponding author e-mail: miahes@kth.se

Abstract: For sustainable practices to emerge, they have to be tried out. In the design intervention A Car-free Year, we studied the particularities of three families' changed practices. With a collaborative mind-set, the practices' constituting elements were analysed, and their intertwined links followed, forming possible design concepts. When designing these seeds for changed practices, we have found, through the knowledge gained from the participants' different perspectives, possibilities to design initiatives that could enable more people to live car-free. We believe that designing enabling ecosystems, where all types of elements encourage sustainable practices, can be an important role of sustainable design. Furthermore, design research can challenge existing societal norms, as clearly revealed in this project, and consequently inspire more people to make sustainable lifestyle choices.

Keywords: sustainable design; practice-oriented design; service design; collaborative design.

Chapter 6
Splashing: The Iterative Development of a Novel Type of Personal Washing

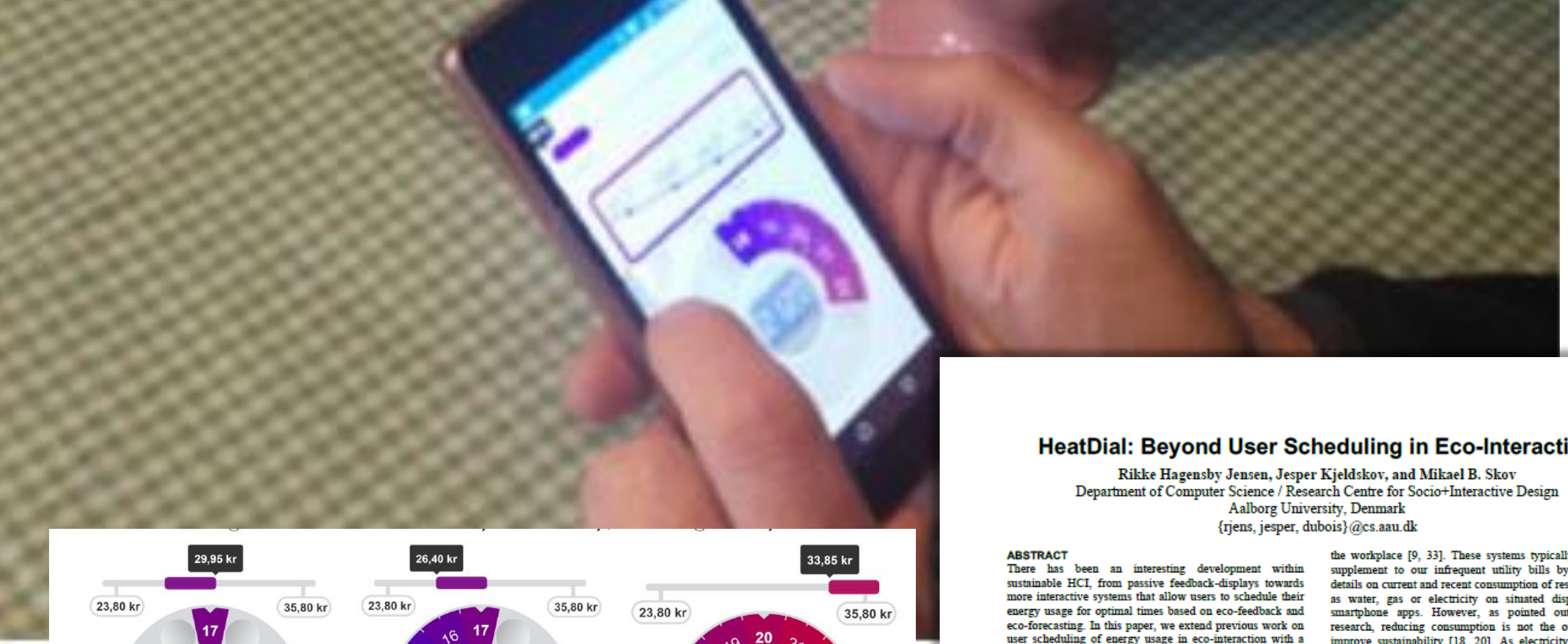
Lenneke Kuijer

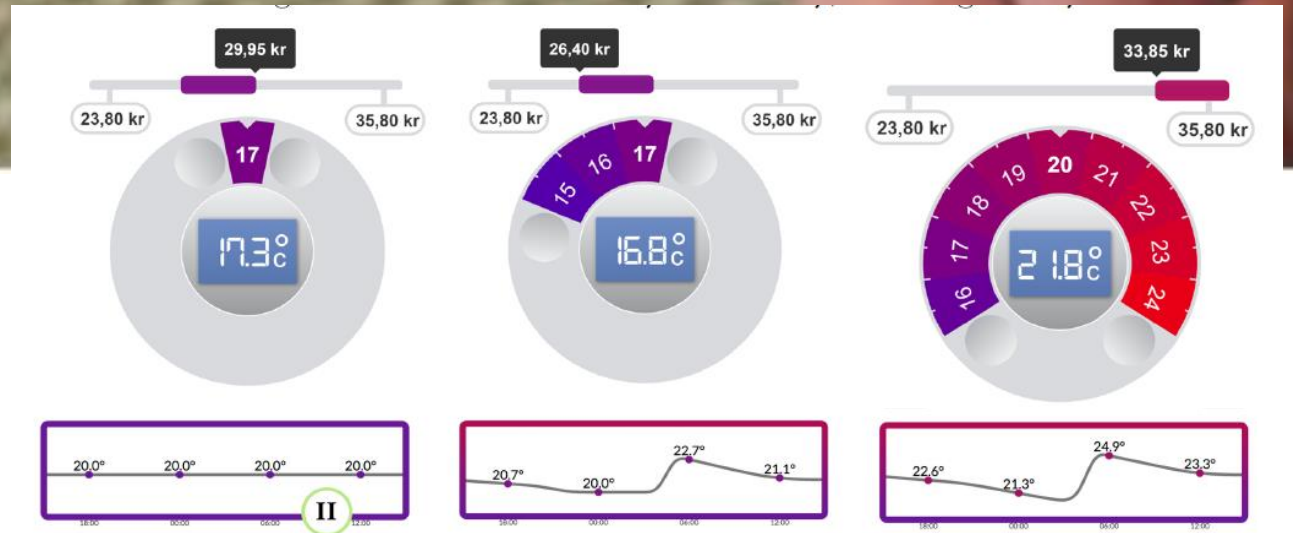
Abstract This chapter describes a case study on personal washing that was developed in association with two subsequent Living Lab projects. Drawing on theories of practice, the case study explored the application of a practices-oriented approach to reducing household resource consumption. Personal washing was taken as a target practice because of its high and growing water and energy consumption. The case study used an iterative process to develop a feasible, but highly less resource intensive alternative to the dominant practice of showering in the Netherlands. Splashing emerged as a promising proto-practice from subsequent performances, both in the lab and the field.

