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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/statisticsexplained/index.php?title=File:Distribution_of_population_by_dwelling_type,_2015 (%25_of_population)_YB 17.png

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

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

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



SLOVENIA

Authors: Tomislav Tkalec

DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY











FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015) 6.262 MWh



ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

Slovenia has a small energy sector, its final energy consumption in 2014 was 4,7 Mtoe (54.661 GWh). Its energy independence in 2014 was 56%. Oil (47,4%) is the main energy source, followed by electricity (23,1%), renewables (13,7%), natural gas (11,3%) and other (4,5%).

Electricity generation can be divided in three parts that wary slightly from year to year because of the weather conditions and amount of rain that influence generation in hydro-power plants: hydro power (37,5%), nuclear power (36%) and thermal power (25%). Biggest share of thermal power goes on coal (lignite). Solar accounts for 1,5% and 2 windmills account for 0,02% of electricity. This data is for the year 2014, when it was an excellent hydrology year. Annual electricity consumption in 2014 was 12.719 GWh.

While the gas and oil market is somewhat privatized, electricity production is still in state hands. The government of Slovenia owns a 100 percent stake in Holding Slovenske Elektrarne (HSE) and Gen Energija (GEN), the major electricity producers in Slovenia. In recent years the government has considered a merger of the two companies, as HSE did not have the necessary financing for the construction of a new coal burning generator at the Sostanj Thermal Power Plant (TES 6). Construction on the TES 6 project continued despite concerns about its cost, commercial feasibility, environmental impact and the perceived lack of transparency surrounding the project. The Government of Slovenia has provided the necessary loan guarantees to finish the project despite expressing serious reservations about its viability. TES 6 went on-line in 2015. GEN Energija own half of the Krško NPP and the other half is owned by Croatia (state company HEP).

Source:

http://www.cigre.org/var/cigre/storage/original/application/72b0f74d6a835404185b41fbf746efbf.pdf

https://www.export.gov/article?id=Slovenia-Electrical-Power-Systems

Particular socio-material aspects that influence energy consumption

Future growth in electricity consumption must be considered given the expansion of air conditioning and electric vehicles. Energy efficiency measures, in particular insulation of multi-apartment buildings and family houses, serve as a counterbalance to these increases. However, the improvement in insulation for buildings are usually concentrated to the better off parts of the population, while the less well-off parts of society are not able to invest into improving energy efficiency of their dwellings.

For the reason of low energy efficiency of buildings in combination with high percentage of ownership of housing stock (more than 95% people live in their own flat/house) and low incomes there is significant percentage of households living in energy poverty.

Because of rising prices of heating oil, in last 10 years there is a tendency to replace this fuel for heating with cheaper one, mostly households choose biomass, as wood is the cheapest option, but also heating pumps and gas. Higher percentage of heating with biomass lead to a higher problem of air pollution.

Current Trends in Energy Policy

The current government has worked on a new national energy concept since fall 2014; it released a draft in 2015, but the program has not yet been adopted. Current version focuses on keeping the



status quo and preparing for changes in the long run. Slovenia's vision for the energy sector is gradually to transition to low-carbon energy sources by focusing on efficient energy consumption, use of renewable energy sources, and the development of active electricity-distribution networks. This strategy will likely envisage a strong reliance on nuclear energy and further development of hydroelectric power.

There is still no definite answer about the timing of closure of the coal power plant TEŠ, as its lifetime is expected not to be met because of economical and environmental reasons. RES are still not a priority and bigger investments (apart from hydro-power) are planned after the year 2030.

Increased hydroelectric power generation is one of the strategic objectives of the government's energy policy. Further upgrading of the upper stations on the Sava River is planned as well as construction of a chain of six new plants on the lower Sava. The government has invested in a series of plants since 2004 and recently announced construction of new hydro-power plants on the middle Sava River with expected investments of EUR 1.7 billion. There are also plans to upgrade three plants on the Drava River and feasibility studies are underway for additional small hydroelectric power projects. Together with the new plants, these renovations will create an additional 470 MW of hydroelectric capacity by 2020.

