ENERGISE

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

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Lead parties for deliverable: AAU

Deliverable 2.5 authors: Charlotte Jensen, Inge Røpke (AAU), Gary Goggins,

Frances Fahy, Eimear Heaslip (NUIG), Marko Hajdinjak, Desislava Asenova (ARC Fund), Mathias Claeys Bouuaert, Tomislav Tkalec, Lidija Živčič, Renda Bellmallem, Kristjan Čoklc, Camille Gomes (FOCUS), Edina Vadovics, Kristóf Vadovics, Jozsef Slezak, Gergő Horváth, Szandra Szomor (GDI), Marfuga Iskandarova, Audley Genus (KU), Eoin Grealis, Annika Musch, Henrike Rau (LMU), Eva Heiskanen, Senja Laakso, Jari Kolehmainen, Eeva-Lotta Apajalathi (UH), Julia Backhaus (UM), Laure

Dobigny, Marlyne Sahakian (UNIGE).

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ENERGISE partners	Logo
National University of Ireland, Galway (NUIG), University Road, Galway, Ireland	OÉ Gaillimh NUI Galway
Aalborg Universitet (AAU), Fredrik Bajers Vej 5, Aalborg 9220, Denmark	AALBORG UNIVERSITY DENMARK
Kingston University Higher Education Corporation (Kingston), River House High Street 53-57, Kingston Upon Thames KT1 1LQ, United Kingdom	Kingston University London
Universiteit Maastricht (UM), Minderbroedersberg 4-6, Maastricht 6200 MD, Netherlands	Maastricht University
Université de Genève (UNIGE), 24 rue du Général-Dufour, 1211 Genève 4, Switzerland	UNIVERSITÉ DE GENÈVE
GreenDependent Institute (GDI), Eva utca 4, Godollo 2100, Hungary	grEndependent Institute
Ludwig-Maximilians-Universitaet Muenchen (LMU Muenchen), Geschwister-Scholl-Platz 1, Muenchen 80539, Germany	LUDWIG MARAHILIANS UNICERENTAT MÜNCHEN
Focus Drustvo Za Sonaraven Razvoj (FOCUS), Maurerjeva Ulica 7, Ljubljana 1000, Slovenia	focus Poder 2 Schwarzen (2011)
Applied Research and Communications Fund (ARC Fund), Alexander Zhendov Street 5, Sofia 1113, Bulgaria	ARC FUND -====
Helsingin Yliopisto (UH), Yliopistonkatu 4, Helsingin Yliopisto 00014, Finland	HELSINGIN YLIOPISTO HELSINGFORS UNIVERSITET UNIVERSITY OF HELSINKI



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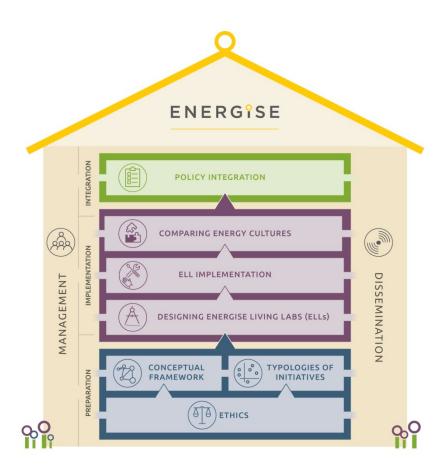
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ENERGISE PROJECT

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.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) 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:

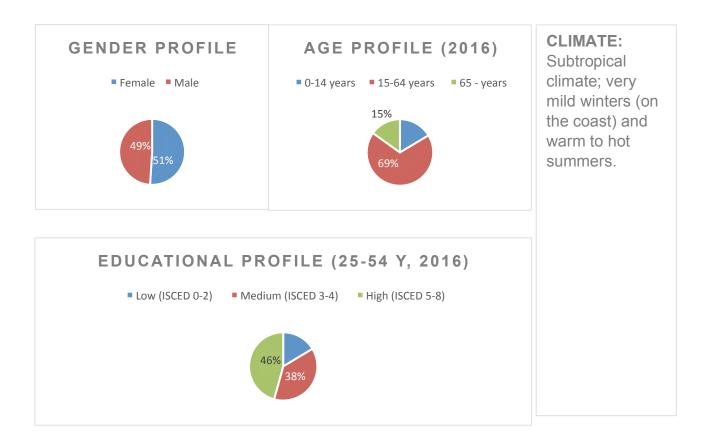
https://www.unitjuggler.com/convert-energy-from-toe-to-MWh.html?val=893.9

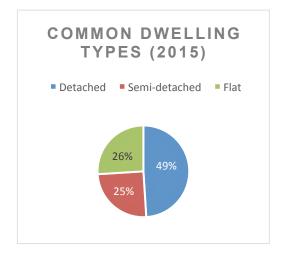


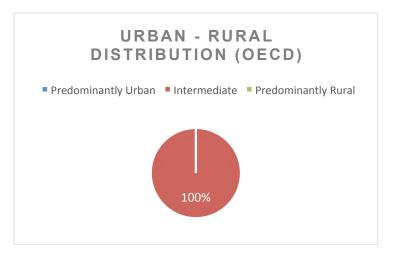
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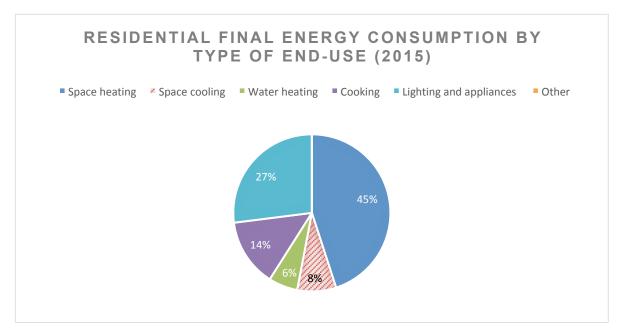
DEMOGRAPHY, ENERGY CONSUMPTION AND ENERGY SUPPLY

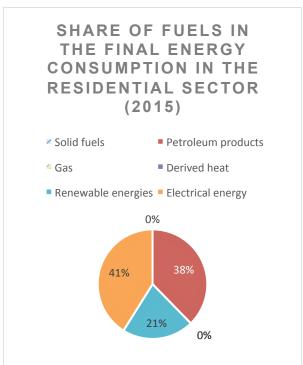












FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS, PR CAPITA (2015)

4.350 MWh



ENERGY SYSTEM AND ENERGY POLICY TRENDS

Energy system

Cyprus has an isolated energy system with no electrical or natural gas interconnections with other countries. Besides renewables, the country is not producing any primary sources of energy. The dominant source of energy in all sectors are imported petroleum products. Around 91.6% of generated electricity is produced from imported petroleum products. This makes Cyprus one of the most vulnerable countries in the EU in terms of energy dependency and security of energy supply.

The electricity market of Cyprus is dominated by the state-owned Electricity Authority of Cyprus (EAC), which is in 2018 still the sole generator, and supplier of electricity. The process of liberalisation of electricity market started in 2004 after the EU accession – first for certain categories of industry consumers. By 2014, all consumers obtained the right to choose their electricity supplier. However, the EAC remains the only supplier of electricity since no other company has entered the electricity market yet.

The natural gas market is regulated by the Cyprus Energy Regulation Authority (CERA). It is expected that the current monopoly of the state-controlled Natural Gas Public Company (NGPC) in the supply of natural gas will continue in the next few years. NGPC is responsible for the internal gas market and network development. It is in charge of the import, storage, distribution, transmission, supply and trading of natural gas and the management of the distribution and supply system of natural gas in Cyprus.