Keywords Practices-oriented design · Personal washing · Splashing · Energy consumption · Proto-practice

6.1 Introduction

This section describes a research and design method that was developed in two subsequent Living Lab projects[1] using a research through design process that had both methodological and empirical aims (Zimmerman et al. 2010). The methodological aim was to explore the implications of taking a practices-oriented approach





HeatDial: Beyond User Scheduling in Eco-Interaction

Rikke Hagensby Jensen, Jesper Kjeldskov, and Mikael B. Skov
Department of Computer Science / Research Centre for Socio+Interactive Design
Aalborg University, Denmark
{rjens, jesper, dubois}@cs.aau.dk

ABSTRACT
There has been an interesting development within sustainable HCI, from passive feedback-displays towards more interactive systems that allow users to schedule their energy usage for optimal times based on eco-feedback and eco-forecasting. In this paper, we extend previous work on user scheduling of energy usage in eco-interaction with a study of heat pump control in domestic households. Aiming at using electricity when it is either cheap or green, our approach is to provide users with an interface where they can set temperature boundaries for the home, and interactively evaluate the impact of different settings on predicted energy cost. Based on this input, the scheduling of energy use is done by an automated system monitoring temperatures and electricity prices. We conducted a qualitative study of the HeatDial prototype with 5 families over 6 months. Key findings were that HeatDial supported users identifying and acting on opportunities for reducing costs, but that automation also had an impact on user engagement and highlighted a need for more feedback on how the system intended to act.