GEN Energija has prepared a plan for a second nuclear production facility; however, the government's decision on the timing of any possible nuclear expansion will depend on energy needs, available financing, and public sentiment about nuclear energy.

Energy efficiency and energy refurbishment of the building stock are perceived as priority measures, but this connotation is still not fully visible in the financial schemes and policies. Energy communities are only slowly entering the discourse.

Trends in national campaigns

National campaigns are run mainly through national Eco Fund and Energy Agency. Eco Fund has programs and financial aids for EE and RES measures (energy refurbishment of buildings, replacement of old inefficient heating systems, energy advising, energy poverty alleviation programs, co-financing investments in RES, subsidies for electric cars). Energy Agency is responsible for tenders for support scheme for RES projects.

The ministry for environment is also active in campaigns for cleaner air that is targeting air pollution from wood burning. Other non-governmental stakeholders and actors and also utility companies run campaigns on RES projects and self-consumption of RES electricity (net metering scheme), civil society has campaigns on community (RES) projects, energy efficiency, energy poverty and sustainable mobility.

Civil society is also active in campaigns against fossil fuels and nuclear power.



OVERVIEW OF NATIONAL SECIS

Below please find a list of Slovenian 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.

| Porabi manj (Use less) | • | Changes in Individuals' Behaviour |
|--|---|-----------------------------------|
| Gen Sonce | 7 | Changes in Technology |
| Energetski center Petrol (Petrol Energy Center) | • | Changes in Individuals' Behaviour |
| Slovenija znižuje CO2 (Slovenia reduces CO2) | * | Changes in Complex Interactions |
| NEP Slovenija | 9 | Changes in Technology |
| ACHIEVE | • | Changes in Individuals' Behaviour |
| REACH | * | Changes in Complex Interactions |
| Energetska dieta (Energy diet) | • | Changes in Individuals' Behaviour |
| Bve, bve Stand-by! | • | Changes in Individuals' Behaviour |
| One tonne challenge | • | Changes in Individuals' Behaviour |
| Community based management of natural resources | * | Changes in Complex Interactions |
| Uresničujmo, z energijo varčujmo! (Let's make it real, let's save energy!) | • | Changes in Individuals' Behaviour |
| ECE – 100% renewable eletricity for households | 7 | Changes in Technology |



| Trainings »How to reduce energy consumption in households« | • | Changes in Individuals' Behaviour |
|---|---|-------------------------------------|
| District heating on biomass in Vransko | P | Changes in Technology |
| National energy advising network ENSVET | • | Changes in Individuals' Behaviour |
| Program for energy advising in energy poor households AERO of the ENSVET network | • | Changes in Individuals' Behaviour |
| OLEA Research unit | • | Changes in Individuals' Behaviour |
| Self-sufficient living cell Ljubljana | | Changes in Everyday Life Situations |
| Sončna zadruga (Solar Energy Cooperative) | 7 | Changes in Technology |
| Energy refurbishment of multiapartment buildings in whole residential area Planina, Kranj | 7 | Changes in Technology |
| AFTER project | - | Changes in Technology |
| Energy Neighbourhoods2 - The Energy Challenge | | Changes in Everyday Life Situations |
| SHARE: reducing energy consumption in non-profit buildings | • | Changes in Individuals' Behaviour |
| SAVE project | • | Changes in Individuals' Behaviour |
| EI – Education | • | Changes in Individuals' Behaviour |
| Renewable energy sources in municipaliteis in Primorska region | | Changes in Everyday Life Situations |
| Energy ViLLab | | Changes in Everyday Life Situations |