By 2020, Cyprus aims to satisfy 13% of its national energy needs through renewable sources. In order to achieve this, in 2010 the government prepared a National Renewable Energy Action Plan according to which 16% of electricity should be produced by renewables in order to meet the 13% objective in the entire energy system in Cyprus. By the end of 2015, the country was on the right track towards achieving this objective with 8% of total electricity generation coming from renewable energy sources including biomass/biogas, wind power, solar photovoltaics and concentrated solar thermal power.²

Particular socio-material aspects that influence energy consumption

Fuel poverty is claimed to be a serious issue in Cyprus. In order to address this issue, a Ministerial Decree introduced measures such as reduced prices on electricity tariffs, financial incentives for participating in a plan for installing a photovoltaic system at houses and grants for upgrading the energy efficiency of houses.³

Another issue is the poor thermal performance of the typical Cypriot houses. A survey from 2016

³ European Commission (2015). Commission Staff Working Document. Country Factsheet Cyprus. Available at: http://data.consilium.europa.eu/doc/document/ST-14015-2015-ADD-7/en/pdf



² Aloupa, Ch. and Damianos, M. (2018). *Energy 2018. Cyprus*. Available at: https://www.globallegalinsights.com/practice-areas/energy-laws-and-regulations/cyprus

Cyprus Energy Regulatory Authority, CERA (2015). *Electricity Prices in Cyprus. Regulatory Measures in Relation to Electricity Prices*. Available at: https://www.cera.org.cy/Templates/00001/data/raek/omilies-parousiaseis2015/2015/_04-parousiasi.pdf
Zachariadis, T. and Hadjikyriakou, C. (2016). *Social Costs and Benefits of Renewable Electricty Generation in Cyprus*. Available at: http://www.ec.gov.cy/environment/environment.nsf/All/1F2ED18A1C2E7651C225802B001B84FD/\$file/%CE%9A%CE%BF%CE%B9%CE%B9%CE%B9%CE%B9%CE%BA%CE%AC%20%CE%BA%CF%8C%CF%83%CF%84%CE%B7%20%CE%BA%CE%B1%CE%B9%20%CF%89%CF%86%CE%AD%CE%BB%CE%B7%20%CE%B1%CF%80%CF%86%20%CF%84%CE%B7%CE%BD%20%CF%80%CE%B1%CF%81%CE%B7%CE%BD%20%CF%81%CE%BD%CE%B5%CE%B5%CE%B1%CF%81%CE%BD%CE%B5%CE%B5%CE%B5%CE%BA%CF%81%CE%B9%CF%81%CE%B9%CF%83%CE%B6%CF%81%CE%BF%CF%81%CE%B9%CF%85%20%CE%B7%CE%BD%20%CE%BA%CF%81%CE%B9%CF%81%CE%B9%CF%81%CE%B9%CF%81%CE%B9%CF%81%CE%B9%CF%81%CE%BF%CF%81%CE%B9%CF%81%CE%B9%CF%81%CE%BF%CF%81%CE%B9%CF%81%CE%BF%C

found that due to lack of heating or air conditioning, 80% of participants feel cold in winter and 87% feel hot in summer in their homes. 4 However, another source claims that the installation of air conditioners and home electric appliances have increased in the recent years, considerably increasing the electricity consumption of households. At the same time, the share of renewables mainly solar thermal water heaters - has gone up as well.⁵ In 2017, Cyprus became one of the highest users per capita in the world of solar water heaters in households, with over 90% of households equipped with solar water heaters.⁶

In 2012, Cypriot households paid among the highest electricity prices in Europe - 29.09 Euro cents per kilowatt-hour. By 2017, the price decreased to 18.63 Euro cents per kilowatt-hour. The reason behind this decrease are CERA regulatory decisions that led to reduction of the final electricity bill removing the extra charge on the final bill of the consumers, recalculating the fuel adjustment clause, and reducing fuel prices.