Author Keywords
Sustainability; electricity; eco-interaction; shifting; smart grid, automation; heat pumps.

ACM Classification Keywords
H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

INTRODUCTION
Sustainability has been a topic receiving much attention in the workplace [9, 33]. These systems typically provide a supplement to our infrequent utility bills by presenting details on current and recent consumption of resources such as water, gas or electricity on situated displays or in smartphone apps. However, as pointed out in recent research, reducing consumption is not the only way to improve sustainability [18, 20]. As electricity production moves toward renewable sources such as wind and solar power that depend on the weather, availability will fluctuate more, suggesting some consumption to be *shifted* to times of the day, where green energy is available. This recent view on energy conservation has led to research into a new type of eco-interactions that extend eco-feedback, where *user scheduling* is the focal point. This new type allows users to actively shift electricity usage to more sustainable times either by being simply informed about the availability of green energy in the near future through means of *eco-forecasting* [11, 13, 19, 26, 29], or by being supported to actively schedule the running of specific appliances [1, 5].

While *user scheduling* have proven useful for shifting usage of some types of electrical appliances, such as washing machines and dishwashers [5, 11, 26], for other appliances, such as fridges, freezers, home heating and cooling [25, 31], it may be more sustainable beneficial to let an automated system manage and monitor the scheduling within a certain boundaries of tolerance. As discussed in [32] the challenge for designers, then, is balancing the control of an automated system pursuing sustainable objectives, while respecting users' comfort preferences. This calls for more research on eco-interaction design

Washing with the Wind: A Study of Scripting towards Sustainability

Rikke Hagensby Jensen, Dimitrios Raptis, Jesper Kjeldskov, and Mikael B. Skov
Human-Centred Computing Group / Department of Computer Science
Aalborg University, Denmark
{rjens, raptis, jesper, dubois}@cs.aau.dk

ABSTRACT
Within sustainable HCI research, we have witnessed a growing interest in studying interaction designs that support households to 'shift' energy usage to times when it is sustainably favourable. In this paper, we investigate shifting through a purposely provocative and scripted design, which challenges the idea that renewable electricity is an always-available resource for households to consume. To do so, we made electricity for washing laundry either free or not available. We conducted a detailed qualitative study with four families that experienced our intervention for a month. We present five themes that illustrate how families adapted, reflected, and formed new routines and expectations related to washing practices. We discuss the broader implications of combining scripting and provocation as a means to intervene, disrupt and understand energy consuming practices within the home.

Author Keywords
Energy consumption, scripting; provocation; sustainability; shifting; field study.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

INTRODUCTION
Designing interactions to support sustainable energy usage has received much attention from the HCI research

practices [54,58] (e.g. heating, laundry, dish-washing) in order to respond to, for example, availability of electricity from wind turbines and solar panels. Towards this end, HCI studies have explored designs that raise awareness about favourable times to use electricity. Some investigated designs that visualise forecasted resource consumption on situated home displays [37,54,58,62], while others have looked more specifically on how to support shifting of domestic practices e.g. charging electric cars [7,10], heating [14,31], or washing [8,17,39].

However, most of the studies aiming to support shifting through such designs report that it is challenging to instigate and sustain practice change [11,51,61]. Based on this observation, we identified two design opportunities. Firstly, it appears that the everyday practices we attempt to change are often not disrupted enough, as most designs do not make people reflect on their broader energy consumption practices. Secondly, many of the energy-consuming appliances people interact with in their homes are not actually scripted to help people act sustainably [50]. For example, when the typical default setting for a washing machine is a high-consuming program instead of an eco-friendly one, people must intentionally deviate from the suggested script to use a low-consuming program.

