



POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part I - Understanding the phenomenon of Energy Poverty, concepts, and policies at national and European level

Eleni Kanellou (NTUA) and Julien Dijol (Housing Europe)
26th October 2022



This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 890437

Module 1 – Structure and content

-  Module goals
-  Module content
 -  PART I: Introduction to energy poverty
 -  PART II: The POWERPOOR project
-  Q&As and discussion
 -  Key takeaways
 -  Further reading

Module 1 – Goals

-  To familiarise the audience with the concept of **energy poverty**, existing policies to address the issue, and the current governance frameworks for energy initiatives at the EU and global levels
-  To present the **POWERPOOR approach** and introduce the role of energy supporters and mentors

PART I: Introduction to Energy Poverty

Concepts: Understanding Energy Poverty

Energy Poverty in the Global Agenda

Energy Poverty in Numbers

EU Energy Poverty Landscape

Key energy poverty alleviation policies at the EU level

"Adequate warmth, cooling, lighting and the energy to power appliances are essential services needed to guarantee a decent standard of living and citizens' health."

EU Energy Poverty Observatory, 2018
(www.energypoverty.eu)

Understanding Energy Poverty

Energy Poverty Concept

- ✓ Energy poverty is defined as a set of conditions where:

“individuals or households are not able to adequately **heat, cool, or provide other required energy services** in their homes at **affordable cost**” (1)

- ✓ Energy poverty is:

“the inability to realise essential capabilities as a direct or indirect result of **insufficient access to affordable, reliable and safe energy services**, and taking into account available reasonable alternative means of realising these capabilities” (2)

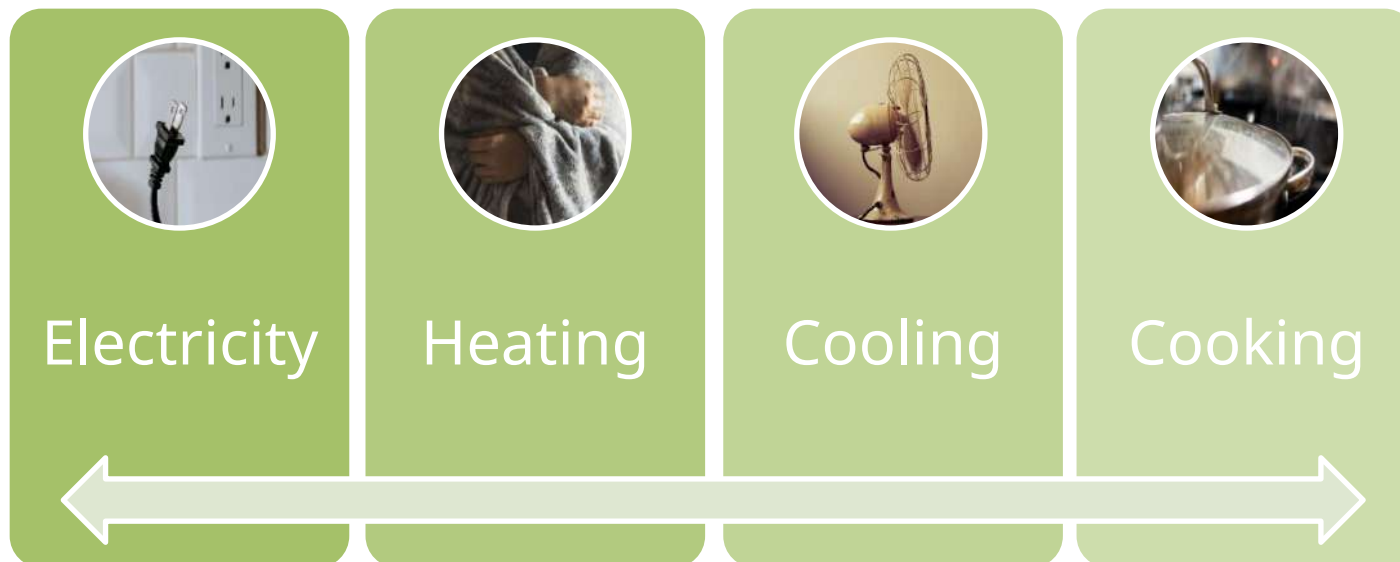
(1) Pye et al., 2015; Bouzarovski, 2018

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Energy poverty is often understood “as a situation where a household cannot meet its domestic energy needs”⁽¹⁾



Living in inadequately heated or cooled households negatively impacts human health and well-being. In addition, individuals who are unable to meet their basic energy needs are prevented from fully participating in society.