Current Trends in Energy Policy

Cyprus makes efforts to introduce smart grids in the national network in order to tackle the energy related obstacles the country is facing - lack of interconnections to the trans-European electricity networks, limitations to the amount of intermittent renewable energy that can be connected to the electricity system, lack of renewable energy sources installations with storage capacity. The country looks for projects that could facilitate energy storage and ventures that have production on a 24hour basis.

Smart meters have already been installed in selected public buildings in order to collect more and precise data for buildings that will be renovated through public funds or through energy performance contracting. The aim is to equip all public buildings with smart meters by 2020.8

The Joint Research Centre of the EC for Smart Electricity Systems and Interoperability along with the EC's Structural Reform Support Service and DG Energy support Cypriot government to establish a comprehensive policy for the inclusion of renewable energy in the electricity system. Two projects are carried out in order to achieve this goal. The first one aims to assess the current state of the transmission and distribution electricity systems and to propose solutions for increasing the RES penetration in the electricity system. The second project is a continuation of the first one and aims to complement its system analyses and to conduct more detailed evaluations on the power distribution system performance and regulations.9

Gross energy efficiency index of households in Cyprus has improved by 32% for the period 2000 to 2013. The main reason is the accession to the EU that has led to introduction of policies and measures in energy efficiency resulting in energy savings. Energy savings were also generated through the introduction of efficient electrical appliances, free compact fluorescent (CFL) lamps and solar water heaters. 10

Ministry of Energy, Commerce, Industry and Tourism (2015). Energy Efficiency Trends and Policies in Cyprus.



⁴ Ozdenefe, M. and Dewsbury, J. (2016). 'Thermal performance of a typical residential Cyprus building with phase change materials.' Engineering Research Technology, Services Vol. 37 http://journals.sagepub.com/doi/pdf/10.1177/0143624415603004

Ministry of Energy, Commerce, Industry and Tourism (2015). Energy Efficiency Trends and Policies in Cyprus. Available at: http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-cyprus.pdf

East Med Energy Centre (2017). Available at: http://www.cyprusprofile.com/en/sectors/energy-and-environment

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⁹ EC Joint Research Centre (2017). The Cyprus Power System and Market Changes. Available at: https://ses.jrc.ec.europa.eu/cypruspower-system-and-market-changes

Trends in national campaigns

In 2013, the Cypriot government announced and implemented support schemes promoting electricity generation using RES. One of the schemes provides state grants to vulnerable households for installing 2,000 photovoltaic systems of 3kW each and their connection to the grid via net metering. Households' electricity bills were calculated by deducting the electricity generated by their photovoltaic systems from their overall electricity consumption. Thus, each participating household saved 80% of its electricity bill. Another scheme of installing additional 3,000 photovoltaic systems of 3kW each (but without a grant) was also implemented in 2013. Similar support schemes for the installation of photovoltaic systems for vulnerable households as well as for commercial or industrial units were announced and implemented in 2014.¹¹

Another campaign related to households achieving energy savings was promoted and subsidised by the Cypriot government and included the free distribution of 1.5 million CFL lamps with the payment of the utility bill. There were also governmental financial support schemes for energy efficiency improvements in existing dwellings including thermal insulation, double-glazing, solar thermal water heaters and geothermal heat pumps. 12

With regard to the public sector, a governmental policy of appointing Energy Saving Officers in each building that is used for services of the public sector was implemented. The role of those officers is to ensure that energy-saving measures are implemented in the buildings. They are also responsible for preparing annual Report on Energy Consumption and Actions related to their building. Special trainings for ES Officers are organised on annual basis by the Energy Department. Furthermore, officers of the Energy Institute and the Energy Department organise inspections in buildings and provide advice on energy saving. If needed, they also make presentations on energy savings and renewable energy sources. 13

OVERVIEW OF NATIONAL SECIS

Below please find a list of Cyprus 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.

FIESTA	-	Changes in Technology
ELIH MED - A Euro-Mediterranean Program to Fight Energy Poverty	3	Changes in Technology
SAVES2: Students Achieving Valuable Energy Savings 2	•	Changes in Individuals' Behaviour

¹¹ Aloupa, Ch. and Damianos, M. (2018). Energy 2018. Cyprus.

