

ENERGISE

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

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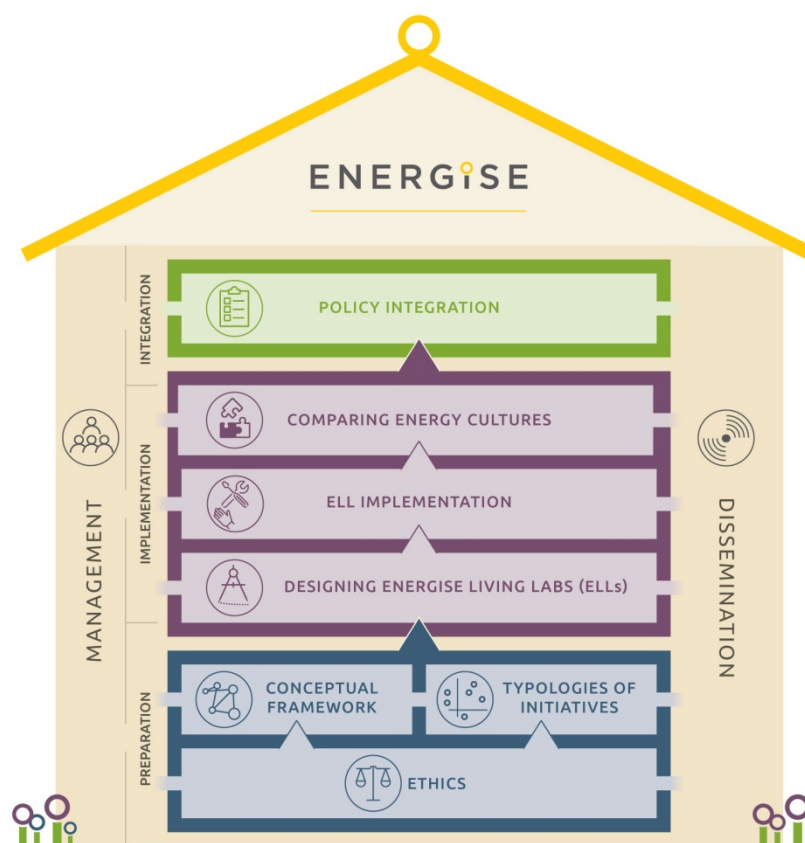
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ENERGISE PROJECT

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.europa.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 (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.

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_\(%25_of_population\)_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

