ENERGISE

EUROPEAN NETWORK FOR RESEARCH, GOOD PRACTICE AND INNOVATION FOR SUSTAINABLE ENERGY

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GERMANY

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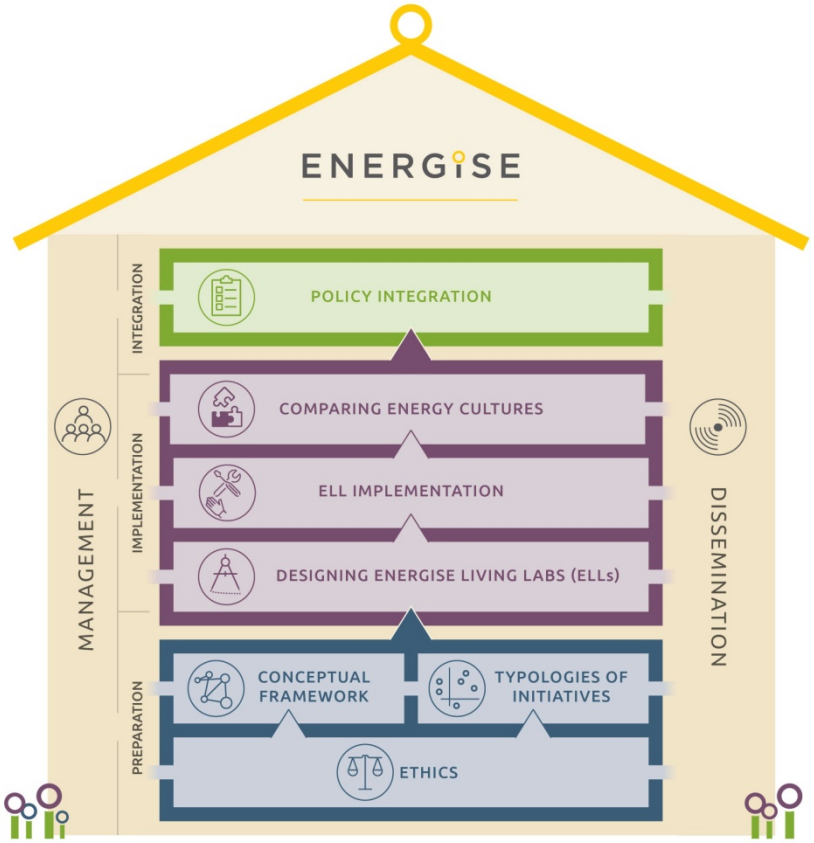
ENERGISE PROJECT

ENERGISE is an innovative pan-European research initiative to achieve a greater scientific understanding of the social and cultural influences on energy consumption. Funded under the EU Horizon 2020 programme for three years (2016-2019), ENERGISE develops, tests and assesses options for a bottom-up transformation of energy use in households and communities across Europe. ENERGISE's primary objectives are to:

- **Develop an innovative framework** to evaluate energy initiatives, taking into account existing social practices and cultures that affect energy consumption.
- **Assess and compare the impact** of European energy consumption reduction initiatives.
- **Advance the use of Living Lab approaches** for researching and transforming energy-related practice cultures.
- **Produce new research-led insights** into the role of household routines and changes to those routines towards more sustainable energy.
- **Encourage positive interaction** between actors from society, the policy arena and industry.
- **Effectively transfer** project outputs towards the implementation of the European Energy Union.



INTRODUCTION

This document is one of 30 national briefs, demonstrating key aspects of national energy supply and demand dynamics. Each brief is comprised of five sections:

Section 1 summarises the energy profile of the country. The section provides basic quantitative information of demand demographics and usage profiles, market trends and energy supply profiles, as well as qualitative reflections on current national energy policy. ***For all the briefs, the quantitative information is derived from ec.europa.eu/eurostat (2015 data), eea.europe.eu (2015 data), and climate-zone.com, unless otherwise stated.***[1] The qualitative reflections are based on a literature reviews and desk-research. References for the literature review and the desk-research are provided in footnotes or in section five.

Section 2 summarises the nationally based sustainable energy consumption initiatives (SECIs) that have been identified as part of ENERGISE WP2 framework (Jensen, 2017). Each SECI has been coded according to the Problem Framing Typology developed in ENERGISE WP2 (Jensen et al, 2017b).

Section 3 provides a *good practice* example of a national SECI that corresponds to category 3: “Changes in Everyday Life” or 4: “Changes in Complex Interactions” in the Problem Framing Typology. Please refer to Jensen (2017) and Jensen et al (2017b) for more information on the way the data for the good practice SECIs has been researched and documented.

