

# ENERGISE

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

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## COUNTRY REPORT:

### LUXEMBURG

#### 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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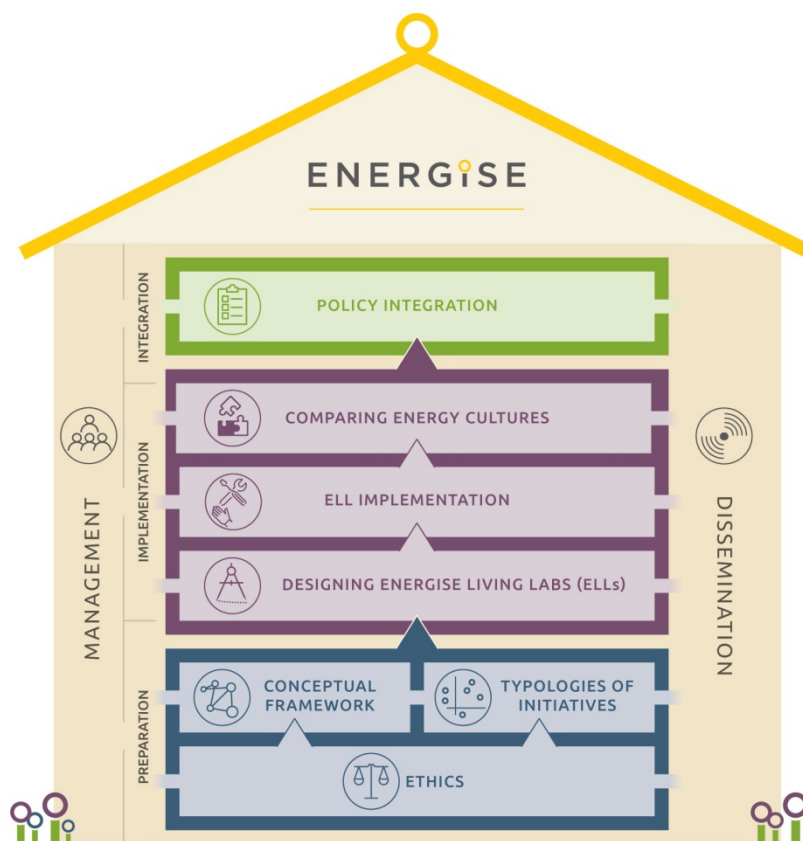
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## ENERGISE PROJECT

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.***<sup>1</sup> 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 (SECI) 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.

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<sup>1</sup> 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/Population_structure_and_ageing)

[http://ec.europa.eu/eurostat/statistics-explained/index.php/Educational\\_attainment\\_statistics](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\\_\(%25\\_of\\_population\)\\_YB\\_17.png](http://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Distribution_of_population_by_dwelling_type_2015_(%25_of_population)_YB_17.png)

Energy demand and supply quantitative data:

[http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy\\_consumption\\_in\\_households](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>

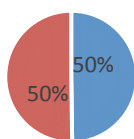
## LUXEMBURG

Authors: Kristjan Čoklc, Tomislav Tkalec, Lidija Živčič

### DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY

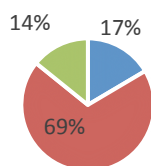
#### GENDER PROFILE

■ Female ■ Male



#### AGE PROFILE (2016)

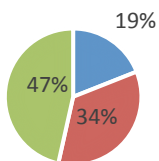
■ 0-14 years ■ 15-64 years ■ 65+ years



**CLIMATE:**  
modified continental with mild winters, cool summers

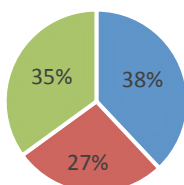
#### EDUCATIONAL PROFILE (25-54 Y, 2016)

■ Low (ISCED 0-2) ■ Medium (ISCED 3-4) ■ High (ISCED 5-8)



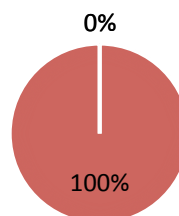
#### COMMON DWELLING TYPES (2015)

