ENERGISE

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

Project acronym: ENERGISE

Title: European Network for Research, Good Practice and Innovation for Sustainable Energy

Grant Agreement number: 727642

COUNTRY REPORT:

NETHERLANDS

EXTRACTED FROM D2.5: PRODUCTION OF 30 NATIONAL SUMMARY BRIEFS

Deliverable 2.5 description: 30 national summary briefs of national energy supply and demand.

Lead parties for deliverable: AAU

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Cite as: Jensen et al. (2018) *30 national summary briefs of national energy supply and demand.* ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable 2.5.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

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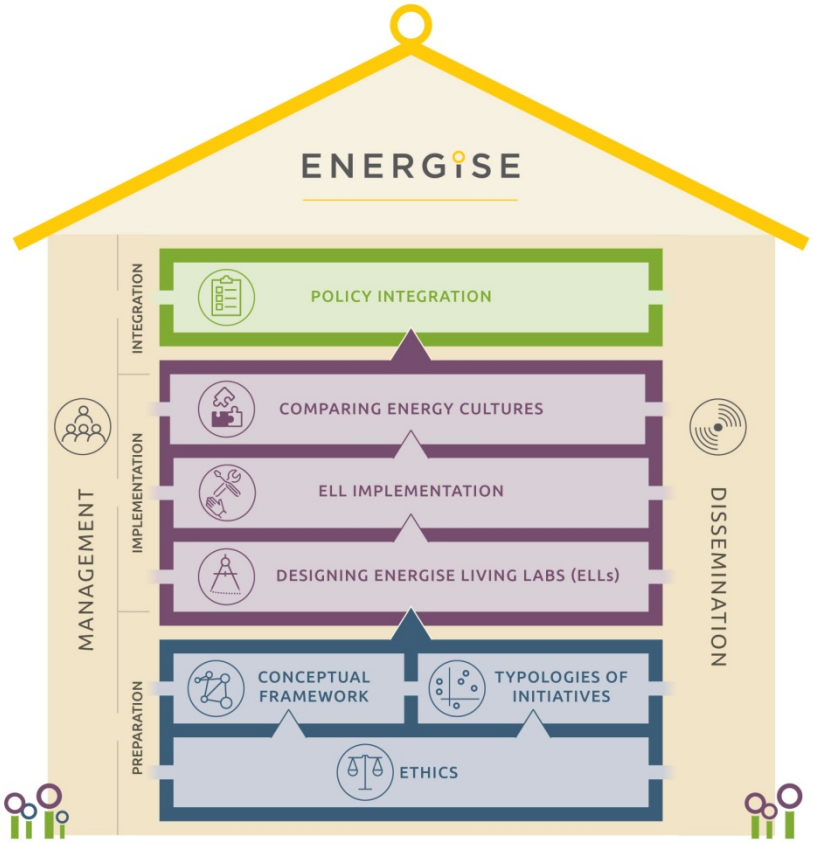
ENERGISE PROJECT

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

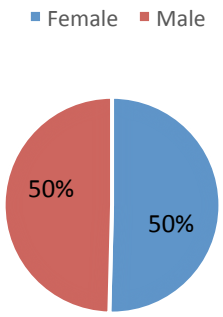
MWh conversion data:
https://www.unitjuggler.com/convert-energy-from-toe-to-MWh.html?val=893.9

NETHERLANDS

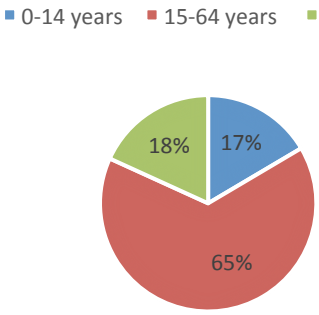
Authors: Julia Backhaus

DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY

GENDER PROFILE

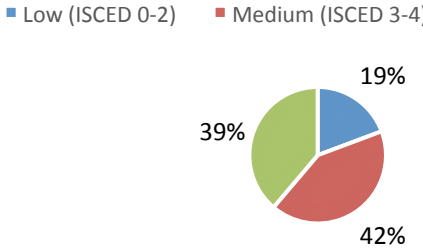


AGE PROFILE (2016)