Understanding Energy Poverty

Energy Poverty in Europe – A complex challenge



Source: Energy Poverty in the European Union, YouTube: https://youtu.be/kT-lpCdd_WI

Understanding Energy Poverty

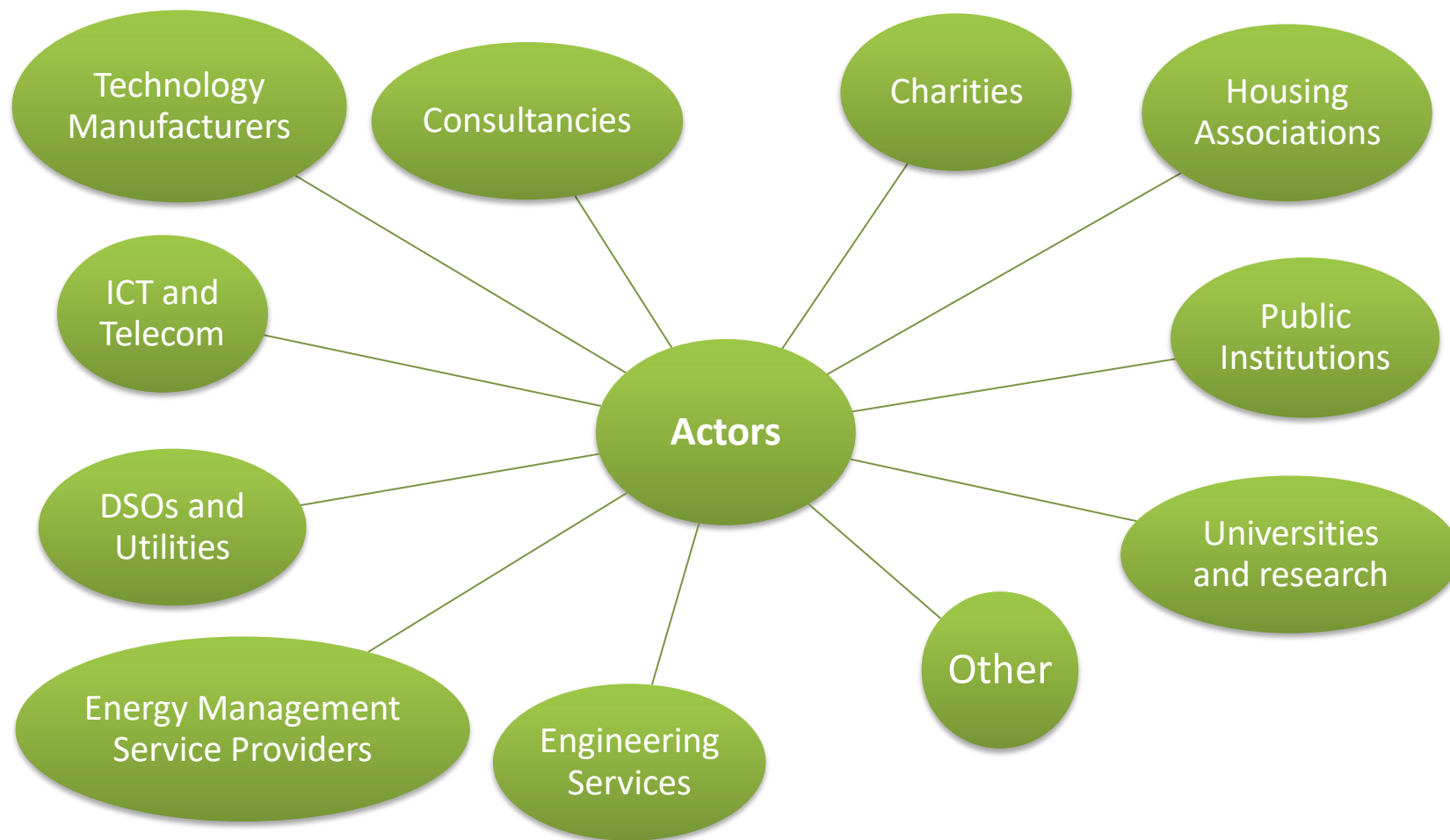
Energy Poverty in the Global Sustainability Agenda



Energy poverty is a serious concern which receives increasing attention in the global sustainability agenda. It is addressed in several international frameworks and platforms.

Understanding Energy Poverty

Key Actors in the Energy Poverty Landscape



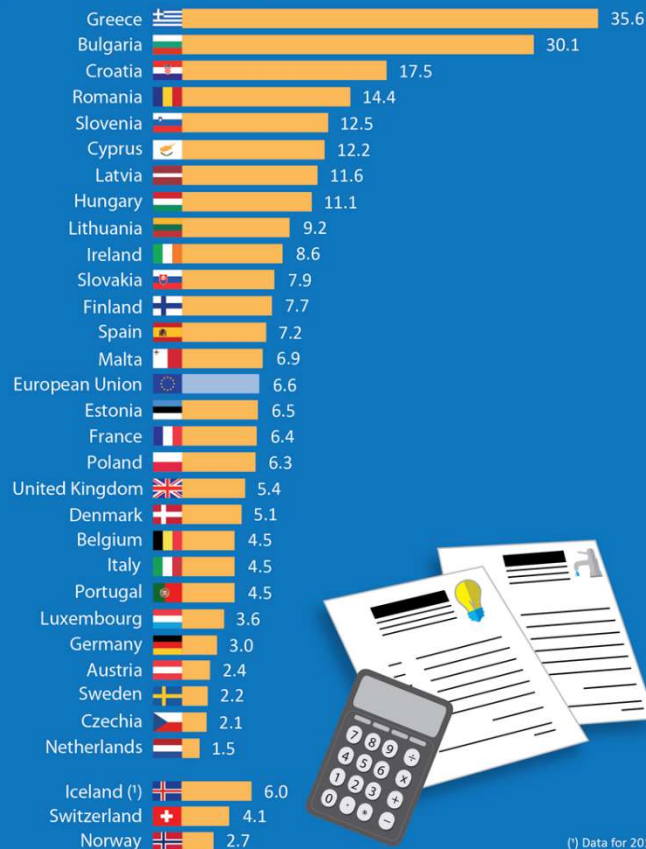
Source: JRC Science for Policy Report. "Energy poverty through the lens of EU research and innovation projects". (2019)