Section 4 provides a brief summary of major nationally specific trends and their implication for energy consumption policies.

Section 5 provides an overview of sources used for qualitative assessments, and can be used as inspiration for further reading.

The national briefs provide contextual socio-material information for the further work to be carried out in Work Package 4, Work Package 5 and Work Package 6 in ENERGISE.

1.1 WP2: TYPOLOGIES OF ENERGY INITIATIVES

ENERGISE WP2 is a systematic criteria-guided review and classification of existing sustainable energy consumption initiatives from 30 European countries (EU-28, Switzerland, and Norway), which provides a comprehensive European database of energy initiatives involving households, and related typologies of sustainable energy consumption initiatives. This extensive synthesizing work guides the selection of Living Lab design elements for ENERGISE and future energy consumption research, policy and practice.

[1] Some piecharts will be empty, as no information is available.

This is done in order to

- Construct innovative typologies of sustainable energy consumption initiatives that can inform further research and action.
- Identify key success factors and related indicators, focusing on individual-level, collective, organizational, institutional and societal aspects of energy consumption, which will inform subsequent WP 3 (Designing Living Labs), WP 4 (ENERGISE Living Labs) and WP 5 (Capturing Energy Cultures).
- Progress the goals of the European Energy Union by creating a publicly archived open access dataset of sustainable energy initiatives across 30 countries in Europe.

Suggested further reading:

Jensen (2017) *Identification of key success factors and related indicators.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.2.

Jensen et al. (2017a) *Establishment of a comprehensive open access dataset of sustainable energy consumption programmes and Interventions.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.3.

Jensen et al. (2017b) *Constructions of typologies of sustainable energy consumption initiatives (SECIs).* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.4.

Sources of quantitative statistics (unless otherwise stated):

Climate data:
http://www.climate-zone.com/continent/europe/

Demography data:
http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing

http://ec.europa.eu/eurostat/statistics-explained/index.php/Educational_attainment_statistics

Dwelling type data:
http://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Distribution_of_population_by_dwelling_type,_2015_(%25_of_population)_YB17.png

Energy demand and supply quantitative data:
http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_consumption_in_households

Final energy consumption of households per capita data: https://www.eea.europa.eu/airs/2017/resource-efficiency-and-low-carbon-economy/household-energy-consumption

MWh conversion data:
https://www.unitjuggler.com/convert-energy-from-toe-to-MWh.html?val=893.9

GERMANY

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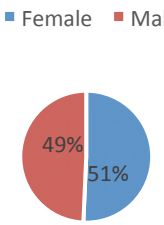
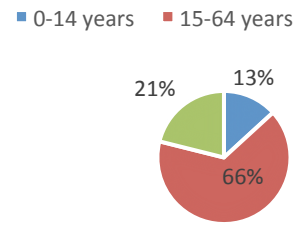
DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY

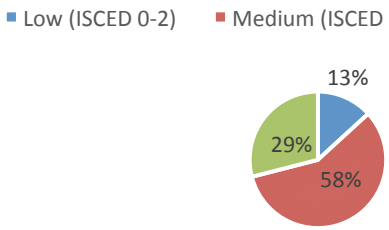
GENDER PROFILE



AGE PROFILE (2016)

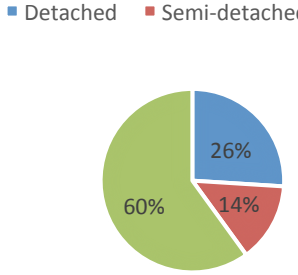


EDUCATIONAL PROFILE (25-54 Y, 2016)

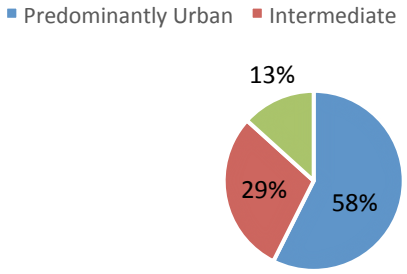


CLIMATE: temperate and marine; cool, cloudy, wet winters and summers; occasional warm wind