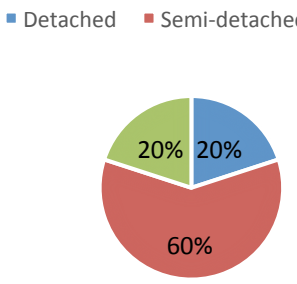


CLIMATE: temperate; marine; cool summers and mild winters

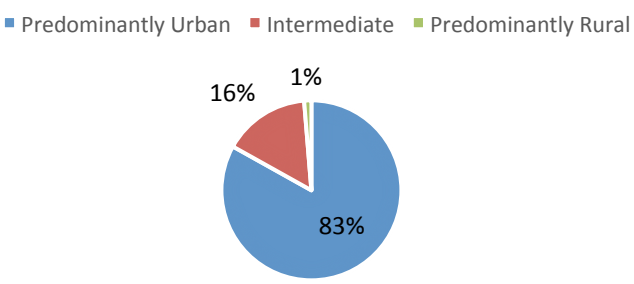
EDUCATIONAL PROFILE (25-54 Y, 2016)



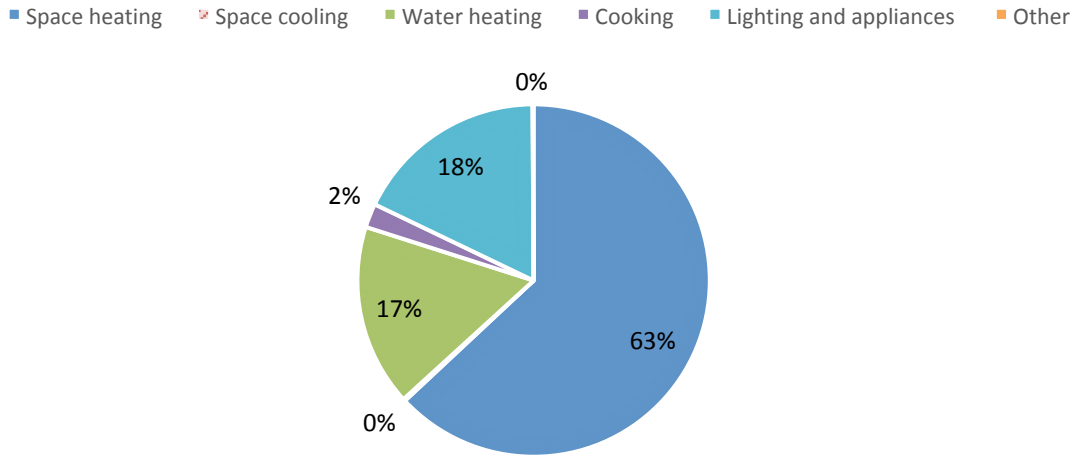
COMMON DWELLING TYPES (2015)



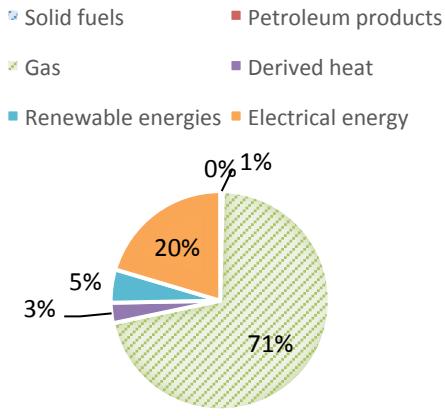
URBAN - RURAL DISTRIBUTION (OECD)



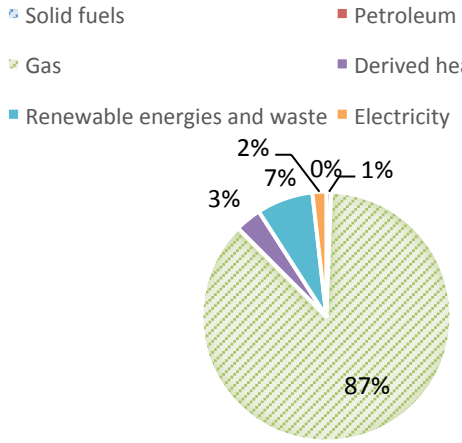
RESIDENTIAL ENERGY CONSUMPTION BY TYPE OF END-USE (2015)