Energy poverty facts in Europe

People unable to pay utility bills on time and keep their homes warm

Households unable to pay utility bills on time in the past 12 months

(% of all households, 2018)



ec.europa.eu/eurostat

People unable to keep home adequately warm

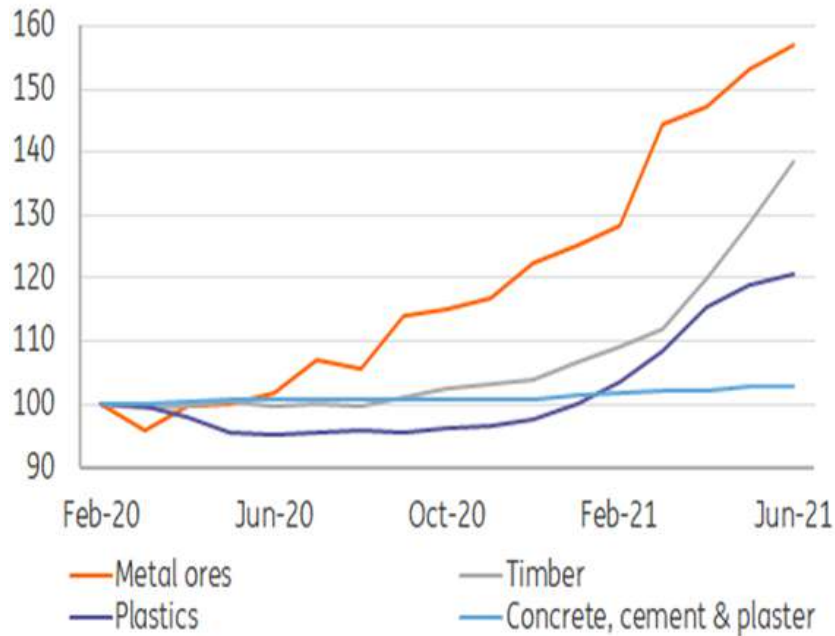
(as % of total population, 2019)