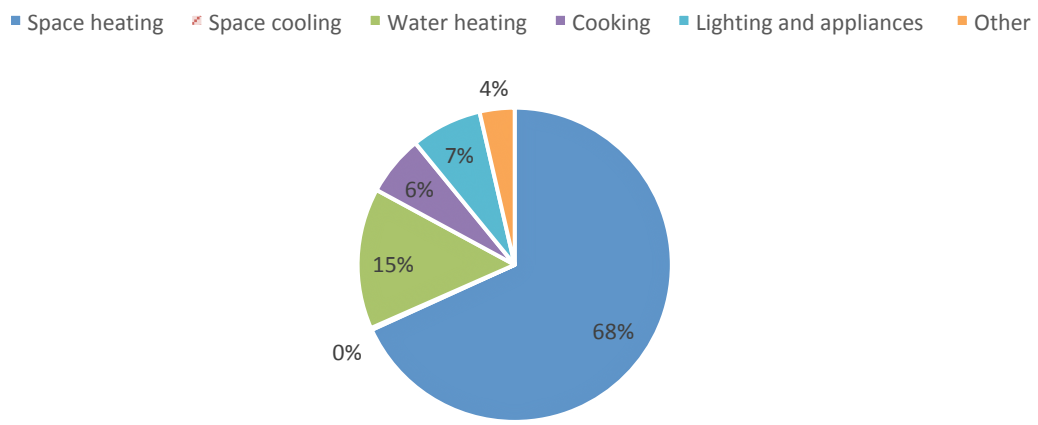
COMMON DWELLING TYPES (2015)



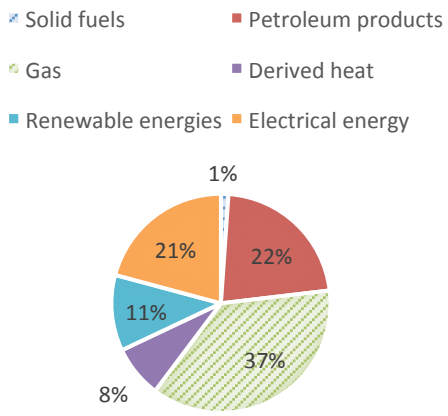
URBAN - RURAL DISTRIBUTION (OECD)



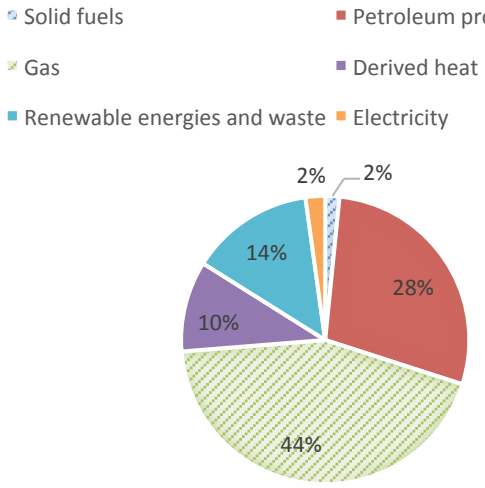
RESIDENTIAL FINAL ENERGY CONSUMPTION BY TYPE OF END-USE (2015)



SHARE OF FUELS IN THE FINAL ENERGY CONSUMP. IN THE RESIDENT. SECTOR (2015)



SHARE OF FUELS IN FINAL ENERGY CONSUMP. - RESIDENT. SPACE HEATING (2015)



FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015)

7.570 MWh

ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

There are four private transmission systems operators (TSOs) in Germany operating in non-contiguous areas namely; 50Hertz Transmission GmbH, Amprion GmbH (RWE), Tennet TSO GmbH and TransnetBW. There is also a separate electricity system for the rail network. In recent years, various sections of the network were compulsorily sold in order to comply with EU competition policy designed to ensure that the network operators did not hold conflicts of interest with their generation subsidiaries (European Parliament 2017).

Particular socio-material aspects that influence energy consumption

With its origins in the anti-nuclear protest movements of the 1970s, climate protection remains a high priority issue for the German people. There is a high level of social consciousness (at least publically) relating to environmental issues and pro-environmental values are seen as important and/or an admirable trait. There are, however, other aspects of German culture and/or norms that objectively may in conflict with those values but are perhaps seen as the basics/essentials or "the norm" and are less palatable for discussion or negotiation. In particular, there is a strong mobility culture within Germany with above average levels of car ownership and the presence of a historically influential auto-manufacturing industry lobby. The holiday culture is also quite strong in Germany with foreign travel and more broadly being widely travelled seen as a normal and highly desirable pursuit with Germany ranking 3rd in terms of outbound tourism expenditure (both in total figures and on a per capita basis) and 2nd in total number of international departures globally in 2015 (UNWTO 2016). There are also high levels of house proudness in Germany with high levels of investment from both a financial and time perspective dedicated to making a house into a home. Another area of note is the organics industry. The organic or "BIO" sector in Germany is very popular with consumers with a high levels of organic penetration in the market (International Federation of Organic Agriculture Movements 2016), however the consumption of meat and in particular pork has a strong cultural tradition in the south of Germany in Bavaria in particular.