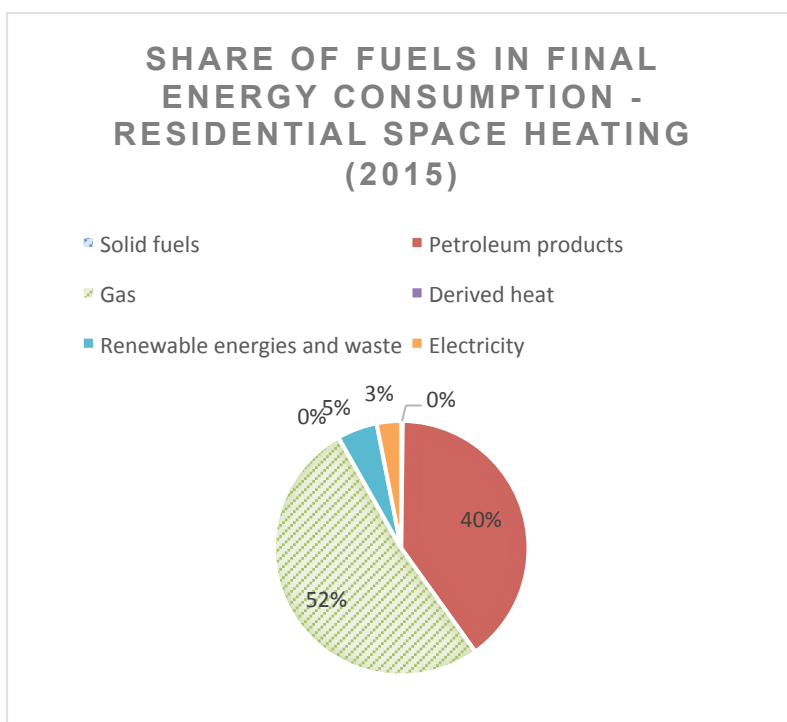
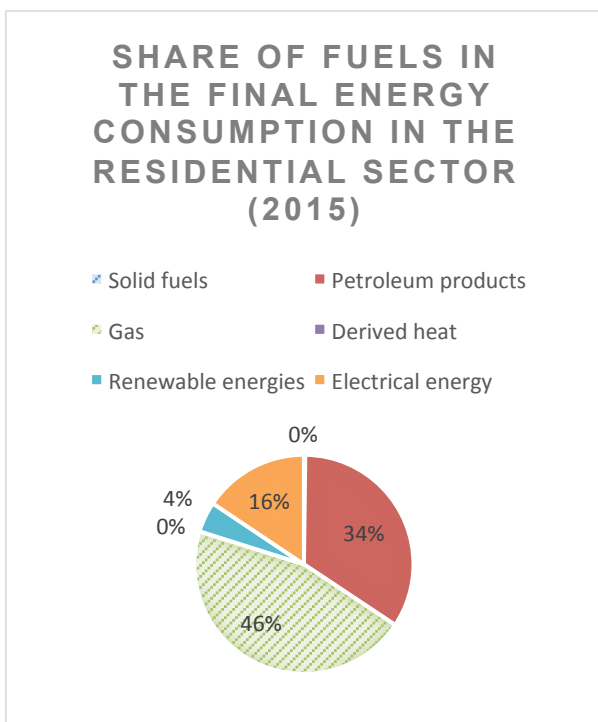
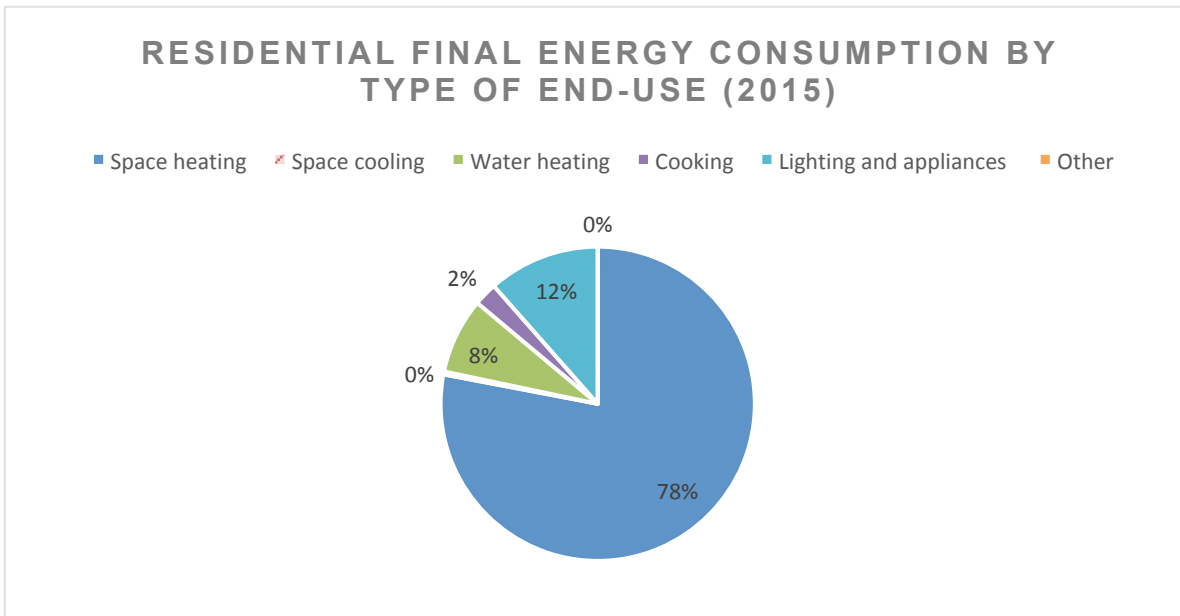
■ Detached ■ Semi-detached ■ Flat