| OPANK | • | Changes in Individuals' Behaviour |
|--|---|-------------------------------------|
| | • | Changes in Individuals' Behaviour |
| mOIDom | | |
| ENERGO OPTIMUM | | Changes in Individuals' Behaviour |
| MOVE for energy sustainability | | Changes in Individuals' Behaviour |
| SEOP – Social Electricity Online Platform | | Changes in Everyday Life Situations |
| Climate Literacy | | Changes in Everyday Life Situations |
| ELIH MED - A EURO-MEDITERRANEAN PROGRAM TO FIGHT ENERGY POVERTY | - | Changes in Technology |
| EnergizAIR The renewable energy weather forecast - Europe | | Changes in Technology |
| EEPLIANT: Energy Efficiency Complaint Products | • | Changes in Individuals' Behaviour |
| MOBISTYLE : MOtivating end-users Behavioral change by combined ICT based tools and modular Information services on energy use, indoor environment, health and lifestyle | * | Changes in Complex Interactions |
| Creating liveable neighbourhoods while lowering transport energy consumption (PRO.MOTION) | ٢ | Changes in Individuals' Behaviour |
| European Young Energy Manager Championship (EYEMAN CHAMPIONSHIP) | • | Changes in Individuals' Behaviour |
| Persuasive force of children through education (FEEDU) | • | Changes in Individuals' Behaviour |
| European Network of Information Centres promoting Energy Sustainability and CO2 reduction among local COMmunities (ENESCOM) | • | Changes in Individuals' Behaviour |
| European Solar Days II (ESD II) | 7 | Changes in Technology |





'GOOD PRACTICE' EXAMPLE OF SLOVENIAN SECI

REACH

Brief Description

REACH (Reduce energy use and change habits) is an IEE project for reducing energy consumption in low-income (energy poor) households). It was implemented in Croatia, Macedonia, Bulgaria and Slovenia. In Slovenia it was implemented by FOCUS. In all countries, practical activities of the project – energy advising in households – were implemented on regional level. In Slovenia it was implemented in Pomurje and Zasavje regions. It started in 2014 and finished in 2017. REACH built on the success of the project ACHIEVE.

Brief Contextualization

Even though the EU is one of the most developed areas in the world, between 50 and 125 million of EU's citizens are estimated to be energy poor. The situation is severe in the Eastern Europe Member States. In the majority of the new Member States up to 30 % or even more households are struggling with energy poverty. Energy poverty in Slovenia is becoming an increasing problem as rising energy prices surpass the rise of income of the population. Thus, the expenditure on energy for households in the first income quintile has risen sharply in the recent couple of years, representing 17.4% of all available resources of individual households in 2010 (in 2000, this share was 13.1%). In the context of EU policies, the issue of energy poverty is becoming more and more visible, but there is no single definition of who is energy poor. Despite the lack of definition, energy poverty is being tackled by some policies: governmental analysis of energy poverty from 2010 highlights energy poverty as a rising issue, National Energy Action Plan 2020 and the Operative program 2014–2020 list energy retrofit of energy-poor households as measures. Hence, some measures for addressing energy poverty already exist in Slovenia: national program for visiting energy poor households by advisers of the national energy efficiency advising network, support for energy retrofit of energy-poor households (100% subsidy), and support for the replacement of heating system in energy-poor households in areas which are particularly burdened with PM pollution. However, further steps are necessary to address the problem fully.

Aims and objectives

Project REACH had two overall objectives:

- 1. To empower energy poor households to take actions to save energy and change their habits.
- To establish energy poverty as an issue that demands tailor-made policies and measures at local, national and EU level.

Each of the objectives was supported with specific aims that project was trying to achieve:

- To compile data and analyse energy poverty situation in four countries in order to form definition(s) of energy poverty and policy recommendations.
- To engage and empower local actors to tackle energy poverty.
- To empower energy poor households to reduce their energy and water use and provide some of them with further support for tackling their problems.