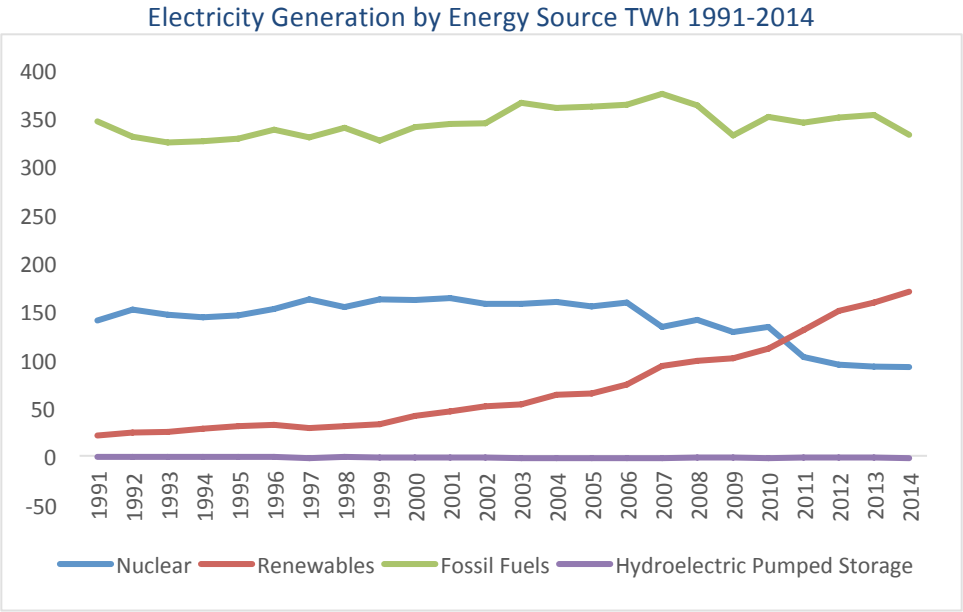
In terms of electricity consumption Germany ranks 6th out of the EU 28 in terms of per capita consumption of electricity with the International Energy Agency reporting an average consumption of just over 7,000 Kwh per annum in 2014 (IEA 2014).

Current Trends in Energy Policy

Historically Germany's energy supply mix was primarily dependent on domestically mined coal reaching a peak in the mid-1950s (Storchmann 2005). In 1950 coal accounted for almost 90% of Germany's primary energy consumption (Renn and Marshall 2016). Since that time Germany energy policy oversaw the rise of nuclear power in the 1960s; the brief resurgence of coal during the oil crisis of the 1970s, the fall in public confidence and trust in nuclear power (post Chernobyl in 1986 and Fukushima in 2011 (Rehner and McCauley 2016) and the commitment to the *Energiewende,* the energy transition (Joas et al. 2016). Despite these dramatic shifts and a steady decline in domestic production, coal still accounts for the greatest source of energy production in Germany today and considerable challenges lay ahead for the successful implementation of the

recently affirmed "Klimaschutzplan 2050" which confirms Germany's commitment to reduce greenhouse gas emissions to between 80-95% of their 1990 levels by phasing out the majority of fossil fuel use by 2050 (Federal Ministry for the Environment Nature Conservation Building and Nuclear Safety 2016a).

Germany's energy policy has experienced significant change over the last 20 years and has become increasingly influenced (at least outwardly) by domestic environmental objectives and broader international commitments to combating climate change. Recent policy changes have been predominantly preoccupied with achieving the aims of the *Energiewende* (Hake et al. 2015), however the decision to expedite the decommissioning all nuclear power plants by 2022 following the Fukushima disaster in 2011 has had a significant impact on Germany's long term goal of reducing emissions to between 90-95% of 1990 levels by 2050 with the shortfall being accounted for (at least in the short-medium turn) with an increase in the use of coal for electricity production (Renn and Marshall 2016).



(Source:Energy Information Administration 2016).