In this paper, we address these two design opportunities for shifting through an intervention called 'the Box'. The Box

How can you convince citizens to change their energy *use?*

By jointly and continuously (re-)designing attractive ways of living that are in balance with renewable energy supply:

- Focus on everyday life
- Out-of-the-box
- In real life
- Flexible and diverse

To close

Thank you

s.c.kuijer@tue.nl

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

EINDHOVEN

References

- Brynjarsdottir, H., Håkansson, M., Pierce, J., Baumer, E., DiSalvo, C., & Sengers, P. (2012, May). Sustainably unpersuaded: how persuasion narrows our vision of sustainability. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 947-956). ACM.
- Godoy-Shimizu, D., Palmer, J., & Terry, N. (2014). What can we learn from the household electricity survey?. *Buildings*, *4*(4), 737-761.
- Hesselgren, M., & Hasselqvist, H. (2016). Giving car-free life a try: Designing seeds for changed practices. In *DRS2016: Design+ Research+ Society-Future-Focused Thinking*. Design Research Society.
- Jensen, R. H., Kjeldskov, J., & Skov, M. B. (2016, October). HeatDial: beyond user scheduling in eco-interaction. In *Proceedings of the 9th Nordic Conference on Human-Computer Interaction* (p. 74). ACM.
- Jensen, R. H., Raptis, D., Kjeldskov, J., & Skov, M. B. (2018, June). Washing with the Wind: A Study of Scripting towards Sustainability. In *Proceedings of the 2018 Designing Interactive Systems Conference* (pp. 1387-1400). ACM.
- Kuijer, L. (2017). Practices-oriented design. In *Design for Behaviour Change* (pp. 116-127). Routledge.
- Kuijer, L. (2017). Splashing: The Iterative Development of a Novel Type of Personal Washing. In *Living Labs* (pp. 63-74). Springer, Cham.
- Shove, E., & Walker, G. (2014). What is energy for? Social practice and energy demand. *Theory, Culture & Society*, *31*(5), 41-58.
- Snow, S., Buys, L., Roe, P., & Brereton, M. (2013, November). Curiosity to cupboard: self reported disengagement with energy use feedback over time. In *Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration* (pp. 245-254). ACM.
- Strengers, Y. A. (2014). Smart energy in everyday life: are you designing for resource man?. *interactions*, *21*(4), 24-31.
- Strengers, Y., Nicholls, L., & Maller, C. (2016). Curious energy consumers: Humans and nonhumans in assemblages of household practice. *Journal of Consumer Culture*, *16*(3), 761-780.

www.demand.ac.uk

Search

DEMAND

DYNAMICS OF ENERGY, MOBILITY AND DEMAND

Energy

SEARCH WEBSITE

CONTACT US

THE DEMAND CENTRE - COLLABORATIVE RESEARCH & ENGAGEMENT

HOME | WHAT IS DEMAND? | PUBLICATIONS | THEMES | EVENTS | PEOPLE | SNAPSHOTS | FILMS | INSIGHTS FOR POLICY

THE DEMAND CENTRE FOCUSES ON WHAT ENERGY IS FOR.

Our research takes a distinctive approach to end use energy demand, recognising that energy is not used for its own sake but as part of accomplishing social practices at home, at work and in moving around.

READ MORE ▶

SPOTLIGHT ON

Films by DEMAND

READ MORE ▶

Publications

READ MORE ▶

Research Insights

READ MORE ▶

OUR RESEARCH HAS FIVE THEMES

UNDERSTANDING DEMAND

MORE ▶

INFLUENCING DEMAND

MORE ▶

PEAKS, TRENDS AND RHYTHMS

MORE ▶

SITUATIONS, SITES, SECTORS

MORE ▶

ENERGY, JUSTICE AND POVERTY

MORE ▶