ec.europa.eu/eurostat

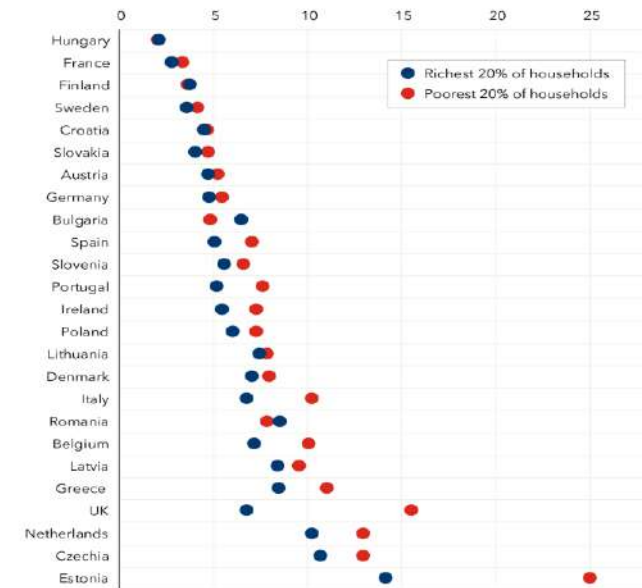


COST OF LIVING CRISIS : MATERIAL AND ENERGY PRICES



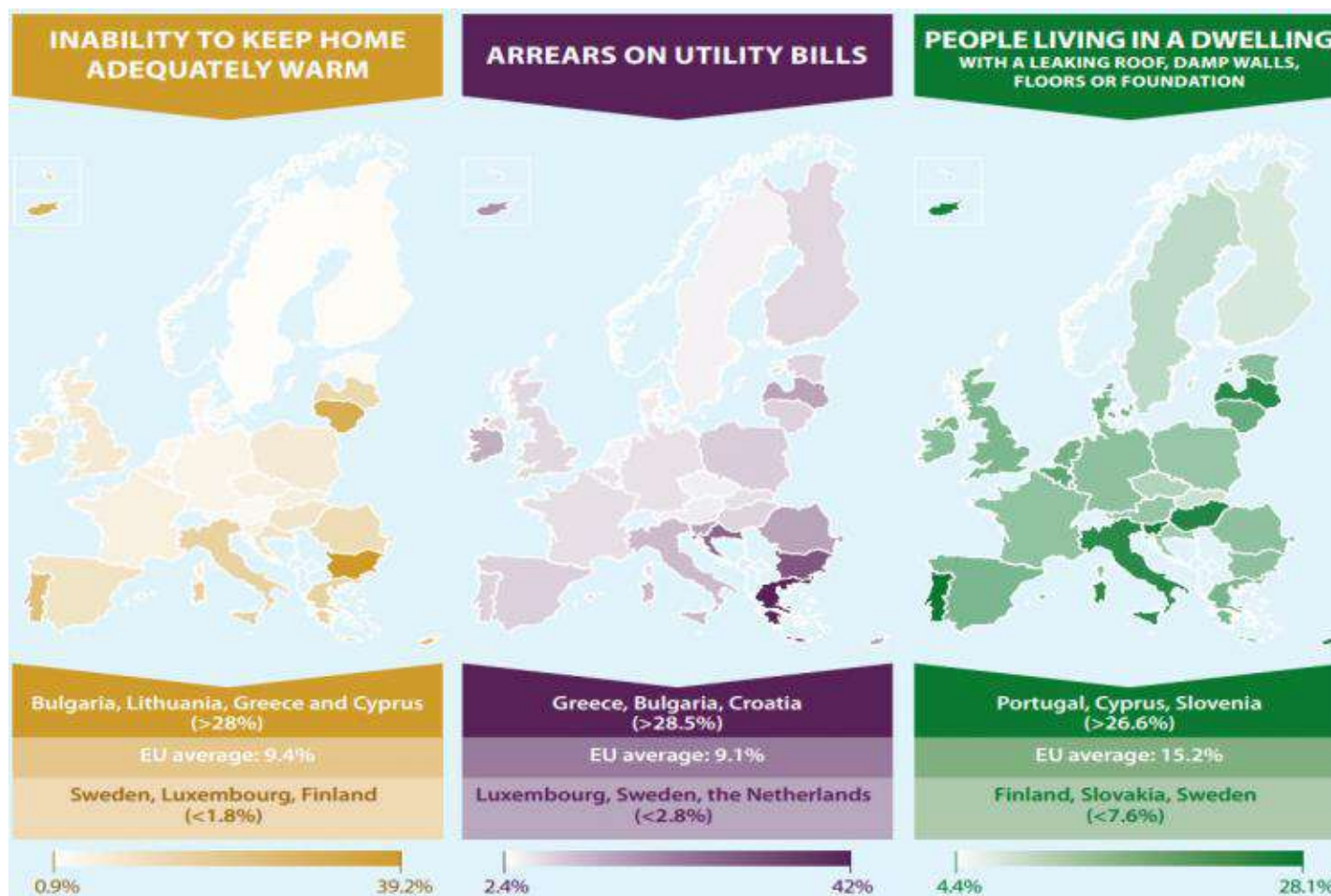
Poorest under pressure

The cost-of-living increase is larger for lower-income households.
(cost of living increase from higher energy prices, in percent of total household spending)



Sources: Bloomberg Finance L.P., Eurostat, and IMF staff estimates using CPAT.
Note: Price increases compare the current projected prices for 2022 based on May 2022 futures prices, with those based on January 2021 futures prices.

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Source: Eurostat, 2020

Energy poverty policy framework in Europe

The Energy Poverty Advisory Hub



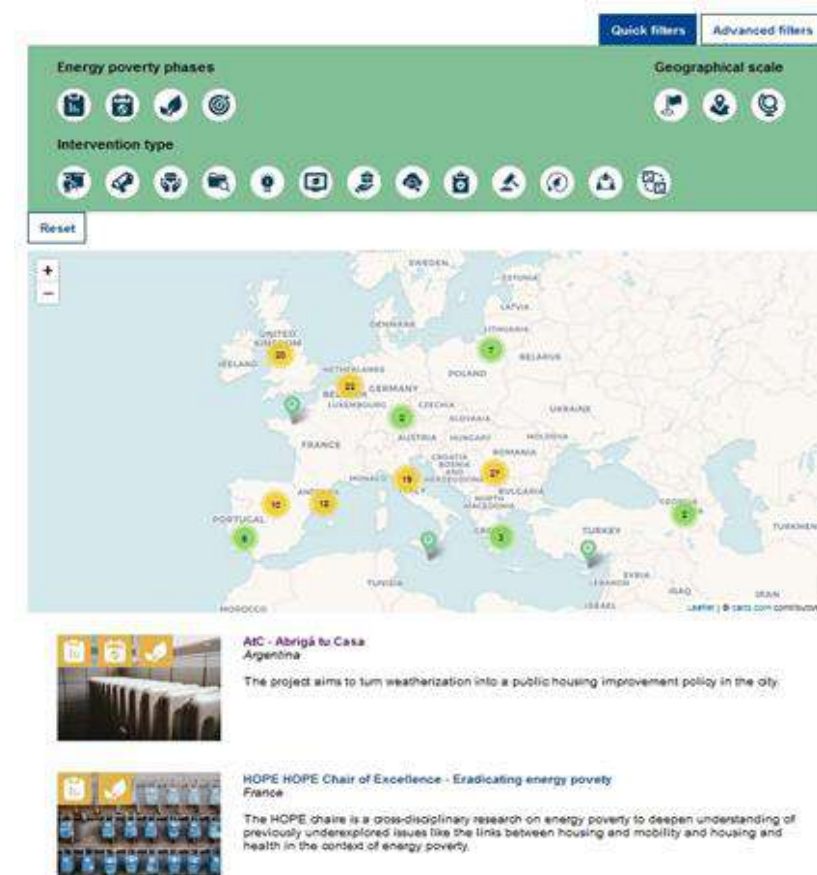
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		Pan-European
DESCRIPTION	The Energy Poverty Advisory Hub, the leading EU initiative run by the European Commission at the request of the European Parliament, is a collaborative network of stakeholders aiming to eradicate Energy Poverty and accelerate the just energy transition of European local governments	
Vision and Mission	Vision Eradicate energy poverty and accelerate the just energy transition of European local governments	
	Mission To be the center of energy poverty experience and expertise in Europe	
APPROACH	By providing direct support, online training, research to local authorities and civil society organisations & by building a collaborative network of all stakeholders interested in taking action to combat energy poverty in Europe.	