National and EU policies such as renewable energy feed-in-tariffs and priority grid access have resulted in the level of installed renewable generation capacity increasing significantly since the late 1990s. However, while the general level of public acceptance and support for the *Energiewende* and wider sustainability issues could be regarded as quite high relative to other countries the abandonment of nuclear energy and the subsequent consequences for both energy prices and fossil fuel use has presented a number of significant challenges as environmental policy becomes increasingly political (Pegels and Lütkenhorst 2014, Joas et al. 2016).

In 2014 the German government, responding to increasing public resistance to the implementation of local energy transition projects and the required upgrading and expansion of the electricity grid, agreed to slow down the expansion of renewable energy projects and limit further expansion to "development corridors" as well as revising the aims of the Renewable Energy Act (Bundesministerium für Wirtschaft und Energie 2014). While the primary focus had up to this point been on the accelerated decarbonisation of energy used to create electricity, recent developments

are beginning to shift attention towards demand side policies (Warren 2014, Sorrell 2015, Kuzemko et al. 2017).

The Climate Action Plan 2050 sets out the primary principles and long term goals of Germany Energy policy (Federal Ministry for the Environment Nature Conservation Building and Nuclear Safety 2016b). The plan provides guidance to achieving the domestic climate targets set out in the Paris Agreement. The energy, buildings, transport, trade and industry, agriculture and forestry sectors have been earmarked for specific strategic action with the following principles outlined in the document:

- Long-term targets: based on the guiding principle of extensive greenhouse gas neutrality in Germany by the middle of the century
- Guiding principles and transformative pathways as a basis for all areas of action by 2050
- Milestones and targets as a framework for all sectors up to 2030
- Strategic measures for every area of action
- Establishment of a learning process which enables the progressive raising of ambition envisaged in the Paris Agreement

In addition, the action plan lays out (among others) the following strategic measures:

- road map towards an almost climate-neutral building stock
- review to be carried out on ways to gradually further develop Germany's tax system with a view to achieving the climate targets for 2050

Trends in national campaigns

To date, national campaign trends have tended to focus on and prioritise technical supply side solutions with the primary future vision for a successful Energiewende reliant on improved technical innovation, improved energy efficiency, passive/carbon positive housing, improved energy transmission and high-tech grid management in order to enable greater proliferation of renewables (Bundesministerium für Wirtschaft und Energie 2018). This trend is also evident, even in those campaigns aimed at changing behaviour with the focus on encourage individuals to make smarter consumer choices in terms of more efficiency lighting, heating and household appliances. Technical efficiency and smart consumption solutions are generally prioritised in such energy saving campaigns with reduction of use strategies less evident.

Smart Systems

Due to the planned phase out of nuclear by 2022, the German government has planned to upgrade the electricity grid substantially over the next few years with over 7,500km of lines to be either optimised, reinforced or newly built in order to ensure that the increased renewable penetration will translate into real emissions savings as power is transmitted from less populated renewable energy sites to the centres of population (Bundesministerium für Wirtschaft und Energie 2017a).

In relation to the concept of Smart cities, in contrast to recent developments in Asia where opportunities exist to build new smart cities from scratch, the focus in Germany lies on integrating smarter technologies in the everyday life of already existing cities (Frankfurter Allgemeine Zeitung 2016). There is evidence to suggest that the concept of Smart cities is gaining momentum in

Germany with major cities such as Berlin (Senate Department for Urban Development and the Environment 2015), Munich (Smarter Together 2017), Mannheim (Grid Innnovation Online 2013), Hamburg (Hamburg Port Authority 2017) implementing smart strategies on various aspects of city life. In May 2017 the Federal Institute for Research on Building, Urban Affairs and Spatial Development released a Smart city charter with the goal of providing normative guidelines for a sustainable digital transformation of municipalities, as well as concrete recommendations for the implementation (Bundesministerium für Umwelt 2017). However, it should be noted that these are merely guidelines on how cities should proceed rather than a prescriptive strategy.

Energy Efficiency/Community

One of the largest current active campaigns by the German government is the "Deutschland macht's effizient" initiative where energy efficiency is the primary focus (Bundesministerium für Wirtschaft und Energie 2017b). The campaign focuses on providing information and consultations as well as administrating financial incentives in the form of grant aid for households, companies and municipalities who undertake steps to improve their energy efficiency. There are also numerous government aid projects focuses at improving the energy efficiency of the housing stock with the Federal Development Bank, financing the construction and purchase of energy-efficient buildings as well as providing substantial subsidies for energy-related refurbishment (CO2 Online 2017).