• To engage decision-makers in tackling energy poverty as an issue that demands structural tailor-made solutions, provide them with recommendations for addressing the problem and create a platform for concerted formulation of structural solutions at the national and EU level.

Methods for intervention

Energy advising in households included free audit, analysis and advice. Visits were implemented in two steps:

- During the first visit, an energy audit was performed by the energy advisors. The advisors reviewed the energy and water bills of the households, conducted a set of measurements (energy use of appliances, water use, etc.) and discussed the household's habits with regard to energy and water use. Inserting data on energy and water use and costs (from bills), electricity using devices (lightning, cooking, washing, entertainment, cooling, heating, etc.), state of the building (heating system, insulation, windows, position of flat, etc.), and behaviour of the inhabitants enabled the energy advisors to run analysis and shape advice for each household.
- During the second visit, the advisors handed out devices, which helped the household reduce energy and water use, and advice for using those devices, changing energy use habits and further possible steps. The package of devices for the households was tailored to the needs of the households. The advice for the household was also tailor-made, taking into consideration the situation and habits of the members. Apart from tailor-made advice, the households also received a list of general tips for reducing their energy and water use and contacts to institutions that can support them in making further steps (e.g. insulation funds).

The approach (energy advising in households) was inspired by German approach (from Caritas Frankfurt) and is methodologically following it. The approach was set in the ACHIEVE project, where Caritas Frankfurt were one of the partners. The difference with ACHIEVE approach is that in the ACHIEVE project energy advising was carried out by unemployed persons (trained and paid for energy advising); and in REACH it was done by high school students.

Steps of implementation

The first step of the action was to map the local and national situation in the field of energy poverty. National analyses of the energy poverty situation were done in order to a) gain insight into the situation, b) provide a basis for fine-tuning the action and c) provide a basis for shaping policy recommendations. The other main activity was the transfer of know-how for energy advising to partners, teachers and students of vocational schools. The transfer was made through training for partners, who have transferred the know-how further to their local vocational schools through 10 training events for teachers and students. After equipping students – energy advisors – with the know-how for visiting households, the visits started. Households were approached in cooperation with Centres for Social Work (a flyer for them was prepared and the CSDs were collecting households applications for visits).



During the first visit, the advisors made energy audit of the household and studied its habits. Based on these inputs, tailored advice has been given to each household in order to empower them to reduce energy and water use. Apart from advice, the households also received free energy and water saving devices that helped them to save energy and water.

Results/outcomes

Results for overall project (for 4 countries combined): Over 200 students and volunteers from vocational schools and faculties were trained to perform energy audits in energy-poor households. They helped partners to implement 1,564 household visits, whereby basic energy efficiency measures were put in place and over 6,650 free energy and water saving devices were installed. The investment of about 30 EUR of free devices resulted in annual savings of over 65 EUR in the visited households, or over 560 EUR saved during the lifetime of devices. In total, 48,200 EUR was invested in energy saving devices that could save over 840,000 EUR over the lifetime of devices.

The role of the households

Energy advising was done in households – that means at least one person from the household (usually the one who takes care of the energy bills) had to be present. No financial contribution from households was included. In fact, they have received free energy saving devices. The communication part of the initiative was developed with help from the households – interviews with them were carried out to ask them which channels are best to communicate the initiative to them.

Problems encountered: Some households were reluctant to receive visits. This is mainly because the people are insecure and think that everything will eventually cost them money (that they will have to buy something or pay for the visits). Cooperation with the organizations that have established trust in the households, such as centres for social work, Red Cross or Caritas, was a must. Only through working with such organizations were the partners able to approach the households and establish sufficient trust to implement the visits and advising.

Location

Regions Zasavje and Pomurje were chosen because they are the least developed regions in Slovenia with the most acute social and economic problems. Target group was energy poor households.

Was/is the initiative successful?

Yes – the results are described above. Apart form the results on practical level – reducing energy consumption in households, it was successful also on structural level with working on policy issues. People found the visits very helpful, especially in terms of understanding their energy and water use better, but they also showed high appreciation of the delivered free energy and water saving devices.