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)

6.562 MWh

ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

Developments in the Dutch energy sector have been and will continue to be strongly dependent on policies and trends in other countries, especially neighbouring countries in Europe's North-West. While the Netherlands are currently a net importer of energy, this is said to change from 2023 onwards according to the most recent National Energy Outlook (Schoots, Hekkenberg & Hammingh 2017). The 2017 NEO indicates a 6% share of renewables in total domestic energy use which is projected to increase to 12.4% in 2020 and 16.7% in 2016. A steep downward trend of total energy consumption, especially in the built environment, could be observed between 2005 and 2016 and is expected to continue. However, actual energy reduction in the built environment is considered to be much lower than theoretical calculations may suggest (Majcen et al. 2013) and demographic as well as socio-economic trends draw into question positive future projections (Brounen et al. 2012).

The Dutch cooperative sector is undergoing remarkable developments, currently fuelling 85,000 (1%) of Dutch households. In 2017, 100 new solar cooperatives have been established, leading to an increase of 53% compared to 2016 and a total solar capacity of 37 MWp. 63 of the new cooperatives benefit from the *Postcoderoosregeling* ('Postcode rose regulation'), a national tax exemption scheme. This development will likely continue this year, with more than 200 projects planned for 2018. Although cooperative wind energy remained stable at 118 MW in 2017, a near doubling of capacity is expected for the period of 2018-2019 due to planned projects that emerged from close collaboration between several cooperatives, governments and commercial companies. Onshore wind energy is increasingly cooperative-based, partly due to municipal requirements (HIER local energy monitor).

Particular socio-material aspects that influence energy consumption

Personal mobility makes up for a great share of national energy use and more than 80% of Dutch households own at least one car. Partially due to public policy, cars on Dutch streets are comparatively smaller and more efficient than in other countries of Europe's North-West. A particularity of the Netherlands is the Dutch 'cycling culture' which is catered to and supported by an extensive network of cycling paths, in addition to a well-maintained road infrastructure and a rather efficient public transportation system.

Compared to households in other countries, Dutch households are not particularly interested in energy-related home renovations. The majority is concerned with investment costs (e.g. for home insulation) and consider their heating system to be working sufficiently well. Vis-à-vis households in other countries, Dutch people feel comfortable at comparatively lower indoor temperatures (below 20 °C) and actively regulate indoor temperature alongside other measures for indoor comfort, such as airing and ventilating. The latter is enabled by a central thermostat and a regulating valve on every radiator in Dutch homes.

Trends in national campaigns

The by far number one issue addressed is the energy efficiency of buildings and of appliances. National government as well as major, nationally known and operating environmental organisations are offering relevant information, guidance and support. Additionally, coaching and information

campaigns seek to spread information on energy efficient behaviours.

Current Trends in Energy Policy

Dutch national policy for the built environment focuses on energy efficiency, offering subsidies for heat pumps, biomass, wood pellet or solar thermal heating systems; since 2017 also to municipalities, provinces and public bodies. The "energy efficiency you do now" (*energie besparen doe je nu*) programme provides cheap loans for energy efficiency renovations (e.g. insulation) to private home owners and associations of apartment owners. Further, national government supports industry efforts with respect to electric heat pumps, district heating (geothermal and residual/waste heat) and the electrification of transport, including personal mobility. Another field of action is the national roll-out of smart meters for all households by 2020.

Agreements have been made with municipalities and housing corporations that all rental apartments owned by housing corporations need to have an energy label of B or better and all privately-owned apartments need to have an energy label of C or better by 2020. There are subsidies for apartment owners who either offer social housing or who plan rather ambitious energy efficiency renovations. An agreement with the construction, installation and energy sector states that every year, 300,000 existing flats are to be made energy efficient. The block-for-block (*blok voor blok*) programme continues since 2012 and comprises 14 projects targeting at least 33,500 flats that are, ideally, renovated cost efficiently, i.e. on block-level.

In recent times, interest has risen in supporting communities that are keen to take collective action, for example by studying their business case (RVO) or by looking into the possibilities of an ESCO model for energy cooperatives (nmf Limburg). Although there are no longer subsides for solar PV, energy cooperatives can profit from tax exemption schemes.