OVERVIEW OF NATIONAL SECIS

Below please find a list of German SECIs that have been researched and documented through WP2 of ENERGISE. The SECIs are researched, selected and documented based on a set of requirements and research interests (please see Jensen 2017 for details). *The list should not be regarded as exhaustive or representative of all kinds of energy initiatives carried out in the country*.

Hochhaus an der Bugginger Straße 50	 Changes in Individuals' Behaviour
Energieberatung für ALG II-Haushalte	 Changes in Individuals' Behaviour
Bremer Stromsparwette	 Changes in Individuals' Behaviour
Gut zu wissen: Energie sparen in Bayern	 Changes in Individuals' Behaviour
Dämmen lohnt sich	 Changes in Technology

Eco TopTen	 Changes in Technology
NECKARSULM-AMORBACH Solar	 Changes in Technology
European Energy Award	 Changes in Individuals' Behaviour
Climate Protection Heidelberg 3 Education: E-Team Project	 Changes in Individuals' Behaviour
Interaktive Energiesparratgeber für München	 Changes in Individuals' Behaviour
Förderung von Mini-KWK-Anlagen	 Changes in Technology
Heizspiegel	 Changes in Individuals' Behaviour
Initiative EnergieEffizienz Private Haushalte	 Changes in Technology
Zukunft Haus	 Changes in Technology
Sanierungshelden	 Changes in Individuals' Behaviour
Gut fürs Geld, Gut fürs Klima	 Changes in Technology
Heizungs-Check/Pellets-Check	 Changes in Technology
Mobicheck	 Changes in Individuals' Behaviour
SchoEDL	 Changes in Individuals' Behaviour
EiMap	 Changes in Complex Interactions

Solar-Checks	 Changes in Technology
Bitte lächeln: Fotowettbewerb zu energieffizienten Elektrogeräten	 Changes in Everyday Life Situations
Klima sucht Schutz	 Changes in Individuals' Behaviour
Holen Sie mehr aus Ihrer Heizung	 Changes in Technology
Klimaschutz. In unserer Hand.	 Changes in Individuals' Behaviour
Verbraucher aktiv - Klimakompetent heizen	 Changes in Everyday Life Situations
Sanieren 60plus	 Changes in Everyday Life Situations
Münster packt's!	 Changes in Individuals' Behaviour
Energiekarawane gegen den Sanierungsstau	 Changes in Technology
Das Saarland voller Energie	 Changes in Individuals' Behaviour
COzwo und Co	 Changes in Technology
Energiesparmeister (SWM)	 Changes in Individuals' Behaviour
Energieeffizienz im Haushalt	 Changes in Individuals' Behaviour
Energie und Klimaschutz in Vierkirchen	 Changes in Complex Interactions
Das 10.000 Häuser Programm	 Changes in Technology

clever heizen!	Changes in Individuals' Behaviour
Grüne Hausnummer	Changes in Complex Interactions
Gut beraten: Energiesparen!	Changes in Technology
Solarenergie auch für ihr Haus? Machen Sie den Solar-Check	Changes in Technology
Hessische Energiesparaktion	Changes in Individuals' Behaviour
Hamburger Energiepartnerschaften	Changes in Everyday Life Situations
Klimaklicker	Changes in Complex Interactions
Avu-Bürgersolaranlage	Changes in Technology
Bielefelder Initiative für Zukunftsenergien und Energieeffizienz	Changes in Technology
Klimatisch Bielefeld	Changes in Complex Interactions
Stromsparcheck für einkommensschwache Haushalte	Changes in Individuals' Behaviour
KlimaAlltag - CO2-arme Lebensstile in der Null-Emissions-Stadt	Changes in Complex Interactions
Klima-Coach	Changes in Individuals' Behaviour
Eigenstromversorgung Hamburg-Barmbek	Changes in Technology
Energiesuffizienz	Changes in Complex Interactions

Deutschland macht's effizient	Changes in Individuals' Behaviour
Various offers of the municipal company Munich Stadtwerke	Changes in Individuals' Behaviour
Energie(spar)ausweis	Changes in Technology
PC game for children from the municipality company Munich	Changes in Individuals' Behaviour
Volltreffer für den Klimaschutz	Changes in Individuals' Behaviour
Energieatlas Bayern	Changes in Individuals' Behaviour
LaVidaVerde	Changes in Complex Interactions
Energiesparberatung incl. Abwrackprämie für alte Kühlschränke	Changes in Individuals' Behaviour
Faktor 10 Sanierungsprogramm	Changes in Technology
Solare Wärme - einen Schritt voraus	Changes in Technology