Source: EU Energy Poverty Observatory <https://www.energypoverty.eu/>

Energy poverty policy framework in Europe

The Energy Poverty Advisory Hub – Tools and Activities

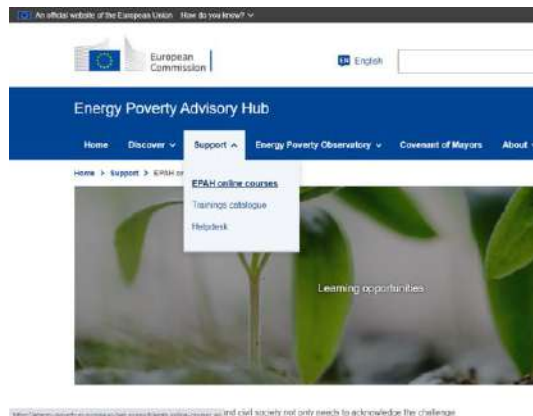
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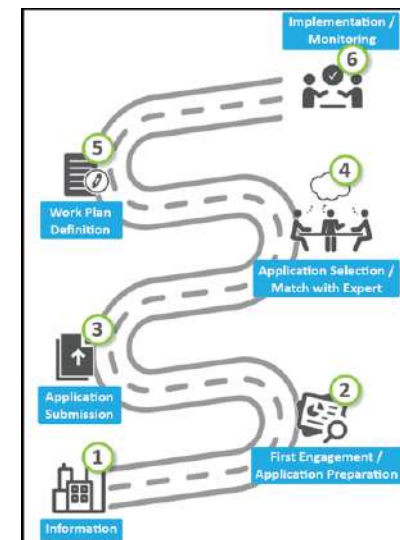
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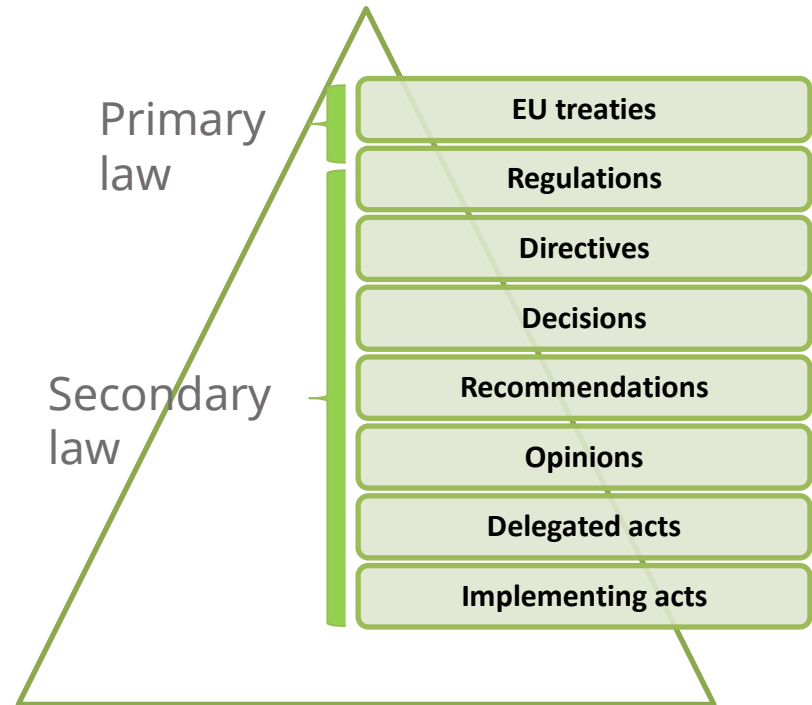
EU energy poverty alleviation policies