Ministry of Energy, Commerce, Industry and Tourism (2015). Energy Efficiency Trends and Policies in Cyprus.



¹² Cyprus Institute of Energy (2012). Energy Efficiency Policies and Measures in Cyprus. Available at: http://ktisis.cut.ac.cy/bitstream/10488/4339/2/cyprus_nr.pdf

ERACOBUILD - Countdown to Low Carbon Homes	Changes in Technology
ActiveAccess	Changes in everyday Life Situations
T.aT Today and Tomorrow "Students Today Citizen Tomorrow" (T.AT.)	Changes in Individuals' Behaviour
Students Achieving Valuable Energy Savings (SAVES)	Changes in Individuals' Behaviour
EURONET 50/50 MAX	Changes in Individuals' Behaviour
Eco Village - Tris Elies	Changes in Complex Interactions
SCORE- Sustainable Construction in Rural and Fragile Areas for EE	Changes in Technology
High energy efficiency schools in Mediterranean Area (TEENERGY SCHOOLS)	Changes in Individuals' Behaviour
preserVe tradItiOnal buiLdings through Energy reducTion - VIOLET	Changes in Technology
A Focussed Strategy for Enabling European Farmers to Tap into Biogas Opportunities (GERONIMO II-BIOGAS)	Changes in Technology
SMILEGOV project	Changes in Complex Interactions



'GOOD PRACTICE' EXAMPLE OF CYPRUS SECI

Eco Village "Tris Elies"



Brief Description

Ecovillage Tris Elies (which means three olive trees) is a small but growing community of people wishing to take responsibility for their own well-being and to live respectfully towards nature and one another. It was established in 2015. The community is based on the principle of self-sustainability, and its daily life is carried out creatively and with minimal impact on the environment. It is located in the Troodos mountains in Cyprus along the terraced hillsides on the "Dragon" river. Village has few full time residents, but many regular visitors come to engage with them in activities such as restoration of overgrown fields and orchards, organic cultivation based on permaculture principles and educational events.

Brief Contextualization

The village of Tris Elies is located in beautiful mountainous region of Cyprus. The village is several hundred years old and consists primarily of traditional buildings. Over the past decades, it has been depopulated and now has only a few permanent inhabitants. In recent years, a small group of people brought new life to the place, creating a project that caters for a healthy and sustainable lifestyle. The group consists of individuals with knowledge and experience in diverse fields such as agriculture, tourism, education, biology, architecture, environmental engineering and business management. Links to the local community and its infrastructure are also vital to the success of this project.

Aims and objectives

The Tris Elies community is dedicated to natural, healthy living, and responsible use of nature and its resources. All activity in the village is based on principles of cooperation and sharing. The community tries to spread its messages and experiences to the wider community as well, educating the target population and promoting sustainable and environment-friendly lifestyle.

Methods for intervention

Tris Elies community strives to satisfy its needs for food, water, housing and energy in ways that respect the cycles of nature. This means that everyday life of community members should be led in a way that increases biodiversity and regenerates ecosystems, giving the people a chance to experience their interdependence with systems and cycles of nature. Sources of water need to be kept clean and regularly replenished. All food is locally grown through organic agriculture. Waste is treated as a valuable resource and used for composting or reused. Old, unused materials are recycled and put to new use (for example, old wooden planks and other pieces of wood were 100% recycled to make roadside signs, flower pots, waste bins and benches). The community is also trying to obtain as much as possible of the energy it uses from renewable sources. In all these activities, the community combines traditional heritage and knowledge with the wise use of



modern technology and resources. For example, soap, toothpaste, body cream, deodorant and similar are also made locally and from 100% organic products.