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

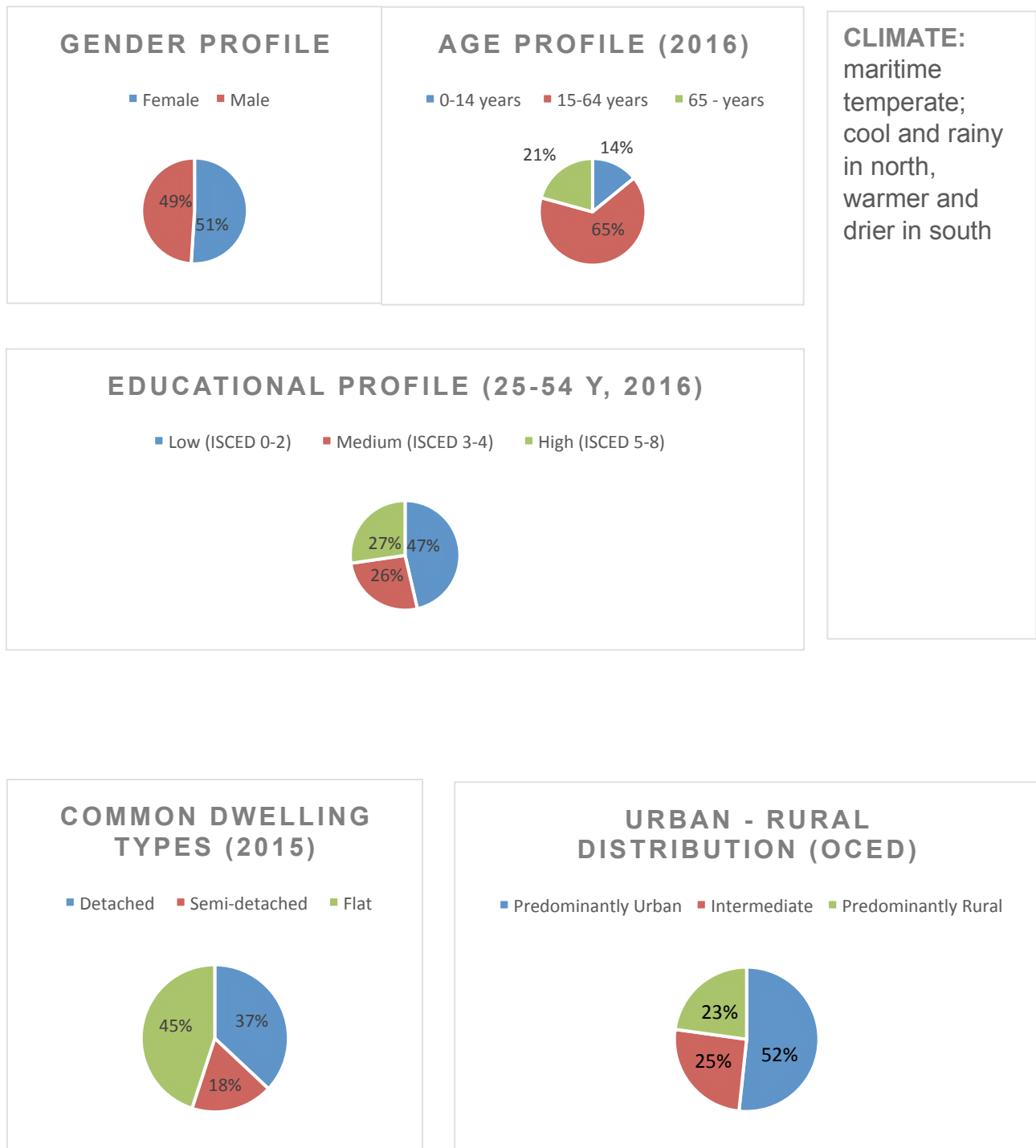
MWh conversion data:

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

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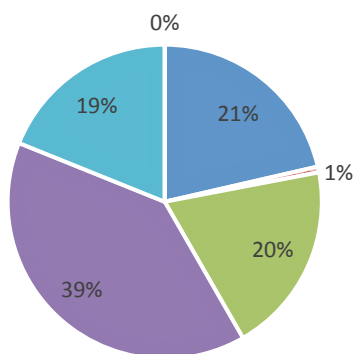
Authors: Renda Bellmallem, Tomislav Tkalec

DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY



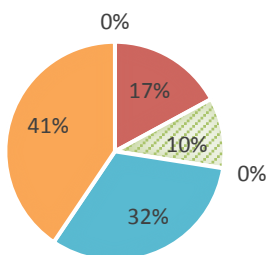
RESIDENTIAL FINAL ENERGY CONSUMPTION BY TYPE OF END-USE (2015)

■ Space heating ■ Space cooling ■ Water heating ■ Cooking ■ Lighting and appliances ■ Other



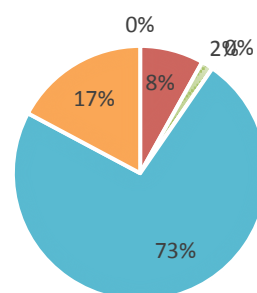
SHARE OF FUELS IN THE FINAL ENERGY CONSUMPTION IN THE RESIDENTIAL SECTOR (2015)

■ Solid fuels ■ Petroleum products
 ■ Gas ■ Derived heat
 ■ Renewable energies ■ Electrical energy



SHARE OF FUELS IN FINAL ENERGY CONSUMPTION - RESIDENTIAL SPACE HEATING (2015)

■ Solid fuels ■ Petroleum products
 ■ Gas ■ Derived heat
 ■ Renewable energies and waste ■ Electricity



FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015)

2.851 MWh

ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

Portugal imports 100% of the fossil fuels (oil, gas, coal) consumed in the country (77% of the country's primary energy needs in 2014). Oil is the main energy resource used in Portugal. Galp Energia is the main Portuguese company in the oil and gas sector, created on 22 April 1999 as part of the restructuring of the Portuguese energy sector. It conducts exploration activities in Brazil, Angola and Mozambique. It is the only refiner in Portugal.