1. Types and categories of energy poverty alleviation policies

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- ✓ **Primary and secondary laws**
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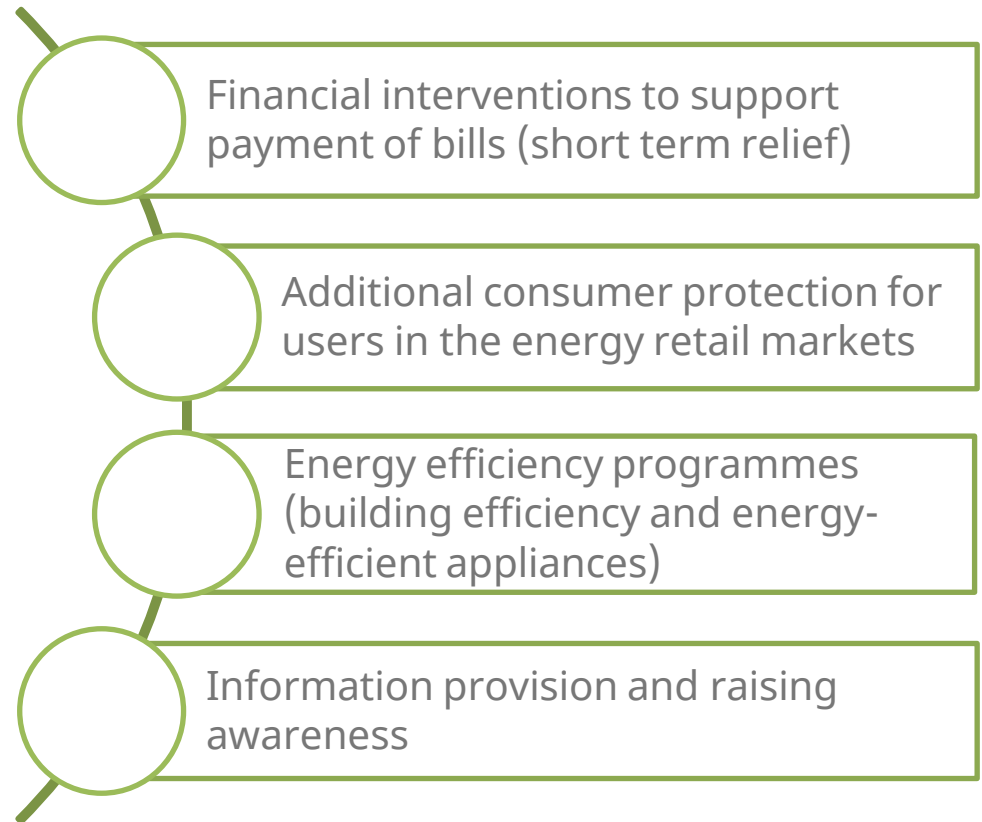


EU energy poverty alleviation policies

1. Types and categories of energy poverty alleviation policies

**Energy Poverty
Handbook (2016)**

**POLICIES are reflected
in different types of
measures**



EU energy poverty alleviation policies



Key stakeholders implementing policy measures on a national level in alignment with national and EU policy frameworks

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EU energy poverty alleviation policies

2. List of energy poverty alleviation policies at the EU level

Directive (EU) 2018/2002 on energy efficiency

“When designing the measures to fulfil energy saving objectives, Member States should take into account the need to **alleviate energy poverty** in accordance with criteria established by them, and they shall include information about the outcome of measures to alleviate energy poverty”

Directive (EU) 2018/844 on energy performance of buildings

“Member States must outline relevant national measures to help **alleviate energy poverty**, as part of their long-term renovation strategies to support the renovation of the national stock of residential and non-residential buildings”

Regulation (EU) 2018/1999. Governance of the Energy Union and Climate Action

“MS must include an objective of energy poverty alleviation in their National Energy and Climate Action Plans (NECPs)”

Source: <https://eur-lex.europa.eu/homepage.html>



EU energy poverty alleviation policies

2. List of energy poverty alleviation policies at the EU level

Directive (EU) 2019/944 Internal market for electricity

Policy plans and measures
to **alleviate energy**

poverty and ensure that
vulnerable consumers
have access to energy in
critical periods but no
definition

Article 29 Energy poverty

When assessing the
number of households in
energy poverty pursuant
to point (d) of Article 3(3)
of Regulation (EU)
2018/1999, Member States
shall establish and publish
a set of criteria, which may
include low income, high
expenditure of disposable
income on energy and

poor energy efficiency

Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources

Empowering jointly acting
renewables self-consumers
also provides opportunities for
renewable energy
communities to advance
energy efficiency at household
level and helps fight energy
poverty through reduced
consumption and lower supply
tariffs. Member States should
take appropriate advantage of
that opportunity by, inter alia,
assessing the possibility to
enable participation by
households that might
otherwise not be able to
participate, including
vulnerable consumers and
tenants.

Renovation Wave (Area of intervention 6)

“Using renovation as a
lever to address **energy**
poverty and access to
healthy housing for all
households (...). The
Commission will launch an
Affordable Housing
Initiative for 100
lighthouse project and will
examine whether and
how the EU budget
resources alongside EU
Emissions Trading System
(EU ETS) revenues could
be used to fund national
energy efficiency and
savings schemes.”

Source: <https://eur-lex.europa.eu/homepage.html>



EU energy poverty alleviation policies

2. Most recent developments at EU level

- ✓ July 2021 the EC announced its Fit for 55 package, designed to deliver 55% emissions reductions by 2030, tackle energy poverty and ultimately make Europe the “first carbon neutral continent by 2050”
- ✓ Including a new Social Climate Fund that will provide dedicated funding to Member States to support European citizens most affected or at risk of energy poverty.

EU energy poverty alleviation policies

2. Most recent developments at EU level

Energy efficiency Directive – article 8

Member States shall **establish and** achieve a **minimum** share of the required amount of cumulative end-use energy savings among people affected by energy poverty, **low-income households**, vulnerable customers and, where applicable, people living in social housing. This share shall at least equal the proportion of households in energy poverty as assessed in their National Energy and Climate Plan established in accordance with Article 3(3)(d) of the Governance Regulation 2018/1999. **Member States shall, in their assessment of the share of energy poverty in their National Energy and Climate Plans, consider the indicators referred to in points (a) to (bb) of this subparagraph.** If a Member State had not notified the share of households in energy poverty as assessed in their National Energy and Climate Plan, the share of the required amount of cumulative end-use energy savings among people affected by energy poverty, **low-income households**, vulnerable customers and, where applicable, people living in social housing, shall at least equal the arithmetic average share of the following indicators for the year 2019 or, if not available for 2019, for the linear extrapolation of their values for the last three years that are available:

a) Inability to keep home adequately warm

b) Arrears on utility bills; and

(ba) **total population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor**

(bb) **at-risk-of-poverty rate (Eurostat, SILC and ECHP surveys [ilc_li02]) (cutoff point: 60 % of median equivalised income after social transfers.**

EED article 22

Member States shall implement energy efficiency improvement measures and related consumer protection or information measures, in particular those set out in Article 21 and Article 8(3), as a priority among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing to alleviate energy poverty.