#### URBAN - RURAL DISTRIBUTION (OCED)

■ Predominantly Urban ■ Intermediate ■ Predominantly Rural





**FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015)**

**10.106 MWh**



## ENERGY SYSTEM AND ENERGY POLICY TRENDS

### Energy system

The majority of the electricity in the Grand Duchy of Luxembourg comes from Germany via two double high-voltage lines. The interconnection with the Belgian electricity market has become operational with the commissioning of a phase shifting transformer (PST) at the Schifflange centre in October 2017, and around 15% of the energy fed into the network is produced locally (biogas, co-generation, wind, hydro, PV).

The liberalization of the electricity market has led to the separation of activities: the production and supply functions are separate from the transmission and distribution functions and are performed by independent entities. On the one hand, network activities (transport and distribution of energy) remain a monopoly and their network usage tariffs are regulated and approved by the Luxembourgish Institute for Regulation (Institut Luxembourgeois de Régulation). On the other hand, production and supply activities are subject to competition. The end customer has the right to choose its electricity suppliers.

In networks with fewer than 100.000 connected customers, activities may continue to be performed by the same entity provided certain organizational requirements are met. Therefore Creos Luxembourg, which manages most of the network in Luxembourg, is a separate legal entity with no production or supply activities, while the Esch / Alzette and Mersch networks continue to be operated by the same entity also active in production and / or supply. By transferring the production and / or supply activity to a commercial company set up for this purpose, the municipalities of Diekirch and Ettelbruck have voluntarily separated the commercial activity from the network manager activity.

Source: <http://www.res-legal.eu/>; <https://en.wikipedia.org/wiki/>; <https://web.ilr.lu/FR/>

### Particular socio-material aspects that influence energy consumption

One of the most outstanding socio-material aspects that influence energy consumption in Luxembourg is the so called 'fuel tourism'. Luxembourg's policy of low road fuel prices lead to considerable increase in "road fuel sales to non-residents" since 1990. Although the "road fuel sales to non-residents", though price differences with neighbouring countries is reducing over time, it still forms a significant part of energy consumption. Another important aspect is that the economic development of Luxembourg these last 30 years has led to an important growth of both the resident population (40% increase over the last 20 years) and the cross-border commuters representing now almost 45% of the paid workers (a 250% increase over the last 20 years). This, in turn, has led to increasing built-up areas (housing, offices, services, infrastructures) and to ever growing transport flows, mainly by road. Population and cross-border commuters growth is also leading to rising energy demand, both for buildings and, as said, for transport. At the same time, industrial emissions have reduced a lot since 1990, both due to technological changes and to the de-industrialisation of the country.