Galp Energia imports natural gas (from Algeria and Nigeria) and sells it in Spain and Portugal. Portugal trades a lot of electricity with Spain, which is its privileged partner. Galp Energia has 175 MW of power plants (co-generation and wind turbines). Natural gas is the second largest source of primary energy used in Portugal. Two of the power plants operate from natural gas. The gas transmission and storage infrastructure is managed by REN (Redes Energéticas Nacionais), which also operates the electricity transmission network. REN manages the overall management of Portugal's public electricity supply system. The operator of electricity production and distribution is EDP (Energias de Portugal). Coal is the third source of primary energy used in Portugal. Coal production in Portugal ceased in 1995. Coal is almost exclusively used for electricity generation.

The national production is exclusively composed of renewable energies (biomass and waste account for more than half of the production, and followed by hydroelectricity, geothermal, solar, wind). The development of RES is done in order to reach the environmental objectives set by the European Union and in order to reduce the Portuguese energy expenditure and dependence on imports. Portugal's growth in renewable energy has been particularly important in recent years in terms of its electricity consumption, particularly since 2005 and the implementation of a governmental program promoting the development of RES. In 2014, RES accounted for 52.1% of the country's electricity mix.

Wind energy is a very important source of energy in Portugal: wind power covered 23.3% of the country's electricity consumption over the period from mid-2016 to mid-2017. This rate places the country in 3rd place in Europe, behind Denmark and Ireland.

The geographical situation of Portugal can be seen as a limit to its energy development. Indeed, it can export its surplus renewable energy or establish interconnections to another electricity network only with Spain.

Particular socio-material aspects that influence energy consumption

The Portuguese have an important use of air conditioning systems in summer. This is an issue that raises questions in the development of energy policy, especially on the wind issue. Indeed, due to the Portuguese climate, the wind turbine produces mainly in winter, during the night period. However, the use of air conditioners leads to high demand in the summer in the daytime.

Current Trends in Energy Policy

Portugal's significant development in wind power finds its limits in the unpredictable intermittency of production. To compensate for this this limit, Portugal wants to develop the hydroelectric potential, particularly through the construction of several reservoirs and pumped-storage plants. Since 2007, Portugal has been developing the largest hydro-power project in Europe in the last 25 years. But

the construction of new dams provokes a mobilization of opponents because of the environmental and patrimonial consequences.

For the first time in the world, one country – Portugal, operated only with electricity from renewables for 4 consecutive days, at the beginning of May 2016. For 107 hours between May 7 and 11, the electricity needs of Portuguese citizens have been covered only by RES: wind, solar and hydro-power. In March 2018, for 139 hours (almost 6 days) Portuguese electricity consumption was entirely provided by RES. During this period, the renewable production was greater than the consumption 60% of the time, but was therefore less than the same consumption 40% of the time. Over the whole month of March, the total production of electricity from renewable sources exceeded the needs of the country. But, in fact, with a highly variable wind and the difficulty of storing energy, a complement of fossil fuels was needed (coal and natural gas mainly) to meet the consumption punctually. By 2040, Portugal hopes to guarantee the country's annual electricity production through renewable energy while reducing greenhouse gas emissions. Nevertheless, they depend largely on weather conditions, and the constant increase in household demand complicates this ambition.

Trends in national campaigns

To encourage the establishment of wind turbines, a government measure has been implemented: the incentive of municipalities that receive 2.5% of the price of electricity paid to wind farms located in their territory. This has greatly contributed to promoting the acceptability of wind power and making municipalities active partners in wind projects. Although there are oppositions against the introduction of new wind turbines, the Portuguese population is largely in favour of wind development, contrary to other European countries. From 2001 to 2004, the Ministry of the Environment amended the Environmental Impact Assessment Regulations several times in order to facilitate and speed up procedures for granting permits to build wind farms.

Transport is Portugal's largest end-use energy sector, and its emissions are expected to continue to grow. Vehicle taxation based on CO2 emissions and scrappage schemes have created strong incentives to use more fuel-efficient vehicles. However, the increase in road traffic cancels the progress made in terms of fuel consumption, and does not take into account the energy needed to recycle cars "to scrap" and to create more fuel-efficient vehicles. Campaigns from various stakeholders are focusing mostly on renewables and energy efficiency. Portugal's specifics compared to some of the other countries is that high number of campaigns either for RES or EE are targeting whole families or even communities.