Historical overview 2013-2017

Source: https://www.rijksoverheid.nl/onderwerpen/duurzame-energie/meer-duurzame-energie-in-de-toekomst

Interesting research on consumer behaviour has been commissioned and published by TNO in 2016. Moreover, there is research on Smart Energy Systems (smart grids) and 12 projects have experimented in practice. Six Dutch cities and an impressive list of partners are part of a transnational Smart Cities network and have urged national government to support their strategy – so far to no avail.

OVERVIEW OF NATIONAL SECIS

Below please find a list of Dutch 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 energy initiatives currently or previously carried out in the country.*

The Green Energy Train project in The Hague, Netherlands (2001-2003)	 Changes in Individuals' Behaviour
The Green Energy Train in Leidsche Rijn, Netherlands (2001-2003)	 Changes in Individuals' Behaviour
Warme Truien Dag (Warm Sweater Day)	 Changes in Everyday Life Situations
HIER Klimaatstraatfeest (for neighborhoods and other groups)	 Changes in Everyday Life Situations
Energy Advice in Student Housing by the Delft Energy Agency	 Changes in Individuals' Behaviour
The GreenHouse project: evaluation of options for reduction of greenhouse gas emissions by changes in household consumption patterns	 Changes in Individuals' Behaviour
Energie Boxen Nijmegen (energy boxes)	 Changes in Individuals' Behaviour
Energieteam Zeewolde	 Changes in Individuals' Behaviour
Warm and Comfortable Living - Amersfoort	 Changes in Individuals' Behaviour
Besparen Loont! (Saving pays off!)	 Changes in Individuals' Behaviour
Het Energiegezelschap Eindhoven (Energy Society Eindhoven)	 Changes in Individuals' Behaviour
De slimme buurt Den Bosch (The smart neighborhood Den Bosch)	 Changes in Individuals' Behaviour

Toon Smart Meter	Changes in Technology
Collectief Zonnepark de Gruyter Fabriek Den Bosch (solar park)	Changes in Everyday Life Situations
Energieteam Urk (Energy team Urk)	Changes in Individuals' Behaviour
Regional Energy Performance Assessment Counter	Changes in Technology
TuinWijk in het Zonnetje (TuinWijk in the sun)	Changes in Technology
Bomenbuurt-noord in Roden (Bomenbuurt North in the village of Roden)	Changes in Individuals' Behaviour
'all electric' wijk Hoog Dalem (all electric neighbourhood)	Changes in Complex Interactions
Perspectief op 0 (Perspective zero)	Changes in Individuals' Behaviour
Goed voorbeeld doet goed volgen (A good example tends to be followed)	Changes in Individuals' Behaviour
1000 slimme huishoudens (1000 smart households)	Changes in Individuals' Behaviour
Wooncoaches helpen bij energiebesparing in Voorst (energy coaches)	Changes in Individuals' Behaviour
Slim Net Lochem (smart grid)	Changes in Individuals' Behaviour
Jouw Energie Moment (Your Energy Moment pilot project)	Changes in Individuals' Behaviour
Cloud Power Texel	Changes in Individuals' Behaviour
Energiebox Utrecht (energy boxes)	Changes in Individuals' Behaviour

Energie Besparen Snel Verdiend (Saving energy as a quick gain)	Changes in Individuals' Behaviour
Perspectief project (Perspective project)	Changes in Everyday Life Situations
Student Energy Race	Changes in Individuals' Behaviour
De Achterhoek bespaart (De Achterhoek saves)	Changes in Technology
Energie Boks App (energy box online app)	Changes in Individuals' Behaviour
Buurttransformator: co-creeren met duurzame energie in buurten met sociale woningenverhuur (Neighborhood Transformer: co-creation project)	Changes in Everyday Life Situations
Mooie Wildeman (Beautiful Wildeman)	Changes in Complex Interactions
Huur de Zon (Rent the sun)	Changes in Technology
ThuisBaas	Changes in Technology
Local Energy Saving Support (LESS) Fatima	Changes in Everyday Life Situations
Drebbl (app)	Changes in Technology
energieteam Heerlen (energy team)	Changes in Individuals' Behaviour
Bestaande Wijk van Morgen	Changes in Technology
Samen Schakelen	Changes in Individuals' Behaviour
Energycoach	Changes in Individuals' Behaviour