Source: <https://www.eea.europa.eu/soer-2015/countries/luxembourg>

### Current Trends in Energy Policy

Since 1 July 2007, the Luxembourg electricity and gas market has been liberalized and household customers are free to choose their energy supplier. Despite the largely harmonized energy structures between Luxembourg and Germany, the Institut Luxembourgeois de Régulation misses the market presence of supra-regional providers for the supply of electricity to end customers and thus ultimately also indications of a functioning competition.

In addition to the very low market potential and language barriers, there is a high level of concentration and strong links between the Luxembourg incumbent and potential supra-regional suppliers, who may be reluctant from a strategic point of view. In addition, there are clear harmonization deficits in the change of supplier and in network usage billing between Luxembourg and Germany. De jure, there are no market entry barriers. Rather, it requires supportive modification to further promote competition.

At a press conference on 1 March 2018, the Deputy Prime Minister, Minister of the Economy, Étienne Schneider, presented new measures promoting the development of Internet of energy, the self-consumption of electricity and the development of renewable energies, in line with the strategy of the Third Industrial Revolution.

The decentralization of electricity production on the basis of renewable energies as well as the digitization of the electricity markets are important energy issues. In line with these challenges, the Council of Government adopted on 21 February 2018 a draft law amending the legislation in the field of electricity. The planned adaptations introduce for the first time in Luxembourg legislation the concept of individual self-consumption, as well as that of collective self-consumption within an energy community.

In line with the principles of the "sharing economy", the adaptation of electricity legislation also provides for the sharing of electricity produced with other users in the context of collective self-consumption within a network energy community that can consist of the inhabitants of a street or a neighbourhood, but also of people living more distant from each other. Electricity produced with low power production facilities and self-consumed, individually or collectively, will also be exempt from the electricity tax.

Source: <https://assets.ilr.lu/> ; <https://gouvernement.lu/fr/>










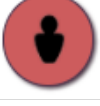

### Trends in national campaigns

Campaigns in Luxembourg differ one from another and are focusing on energy efficiency, alleviation of energy poverty, promotion of renewables and other topics. Quite number of them are focusing on sustainable mobility. They are implemented by national authorities, municipalities, civil society organizations and energy agencies. In March 2018 the national government has introduced a regulation for self-consumption of electricity generated from RES, and has also presented new measures specifically encouraging the production of photovoltaic energy and contributing significantly to national energy objectives: these are calls for tenders for the installation of photovoltaic installations of size.

Source: <https://gouvernement.lu/fr/>

## OVERVIEW OF NATIONAL SECIS

Below please find a list of Luxemburg 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.

e-passport		Changes in Technology
TM EnerCoop		Changes in Technology
Assistance aux ménages en précarité énergétique (Assistance to households in energy precariousness)		Changes in Individuals' Behaviour
EcoPrêt (ecoloan)		Changes in Technology
TOPTEN ACT : Enabling consumer action towards top energy-efficient products		Changes in Individuals' Behaviour
« Energiesparen macht Schule »		Changes in Everyday Life Situations
Luxmobil		Changes in Individuals' Behaviour
mLive – synchronising mobility		Changes in Individuals' Behaviour
Den Trollmops ass mobi		Changes in Individuals' Behaviour
Vël'OK		Changes in Individuals' Behaviour
<a href="http://Energyhesper.lu">Energyhesper.lu</a>		Changes in Individuals' Behaviour

## ‘GOOD PRACTICE’ EXAMPLE OF LUXEMBURG SECI



### « Energiesparen macht Schule »

#### **Brief Description**

The initiative is focusing on schools and energy and water use in schools. Main target groups are teachers, school administration and caretakers, and through teachers also school children. Secondary target group are parents, who are targeted through their children. The initiative tries to develop knowledge about energy consumption through playful and experimental methods.

#### **Brief Contextualization**

The initiative started in Germany in 1997 by a German NGO and is focusing on schools and on changes in consumption patterns related to energy. From its beginning it has been introduced to more than 300 schools and kindergartens in which they have succeeded to save on energy and water costs.