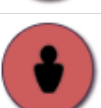



OVERVIEW OF NATIONAL SECIS
















Below please find a list of Portuguese 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.

CLEAR Consumers to Learn about, Engage with and Adopt Renewable energy technologies



Changes in Individuals' Behaviour

About EnergizAIR The renewable energy weather forecast - Europe		Changes in Technology
Euro-Topten Act (Topten.pt)		Changes in Individuals' Behaviour
iBROAD : Individual Building (Renovation) Roadmaps		Changes in Technology
EcoCasa		Changes in Individuals' Behaviour
EcoConsumo		Changes in Individuals' Behaviour
Conversas com Ambiente & EcoFamílias da Póvoa (conversations with the environment and EcoFamilies from Povoá)		Changes in Individuals' Behaviour
Ecosave		Changes in Individuals' Behaviour
Ecofamilias		Changes in Individuals' Behaviour
EcoFamílias - Água		Changes in Individuals' Behaviour
Ecological families from Oeiras		Changes in Individuals' Behaviour
Planet Me°		Changes in Individuals' Behaviour
EcoBrigadas		Changes in Individuals' Behaviour
Energy, Education, Governance and Schools. A European school panel for involving local communities in energy efficiency programs (EGS)		Changes in Complex Interactions
Coopernico		Changes in Complex Interactions
Energy-Conscious HOuseholds in ACTION (ECHO ACTION)		Changes in Complex Interactions

ENERGY SELF SUPPLY IN RURAL COMMUNITIES (ENSRC)		Changes in Technology
European Young Energy Manager Championship (EYEMAN CHAMPIONSHIP)		Changes in Individuals' Behaviour
Ecocomunidades (eco communities)		Changes in Complex Interactions
Tamera, sustainable community		Changes in Complex Interactions
Persuasive force of children through education (FEEDU)		Changes in Individuals' Behaviour
European Smart Metering Alliance (ESMA)		Changes in Technology
Common appliance policy – All for one, One for all – Energy Labels (COMEON LABELS)		Changes in Individuals' Behaviour
Eco n' Home or how to reduce energy consumption in Household (ECO N' HOME)		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)		Changes in Technology
TRENDY TRAVEL; Emotions for sustainable transport (TRENDY TRAVEL)		Changes in Everyday Life Situations
Promotion of energy efficient appliances (PROMOTION 3E)		Changes in Individuals' Behaviour
Pattern of Energy Efficiency in the Schools (P.E.E.S.)		Changes in Everyday Life Situations
Residential Monitoring to Decrease Energy Use and Carbon Emissions in Europe (REMODECE)		Changes in Individuals' Behaviour
Campanha ON-OFF		Changes in Individuals' Behaviour

‘GOOD PRACTICE’ EXAMPLE OF PORTUGUESE SECI



Ecocomunidades, Iniciativas de Transição para Sociedades Sustentáveis.

Description

The project Ecocomunidades was developed by an organisation called Zero, Associação Sistema Terrestre Sustentável. Households are large contributors to GHG emissions, are large consumers, and at the same time are vulnerable to changes if different models of development towards transition to a low carbon human ecosystem will not be adopted, the project was initiated.

Contextualization

The Zero association was born because a big group of people felt they needed to do something to change the development path and that sustainability has to be achieved also by the communities themselves.

Aims and objectives

The central objective is to promote lifestyle compatible with the post-carbon society, by interventions in various areas. The goal is to reduce GHG emissions, to improve the efficiency of resource consumption in all sectors and to promote incentives to changes in everyday habits.

- Promotion of reductions of consumption and energy efficiency in households; promotion of investments (collective and individual) in renewable energies, stimulating micro generation and self-consumption
- Promotion of sustainable mobility, through daily public/collective transport use, non-motorized transport options and progressive substitution from vehicles running on fossil fuels to electrical vehicles
- Water use reduction and re-utilization of waste water.
- Stimulate transition from a linear model, based on assumptions of abundance of resources (extraction – production – consumption – discard) to a circular model, which favours reduction, re-utilization, repair, recycling of materials and existing products.
- Stimulating practices aiming to reduce waste and raise recycling rates (bio waste as a main category) through education for sustainable consumption
- Raise awareness for the need for reconciliation between human diet and a type of agriculture which copies and optimizes natural ecological processes (balanced diet, short supply chains, localization)

Methods for Intervention

The concept is set to test a hypo-carbonic strategy in small local communities – ecocomunidades, on the level of municipalities or inter-municipal communities, with the vision to replicate the practices on wider society. All this by promoting a set of practices and everyday behavioural patterns with important impacts; followed and monitored, focused on reduction and prevention of consumption and efficiency in resource use. The users/target groups are Portuguese municipalities, trans-municipal communities, companies, which want to raise awareness between their employees and customers, in the framework of social responsibility.