3. To support vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, Member States shall: a) implement energy efficiency improvement measures to mitigate distributional effects from other policies and measures, such as taxation measures implemented according to Article 9 of this Directive, or the application of emission trading in the buildings and transport sector according to the ETS Directive b) make the best possible use of public funding available at national and Union level, including, where applicable, the financial contribution Member State received from the Social Climate Fund and revenues from allowance auctions from emission trading pursuant to the EU ETS, for investments into energy efficiency improvement measures as priority actions

EU energy poverty alleviation policies

2. Most recent developments at EU level

Energy Performance of Buildings Directive (EPBD) article 9

Member States shall ensure that residential buildings and building units achieve at the latest

- (i) after 1 January 2030, at least energy performance class F; and
- (ii) after 1 January 2033, at least energy performance class E;

References and further reading

- ✓ POWERPOOR Online Library: <http://powerpoor.eu/library>
- ✓ Energy Poverty Observatory: <https://www.energypoverty.eu>
- ✓ Eurostat: <https://ec.europa.eu/eurostat>

PART II: The POWERPOOR project

Approach, content and concept of the POWERPOOR project

Description of the tools developed within the project

Results and actions until now

The Project at a glance

Start: 01/09/2020

Duration:
36 Months

Empowering Energy
Poor Citizens
through Joint Energy
Initiatives

Coordinator:
National Technical
University of Athens
(NTUA)
Project partners: 14

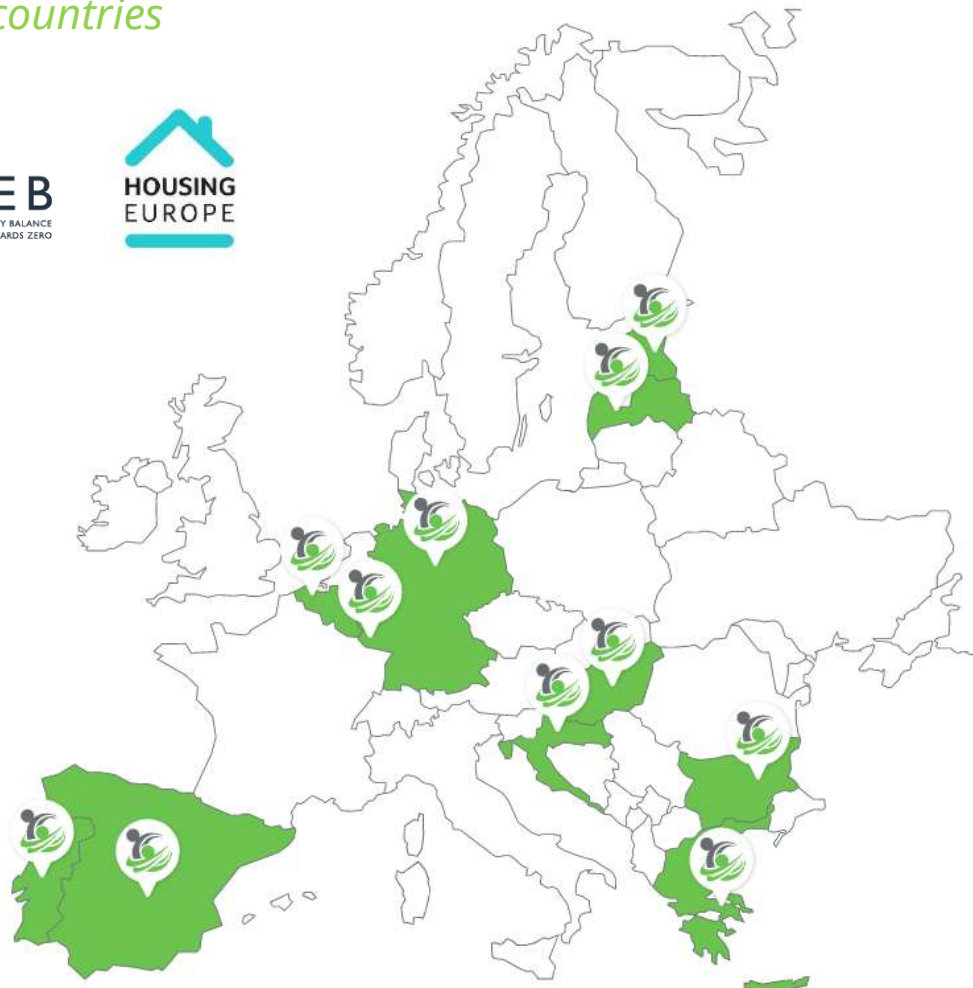
European Union's **Horizon 2020** Research and
Innovation Programme

Budget:
€1,999,812.50

Grant Agreement number:
890437 — POWERPOOR —
H2020-LC-SC3-2018-2019-2020/
H2020-LC-SC3-EE-2019

The POWERPOOR consortium

*14 participating partners – 11 countries
- 8 pilot countries*



POWERPOOR leads the way in

Supporting energy poor citizens to implement energy efficiency interventions and participate in joint energy initiatives, through the development of the POWERPOOR support programmes and tools, with the aim to alleviate energy poverty.