‘GOOD PRACTICE’ EXAMPLE OF GERMAN SECI

Energiesuffizienz

Brief Description

The project “Energiesuffizienz” (energy sufficiency) was carried out between 2013 and 2016 and was based in an urban environment. The project’s authors defined the term energy sufficiency as a strategy to reduce energy consumption to a sustainable level by three approaches:

a. Quantitative reduction of sizes, features, usage times of devices etc.
b. Substitution of technical equipment in households by e.g. urban services.
c. Adjustment of technical services delivered by appliances to utility needed and desired by users

Aims and objectives

The project listed the following research questions:

1. What is the driving economic, paradigmatic, infrastructural, societal, cultural, gender and political factors and dynamics for the expansion of energy use related needs and how can they be addressed?
2. Which sufficiency strategies exist already?
3. How do energy relevant products, services and infrastructures need to be designed to allow or improve energy sufficiency
4. How can households be involved in this process?
5. What policy measures are necessary?

Methodology

The approach concentrated on three elements: households, appliances as well as urban infrastructure and services in municipalities. A criteria based analysis was conducted that examined action and measurement options for energy sufficiency in the distinct areas of living and building as well as individual barriers and framework conditions that influence/hinder the implementation of energy sufficiency. Based on this theoretical framework empirical studies were carried out which included transdisciplinary methods.

Households represented the core subjects of investigation in the project. In a representative survey of 600 households the research team enquired as to how energy-sufficiency practices are currently perceived and evaluated, what sufficiency practices are already employed and how other sufficiency practices may be accepted in the future. Additionally, there were interviews with several actors at the municipal level to analyse existing measures and approaches to improve energy sufficiency.

The Neighbourhood Labs drew on five local communities of practice (youth group, local co-op, a group of degrowth activists, senior citizens club and a Christian seniors group). The research team then used cultural probes to get to know the participants and their performances of practices also within the group and held co-creation workshops to counter conflicts with handling sufficiency strategies.

Results/outcomes

Through interviews and focus groups, the authors found (among other aspects) that energy sufficiency practices:

- Can be found in numerous households and are already regarded as normal.
- Can be made possible and facilitated with the design of structures, processes and facilities in the household.
- Are not correlated with financial endowment and can be implemented irrespective of incomes.
- Are less acceptable in leisure activities than during core household duties.
- 1/3 of the 600 participants of the questionnaire stated that they could see themselves living in a flat share or in a smaller apartment when they grow older.
- Energy sufficiency can play a large role when it comes to efforts to reduce energy.
- At the municipal level, in the fields of food, consumption and building/living there is a lack of research and measures that link energy sufficiency with climate protection.
- Interviewees noted that they wanted to quickly finish the work in their household even though it is not urgent/necessary (e.g. a half full dishwasher being switched on just for the sake of the work being done, tumble dryer used because the process of drying is done quicker than on a clothesline).
- However, interviewees did partake in energy sufficient practices if these practices were adapted to certain routines or structures (e.g. the non-use of a tumble dryer was seen as more likely if the household possessed an aesthetically pleasing clotheshorse).
- Playing on people environmental consciousness or guilt tripping people into action are not necessarily helpful strategies for promoting sufficiency ‘behaviour’.

Through the open innovation workshops, the project design guide also provided detailed and specific ecodesign sufficiency recommendations relating to the ***reduction*** (e.g display and adjustability of cooling temperature, instead of an abstract scale in refrigerators and freezers), ***substitution*** (supporting the change practices and routines towards energy and resource conservation through innovative design of the appliances e.g. washing with low temperatures, measured laundry dosing), and ***adjustment*** of appliances (e.g. equipment should be designed such that functions and features only consume energy, when they are in use).

Was/is the initiative successful?

As this was a research initiative and not a targeted energy saving initiative, any statement on the success or otherwise of the project would be a subjective view of the values of the output. It could be said that further discoveries about the nature and likelihood of the application of energy sufficiency measures in households and the output of the design innovation workshops were successful outputs from the project.

Textual and communicative aspects of initiative

In this project, energy was considered as a consumer product which held very little day to day interest for consumers due (in addition other aspects) to the distance consumers experience from costs and consumption levels on a day to day basis. The focus on energy sufficiency as a key pillar of success when it comes to sustainability goals was a novel aspect and approach to the problem.

The physical/technological aspects of the initiative

Due the nature of the sufficiency project the technological aspects in terms of interventions were negligible for the field test part of the study. However, the open-innovation workshop resulted in the conceptual imagining of appliances where sufficiency was the central goal and which contained significant changes in the technical characteristics of products, conferring greater control in the hands of users to reduce, substitute and adjust energy use based on their own needs.