Steps of implementation

Along the period of 3 years the interaction with citizens/families, connected in ecocommunities, will be constant. Through the interaction with communities different integrated and connected initiatives will be developed, in order to promote and sensitise for adoption of low carbon lifestyles within the logic “think global, act local”. The result will be a local strategy, which will be adaptable to the national level.

The role of the households

Adoption of practices promoted by the project, cooperation in shaping the strategies.

Location

Portuguese municipalities and trans-municipal communities, eco-communities.

Textual and communicative aspects of initiative

The energy consumption is framed as a problem within the wider need for change (resource use, GHG emissions, and inequalities). The practices are being taken from actual communities connected already and aimed in wider application.

The problem is tackled on a community level/ municipal level and from bottom up practices taken to national / policy level. The institutions are being understood as potential facilitators of the transition towards low carbon society.

It is not focusing on individual actions but instead on community level actions.

The physical/technological aspects of the initiative

The initiative includes technological aspect, as it promotes use of RES technologies for energy production and electricity self-consumption, substitution of vehicles running on fossil fuels to electrical vehicles. In that way it introduces new technologies to the target group and in some aspects substitutes existing ones.

Shared understandings related to initiative

Shared understanding is related to initiatives’ central objective, which is to promote lifestyles compatible with the post-carbon society. Understanding of these lifestyles should be at least similar, if not same, by majority of the included actors and individuals.

CONCLUDING REMARKS AND POLICY IMPLICATIONS

Trends in Portuguese energy policy go in the direction of developing the RES sector, especially in terms of electricity generation. Currently, Portugal imports all of its fossil fuel consumption. But on the other hand they generate big amounts of electricity from RES. Their policy goes in the direction that in 2040 Portugal hopes to guarantee the country's annual electricity generation with RES. SECI is in a way following this path, although the initiatives are focusing more on energy efficiency aspect than on RES.

Identified SECIs are in a big majority at least partly refer to the particular socio-material aspect of energy use in Portugal, that is high energy use for air-conditioning systems in the summer. Energy efficiency is one of the better represented topics in the initiatives. What is also specific for Portugal and the identified SECIs, is that more than half of them include the term 'eco' in their name and are referring not only to the energy topic, but are trying to integrate a more holistic approach to sustainable development in their objectives and activities. Apart from that, there are some SECIs that are dealing also with renewables and with sustainable mobility.

Majority of the identified SECIs are focused on changes in individual's behaviour (19), 5 of the SECIs on changes in technology and the same number of initiatives on changes in complex interactions, while 2 of them are focused on changes in everyday life situations. Many SECIs work at a cross-national level (18), while the national (7) and local (6) level actions account for less than half of identified initiatives.

Governmental programs are rather scarce, an important part of the action comes from EU projects and initiatives by the local NGOs. Actions are mostly not targeted to specific socio-demographic groups or are targeting families and whole communities. Some rare initiatives are targeting students and schools.

The highlighted SECI is focusing on community and initiatives and wants to guide them in sustainable development pathway. While targeting whole communities, its objective is to change everyday habits, not only regarding individual's energy use, but also regarding sustainable mobility, water use reduction, circular economy, reducing waste and dietary habits. Most important lesson of the initiative is that it encompasses a long term engagement of individuals and communities, because it's goal is to have long-lasting impacts on change. Apart from that, and this can be regarded as a relevant input for policy-making, the SECI is framing energy use as a problem within the wider need for change (resource use, GHG emissions, inequalities) and is framing the solutions in the same way – not focusing only on energy, but having in mind the broader picture, it also includes other aspects. The selected good practice example shows how to tackle problems on community or municipal level and how to understand (and include) institutions as potential facilitators of the transition towards low carbon society.

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Galp Energia: <https://www.galp.com/en/>

Redes Energéticas Nacionais: <http://www.ren.pt/en-GB>

<http://zero.org/projetos/ecocomunidades/>