Textual and communicative aspects of initiative

The main frame in which the initiative worked was focusing on energy poverty and trying to help households that are energy poor by giving them energy saving devices for free and





giving them advices. Energy poverty was seen as energy and social problem. But when talking with households, the initiative did not use the term energy poor; also because the term is not widely known. That is why if was re-framed to "households that receive social help".

The physical/technological aspects of the initiative

During the second visit, the advisors were handing out simple devices, which helped the household reduce energy and water use (energy efficient light bulbs, tap aerators, draft proofing for windows and doors, power strip with on/off button, reflective panels for radiators), and advice for using those devices, changing energy use habits and further possible steps. The package of devices for the households was tailored to the needs of the households.

Shared understandings related to initiative

Initiative was focused on reducing energy and water use in households – with energy saving devices; and also trying to influence their behaviour with giving them tips and advices about how to reduce their energy use. Main motivation for households (energy poor) was to save money.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

Slovenia has a small energy sector, where oil with its 47,4% share represents the main energy source (mainly for transport). Electricity generation can be divided in three similarly sized parts: hydropower, nuclear energy and coal. Trends in energy policy, as prepared in the new proposal for national energy concept go in the direction of keeping the status quo regarding the energy sources, while also trying to follow the EU directives and fulfilling the EU set targets for RES, EE and GHG emissions. SECIs are ahead of the trends in national energy policies. This is already evident in the field of energy efficiency and diversity of effective approaches that policy-makers still don't perceive as relevant, and in particular in the cases of RES initiatives, community energy projects and the problem of energy poverty. Especially in the last two topics, SECIs show examples to the decision-makers on how to proceed in this area. This means that non-governmental actors take the initiative in these areas and, on the basis of their acquired knowledge and experience, influence the policy-makers who, due to these SECIs, are beginning to deal with the topics concerned (namely energy poverty and community energy).

There is some attention paid in SECIs to the socio-material specifics of energy use. Energy efficiency is highly on the agenda of several SECIs. Energy poverty is highlighted as one of the socio-material aspects and is reflected in 10 identified SECIs. One visible characteristic of energy poverty SECIs is that many of them work with such households in variety of manners, from working towards energy retrofits, to providing home audits, energy advising, awareness raising, understanding of energy and heating bills, participatory workshops on energy saving, providing financial support and other support measures.



The majority of identified SECIs focus on changes in individuals' behaviour (27), then some on changes in technology (11), while focus on changes in complex interactions are scarce (4). However, there are 7 SECIs focusing on changes in everyday life situations. Majority of SECIs (25) are run at a cross-national level, 14 of them are run on national level, 5 of them on regional and 5 of them on national level. Governmental programs are rather scarce, an important part of the action comes from EU projects, energy agencies and initiatives by the environmental NGOs. Actions are mostly not targeted to specific socio-demographic groups, although there is quite high number of initiatives targeting low income households (10), which shows that energy poverty is recognized as an important issue. Small number of SECIs target families, students or children.

The emphasised SECI provides an example of initiative that is focusing on energy poverty and includes activities on practical and structural level. Cross-national project's aim was to reduce energy consumption in low-income households and it achieved that part with energy advising in households. Results show over 65 EUR of savings per household per year on average. It also included a policy aspect, as advocacy activities were part of the project. Results from the practical part of the project were used for advocacy work and in that way decision-makers were presented with a 'ready-to-use' scheme. This would be the main lesson to learn from this initiate, especially as it was successful in engaging decisionmakers on the national level and their activation on the topic of energy poverty and preparation of nation-wide program for energy poverty alleviation.

REFERENCES:

<u>http://reach-energy.eu/</u> Project REACH. 2017. Fighting energy poverty: achievements and lessons of project REACH. Final report.

See also individual sections.