#### **Aims and objectives**

This 5 year programme aims to reduce school water and energy consumption by promoting a change in habits. Various seminars and training sessions were organised to provide teachers with basic knowledge and practical examples and to present the various energy savings measures. This knowledge is imparted to the pupils through different playful and experimental methods. Establishments were also inspected, in collaboration with the consulting firms, to identify potential large consumers.

#### **Methods for Intervention**

Starting point is the user behaviour. Interventions include seminars and training sessions for teachers, who then present the knowledge to the children that they teach in the form of different playful and experimental methods. Apart from that energy audits are carried out in the facilities of the school.

#### **Results/outcomes**

Schools have reduced their energy use and energy related costs. In order to motivate schools to participate in the initiative, they can keep 40 % of the achieved cost savings and other 30 % of savings remain to the city. The financial savings achieved by the schools have meanwhile made it possible to fully pay for the remuneration of the consulting offices and even to purchase school supplies.

#### **The role of the households**

Households are not targeted directly, but are a secondary target group of the initiative. School children are taught about energy and water saving possibilities and measures, which they then transfer to their parents. In that way households' awareness raising is carried out by children that live there.

#### **Location**

The initiative is carried out in various places in Luxembourg and Germany. In Luxembourg it is implemented in the city of Dudelange.

### **Textual and communicative aspects of initiative**

The initiative is focusing on didactic and pedagogical tools. It is easily replicable in other schools kindergartens and for that reason they have, apart from other communication and promotional materials, prepared a mascot of the initiative (a blue dragon).

### **The physical/technological aspects of the initiative:**

The initiative is focusing more on behaviour aspect and on teaching / training, with inclusion of various physical teaching aids and experimental kits. But it also includes the use of measuring equipment, so they can measure energy and water use in the school. It also focuses on optimization of settings of various energy systems in the school (heating, etc.).

## **CONCLUDING REMARKS AND POLICY IMPLICATIONS**

Luxembourg's energy policy includes some progressive approaches, such as measures for promoting the development of Internet of energy, decentralisation of electricity production, the self-consumption of electricity, the development of renewable energies or digitisation of the electricity markets. The legislation also enables sharing of electricity produced with other users in the context of collective self-consumption within a network. The identified SECI mainly do not follow the progressiveness of energy policy, as they are mainly oriented towards general energy efficiency awareness raising (energy certificates for buildings and appliances, energy saving advising or education, old-for-new appliances, CO2 calculator, etc.). One of the identified SECI follows the trends, set by the energy policy energy cooperative, which is the local producer of green energy.

One of the outstanding socio-material aspects that influence energy consumption in Luxembourg is an important growth of both the resident population and the cross-border commuters, which has led to ever growing transport flows, mainly by road. In response to this challenge, many of the identified SECI focus on mobility, from surveying mobility needs to providing mobility information. The later SECI focus on individual route planning, connections between mobility modes and promotion of multimodal approaches.

The SECI are implemented by national authorities, municipalities, civil society organisations, and energy agencies. Mainly they are of national or even local coverage, only one of the identified SECI was a part of an international campaign. The SECI mainly work towards changes in individual behaviour (7 of the identified), there are several working towards a change in technology (3 of them) and one is stimulating changes in everyday life situations.

The highlighted SECI is an initiative focusing on energy and water use in schools. Main target groups are teachers, school administration and caretakers. Through teachers school children are targeted, who then target their parents as a secondary target group. This

teaches us that working with children is beneficial because of their impact on parents and wider families. In order to motivate schools to participate in the initiative, they can keep 40 % of the achieved cost savings and other 30 % of savings remain to the city. The financial savings make it possible to fully pay for the remuneration of the consulting offices and even to purchase school supplies.

The financial sustainability of the action is the most important lesson learned from this example, which should inform policy. Putting forward measures that pay off well, as well as sharing the profits of such measures between the interested stakeholders, ensures financial sustainability of the measures, which is of key importance when talking about energy policies.

## REFERENCES

For references, please see individual sections