Shared understandings related to initiative

The project team framed energy as a consumer product that in and of itself held little interest for households in their day to day lives and that energy sufficiency measures should be developed in such a way that consumers become aware of which needs and wishes are important for a high quality of life (and conversely which are not). They also state that sustainability goals will only be successful by combining energy sufficiency with energy efficiency and consistency (extension of existing techniques for using renewable energy).

Contextualisation

The authors argue that the existing policy measures that foster the “Energiewende” (energy transition) in Germany concentrate primarily on improving energy efficiency and that they ignore energy sufficiency strategies to a large extent (European Commission 2008). They note that while energy efficiency in many sectors has been consistently improved, total energy use has remained stable. They further note that efficiency is only one factor of total energy use and point to the fact that the technical characteristics (size, features etc.), use patterns and total number of appliances have a significant bearing on overall energy use. The authors further argue that energy efficiency improvements are being eaten up by higher levels of consumption, and/or rising expectations of comfort (rebound effect). Consequently, the authors argue that as there are technical-economic limits on energy efficiency, energy sufficiency is an important part for designing a long-lasting sustainable energy use and attempt to show that energy sufficiency can have a significant role to play in the energy transition.

This project could not be considered as being framed in traditional policy interventionist styles. However, it does not neatly fit into the practice perspectives categorized by Spurling et al. (2013) either. While it recognizes the role of practices in energy use, the focus on sufficiency inverts the problem on its head. Instead of re-crafting, substitution or changing the relationship of practices to reduce energy use while maintaining similar levels of consumption/improve existing social or economic outcomes the approach attacks the optimization orthodoxy. It could be argued that the project draws on elements of all three of Spurling et al.’s listed practice perspectives but the innovative approach forces us to consider that in fact the project involves more than a re-crafting/substitution/change of interlock of practices but in fact stimulates a revaluation of the goals of the practices themselves in terms of their desirability.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

To date, the majority of SECIs in Germany closely mirror current trends in national policy, with their focus on changing technology and individuals' behaviour. To a large extent national policy concentrates support in the area of technical innovation or efficiency measures and tries to nudge individual behaviour to smarter purchasing decisions and behaviours (e.g. to switch to renewable energy providers, to consume more energy-efficient products, to embrace smarter homes and improve efficiency through retrofitting). The focus remains on smarter or more efficient consumption rather than any re-evaluation of whether or not such consumption is necessary.

In terms of individual or household-level participation, most SECIs address the entire population, due to the sensitive political nature and limited public acceptability of aiming specific initiatives at any particular socio-demographics profiles or target groups. Many SECIs do however attempt to tap into community action through the targeting of cities, regions, villages, or neighbourhoods. There is also significant stratification when it comes to particular targeted areas of energy use/efficiency, with many initiatives targeting one particular aspect of energy use such as retrofitting, information campaigns targeting behaviour, potential analysis, and/or energy saving and emission saving competitions.

The large number of SECIs profiled demonstrates a general commitment to improving environmental awareness and the willingness to contribute to energy saving and climate protection; however, the emphasis on saving (energy and/or money) and other participatory incentives reveals that there is a current expectation that SECIs should provide "added value" for participants. Certain basics/essentials or cultural consumption norms would appear to be less palatable for discussion or negotiation (e.g. addressing car ownership, extensive travel, meat consumption) and are not particularly targeted in SECIs related to energy initiatives.

Significant lessons may be learned from the experiences of the Energiesuffizienz project. Its authors argue that energy efficiency improvements are being eaten up by higher levels of consumption, and/or rising expectations of comfort (rebound effect). They assert that as techno-economic limits on energy efficiency exist, energy sufficiency is an important component in designing a long-lasting sustainable energy use strategy and an essential component of a successful energy transition. Energy was perceived as a consumer product that in and of itself held little interest for households in their day to day lives and that energy sufficiency measures should developed in such a way that consumers become aware of which needs and wishes are important for a high quality of life (and conversely which are not).

While delivering lower unit/per use costs, the current efficiency-focused policy strategies are unlikely to deliver the anticipated reductions in overall energy use. Without complementary sufficiency thinking, households are likely to simply rebound and either enjoy higher levels of energy use and comfort at the same cost or simply increase consumption in other areas. This requires a change both in the way we approach energy reduction strategies and in how we evaluate anticipated or expected outcomes.

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