Energieloket	 Changes in Individuals' Behaviour
Servicepunt Energie Lokaal Limburg SELL (Service point energy local Limburg)	 Changes in Everyday Life Situations
DUW Parkstad	 Changes in Individuals' Behaviour
Repair Café	 Changes in Everyday Life Situations
Goeie Peer (Good Pear)	 Changes in Individuals' Behaviour

‘GOOD PRACTICE’ EXAMPLE OF DUTCH SECI

THE PERSPECTIVE (PERSPEKTIEF) PROJECT

Brief Description

This initiative is a research project that tested the possibility of living a low-energy lifestyle with a high level of well-being in a system of economic growth. The project Perspektief was carried out in the Netherlands from 1995 until 1998, financed by the then Ministry of Housing, Spatial Planning and the Environment (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu; VROM). Supported by a research institute and two universities, the consultancy practitioner CEA implemented the project, involving a dozen households over a period of two years. The 20 households were hand-picked and committed to aiming to reduce their energy use as much as possible over a period of two years. They were informed about the energy intensity of products and services, and coached and monitored throughout the entire run-time of the project towards achieving and maintaining a low-energy lifestyle.

Contextualization

In the Dutch context, the Perspective project is unique in terms of its focus, funding, run-time and ambitions. National government was confronted with a constant increase of energy use, also by households. Research gave reason to believe that demand would continuously grow unless addressed. Therefore, the idea emerged to test whether energy use can be reduced and kept low, even if income increases, whilst well-being remains stable or increases.

The Energy research Centre of the Netherlands (ECN) had already conducted studies on the energy intensity of products and services. Building on these figures, a project team was created with CEA, the University of Groningen and Utrecht University, that aimed to support households in reducing their energy consumption as much as possible. There had been research on energy demand reduction, none of which had focused on indirect energy and taken into account participants’ experience and well-being. A follow-up project conducted by the Netherlands National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu; RIVM) incorporated the results of the Perspective project in scenarios on households’ future environmental impacts.

The Perspective project benefited from a general awareness of environmental and energy issues beyond the research and policy sphere. However, an exploration of what a reduction of indirect energy use means in practice was unprecedented. A variety of households were selected for participation and it appears that financial gains were as much a motivation to participate as possible environmental gains.

Aims and objectives

The main aim of the project was to test whether people could lead low energy-lifestyles in a framework of economic growth (which was simulated by providing people with additional household income) and to assess resulting advantages and disadvantages. While direct energy use was addressed by means of selecting participants living in energy efficient buildings and providing energy efficient appliances, the primary focus was on reducing indirect energy use. One objective, therefore, was to educate people about the energy intensity of products and services and to support them in changing levels and patterns of consumption. The project is regarded as rather successful for having achieved, on average, a reduction of household energy use of 43%.

Methods for intervention

The methods of intervention addressing direct energy use were the provision of energy efficient appliances, monitoring, information and coaching. Participating households were gathered at a kick-off event where the basic principles to reduce indirect energy use were explained (e.g. quality rather than quantity, services rather than products). Second, people were given information on energy consumption and monitoring in print form. Most importantly, households received monthly coaching advice. Advice focused on helping with the monitoring of home energy consumption, with thinking about saving strategies, with the planning of monetary spending and with additional information on the energy intensity of products and services. A second event bringing together all participating households was organized about half-way through the project to thank and motivate everyone, exchange tips and experiences and to commit people to the next period of keeping achieved consumption levels low. A final event was held to celebrate the successful finalization of the entire undertaking.

Another method of intervention was the provision of 20% additional household income to simulate economic growth. Households were obliged to follow a number of rules with respect to spending their income to ensure that their spending patterns would be following similar principles as before: no unusual donations or ‘silly’ expenditures; no more savings than prior to the project; and no big loans and investments. Any purchase costing more than 500 Dutch guilders had to be discussed with the coach who then gave advice based on potential energy impact.