Results/outcomes

The experimental and innovative treatment of resources has produced numerous positive results and lessons that can be replicated in other eco-communities in Cyprus and other Mediterranean countries, and with some modification also elsewhere. The eco-community has brought life back to a village, which was practically abandoned, despite being located in a place brimming with life and blessed with clean water and rich soil. Tris Elies is a successful attempt to bring people back to a depopulated village, where nature is not exploited, but its resources are used responsibly and sustainably.

The role of the households

All households / members of the community must live and work according to the principles of the re-use, re-think and recycle philosophy, respecting the environment and natural resources, sharing them with all other living beings. Everyone in the village (resident or visitor) participates in the work and in decision-making. All households are expected to maintain the land, putting back as much as they take from it. While the original idea was developed by a very small group (3-4 people), now all members (over 30 people) actively participate in further developing the village, participating in different activities and bringing forth new ideas and approaches.

Volunteers and short time visitors are also welcome and can be accommodated in the village. In exchange, they need to engage in daily tasks like farming and gardening, dehydrating fruit, tending the animals (mostly chickens), cooking, cleaning and babysitting (there are some small children in the community).

Location

The village is located in the Troodos Mountains in central part of Cyprus.

Was/is the initiative successful?

It is difficult to assess a recent and ongoing initiative, which is not pursuing any quantifiable and measurable objectives. According to information on its websites, initiative can be definitely evaluated as successful, because its participants are managing to live as planned – in close contact with the nature and with minimum impact on environment, reusing and recycling resources and materials, and using energy (for lighting, cooking, cooling, washing, etc.) in a way that leaves behind the minimal carbon footprint.

Shared understandings related to initiative

There is a very strong sense of community and all households are very devoted towards the common objective – living sustainably and with full respect of the nature.



CONCLUDING REMARKS AND POLICY IMPLICATIONS

Although the overview of sustainable energy consumption initiatives (SECIs) in section 2 should not be regarded as comprehensive, it provides a good indication about the place of these initiatives in the national energy policy. Almost all initiatives were conducted as part of international projects funded by various EU programmes, and they predominantly focus on achieving energy savings through employment of technological solutions or changing the behaviour of individual consumers. This corresponds well with the national policies that strive towards improvement of poor thermal characteristics of typical Cypriot dwellings and introduction of measures that would harness the RES potential of the country – above all the use of solar and wind energy. A special attention has been given to vulnerable consumers, to whom grants for purchasing photovoltaic systems were provided.

Overall, it can be concluded that in general, the national policy trends and the implemented initiatives try to decrease the household energy consumption — especially energy produced from conventional sources, while increasing the use of renewable energy sources and of more energy-efficient heating and cooling systems (heating and cooling are responsible for over 50% of the final energy consumption in households). Some of the initiatives, for example FIESTA, ELIH-MED and SCORE focus on testing different cost-efficient technical solutions, sustainable construction techniques and innovative financial mechanisms for improving energy efficiency in households. Special attention is often given to vulnerable households and people residing in rural and socio-economically disadvantaged regions.

Another group of SECIs (SAVES, SAVES2, T.aT., EURONET 50/50, TEENERGY SCHOOLS) targets schools and universities, raising energy awareness of the school building users (children, staff, parents) and actively involves them in energy—saving measures. Some SECIs introduced a competitive element, engaging energy consumers (households, but also students residing in dormitories) in a competition for the most successful energy savers. A third significant group of SECIs has a goal to change mobility behaviour of Cypriots, encouraging them to use public transport and bicycles, or to walk on shorter distances, instead to use carbon-intensive means of transportation like private cars.

Finally, there are two SECIs, which experiment with different approaches to change complex interactions and that could serve as models for self-sustaining communities, able to live with a minimal impact on the environment. This is of crucial importance for the island countries with an isolated energy system and high dependence on imported carbon energy sources, such as Cyprus. In this sense, the example of Tris Elies might not be very representative and replicable on the wider European scale, but could be a very good model to follow in more specific settings – mountainous rural areas, island communities and socio-economically deprived regions with high rate of vulnerable consumers.



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