Steps of implementation

The Perspective project was preceded by extensive research on ‘embodied energy’, i.e. energy that has gone into the production and provision of products and services, carried out by ECN, Utrecht University and the University of Groningen. During the initial phase 0, households were selected of different composition that lived in energy efficient housing. This was followed by a phase of baseline measurements, equipping households with a

computer and teaching people how to register the products and services they consumed using a supermarket scanner and manual insertion of data (phase 1). Over the course of the following year, households were informed and encouraged to reduce their energy consumption as much as possible (phase 2). During the final year, people were motivated and encouraged to maintain the lowest consumption level achieved (phase 3).

Overview of the project period from December 1995 until December 1998

Phase	Period
0 – preparation, recruitment, consent	Until December 1995
1 – baseline and learning procedures for monitoring	December 1995 until June 1996
2 – trying to reduce energy consumption	June 1996 until June 1997
3 – maintaining low energy consumption	June 1997 until June 1998
Analysis	Until December 1998

Results/outcomes

The goal of the Perspective project was a 40% reduction in energy use compared to similar households. An average of 43% of reduction was accomplished, about half resulting from reductions in direct, and half from reductions in indirect energy use. Miniscule monitoring was done through meter readings as well as the careful registering of all products bought and services used. The registering of product purchases was made somewhat easier by means of a self-learning system, which required the manual entering of data only the first time an item from the supermarket was scanned. All subsequent scans were then automatically registered. Some products had to be weighed in the monitoring process. In addition, interviews were conducted to gain insights into people's emotions and experiences for example with respect to comfort and well-being and the value they attach to different consumption categories. Personal coaches took note of dilemmas people faced, such as the desire of wanting to go to a faraway place for vacation and, due to their commitment to the project, the requirement to take a low-energy holiday instead.

Overall, households reached the target by reducing their direct and indirect energy use and increasing their level of spending and wellbeing. They achieved a reduction in energy use in all categories measured: transport, food, living, hygiene, clothing and leisure. Monetary spending increased in the categories of food and living and decreased in the categories of direct energy use and leisure. Households were free to decide which

changes to make. Three main strategies were identified: reducing or improving within consumption categories and shifting between consumption categories.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

Heating, cooking and showering in Dutch households is largely fuelled by gas – not least due to the country's natural gas reserves. Nevertheless, the Dutch "energy transition" has been brought on the way more than a decade ago and in the time since, Dutch government has committed to an energy system entirely based on renewables by 2050, no longer requires newly built homes to be connected to the gas net and ordered gas sourcing companies to cap and within four years completely stop extraction from a major gas field in the country's north after a series of increasingly severe earthquakes. While the country set out to become "gasless", the share of renewable energy is still very low and implementation is slow.

Sustainable Energy Consumption Initiatives (SECIs) in the Netherlands reflect Dutch energy policy in various ways. The slow roll-out and uptake of energy efficiency measures as well as renewable energy has been recognised and governmental actors at different levels have become better aligned by offering complementary support and services. While national energy policy for the built environment mainly addresses building envelopes, energy sources, (smart) systems, and appliances, Dutch municipalities and hence many SECIs seek to facilitate and support uptake by collaborating with commercial actors, neighbourhood initiatives, cooperatives, etc. In addition, municipalities and environmental organisations try reaching individual households with more direct, tailored and accessible information about energy efficiency, available subsidies and other support schemes. For example, several SECIs consist of central information points or energy coaches who provide tailored advice. Another frequently found SECI provides energy efficiency equipment to households for free – in the ideal case, like the energieteam Heerlen, coupled with a hassle-free installation service.

The 'good practice' example described in this national brief, the Perspective Project, was a long-term research project that combined various measures to explore options of maximally reducing direct and indirect household energy use despite a high and even increasing standard of living. Interestingly, levels of comfort and convenience could be maintained and even increased despite a 43% reduction of household energy use on average. By necessity, this ambitious project had to take a small-scale approach, which was partially compensated by means of detailed quantitative and qualitative evaluation.

Households' strategies to meet and maintain lowest possible energy use that were found in collaboration with personal coaches could serve as inspiration for future policies and projects. For example, care was taken to provide inspiration for how money saved or provided by the project as supplementary income could be spent in energy-efficient ways to increase happiness and well-being.

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