Facilitating behavioural change in energy usage and enabling the uptake of energy efficiency measures through experience and knowledge sharing, as well as through joint energy initiatives and citizen engagement campaigns targeting groups of consumers in energy poor communities.

Promoting energy community projects / alternative financing schemes and assisting citizens to pursue funding opportunities (e.g., energy communities, energy cooperatives & crowdfunding).

Energy poverty alleviation support schemes

will be designed, developed and implemented in 8 pilot countries across Europe, led by a network of certified Energy Supporters and Energy Mentors.

Through energy poverty alleviation support schemes

citizens are positioned at the heart of the solution through a gradual transition from an energy poor citizen towards an informed consumer and later an active prosumer.

Energy Poverty Mitigation Toolkit



Identify citizens suffering from energy poverty

Module 1 - ENPOV



Enable them to understand their energy use

Module 2 - ACTIONS



Communicate innovative financing

Module 3 - FUND



Incorporate energy poverty mitigation actions into SECAPS

Module 4 - PLAN

Training material

The toolkit can be utilised by citizens suffering from energy poverty, public and national authorities, energy communities or cooperatives, experts in the field, or other stakeholders



Energy poverty support programmes



In each pilot country, energy poor households and citizens will be identified, leveraging the knowledge of the local partners (**POWER-TARGET**).



Energy support programmes will be developed by a certified network of **Energy Supporters**, who will provide energy poor citizens :

(a) Tips and information to encourage behaviour change and/or small-scale interventions (**POWER-ACT**), in addition to



(b) Information on how to take part in innovative financing schemes such as energy communities, cooperatives and crowdfunding campaigns to fund interventions that can alleviate the problem (**POWER-FUND**).



Local Energy Poverty Alleviation Offices will be established in the participating municipalities, run by a certified network of **Energy Mentors**

***Energy Supporters** will directly engage energy-poor citizens and assist them in planning, securing funding and implementing energy efficiency interventions.*

***Energy Mentors** will provide support and expertise in all the key areas associated to the operation and/or creation of an energy community / cooperative of energy poor citizens.*



Engagement activities

- ✓ **Group training seminars** and **a series of webinars** will be organised in the 8 pilot countries (Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, Portugal and Spain) so that interested individuals can become **Energy Supporters and/or Energy Mentors**.
- ✓ Through **face-to-face (F2F) tailor-made training seminars**, the local project partners will also train representatives from cities and regions, members of energy communities/cooperatives and other social service organisations, facilitating the establishment of Local Energy Poverty Offices that can operate as focal points on energy poverty.

Interested individuals may include public authorities (employees of local and regional authorities), members of existing communities/cooperatives, social workers, local consultants, professionals and entrepreneurs in the field of sustainable energy, health practitioners, university graduates and young scientists.

Expected results

- ✓ A total of **1.100 Energy Supporters and Energy Mentors** trained and certified.
- ✓ Establishment of **15 Energy Poverty Alleviation offices**.
- ✓ **8 National Roadmaps** in 8 European countries (Bulgaria, Croatia, Greece, Latvia, Estonia, Portugal, Spain) recommending policies to tackle energy poverty.
- ✓ **1 European Roadmap** aiming to alleviate energy poverty across Europe.
- ✓ Establishment of the **POWERPOOR Alliance** network to support the sustainability of the project results after its completion.

The role of Energy Supporters and Mentors

Energy Supporters

Engage with households and energy poor citizens directly and help them to understand their energy spending, to plan small scale energy efficiency interventions, to adopt behavioural changes that will help them lower their energy consumption and expenses and guide them to further mitigate energy poverty using joint energy initiatives and innovative financing schemes.

Energy Mentors

They are providing support in all the areas that are related with setting up and operating an energy community or cooperative and leveraging innovative financing schemes in a municipality, city, or region level to mitigate energy poverty.

The role of Energy Supporters and Mentors

- ✓ Growing ecosystem of energy communities and of the notion of prosumers across EU, need of people with knowledge.
- ✓ Municipalities, cities, and regions will need guidance in leveraging innovative financing schemes.
- ✓ Energy Supporters and Mentors get a wider view of the energy poverty issue and how it can be addressed with joint energy initiatives leveraging innovative financing schemes.
- ✓ Becoming part of a pan European network that fosters synergies, knowledge and experience exchange

In a nutshell

- ✓ More than 750 people have attended the 35 training seminars across EU
- ✓ More than 550 people became certified Energy Supporters and Mentors
- ✓ 1400 interactions in the tools
- ✓ Support of about 8.000 households in 52 municipalities, 10 of which have also established an Energy Poverty Alleviation Office
- ✓ More than 700 home visits in energy poor households
- ✓ 15 info days with more than 550 attendees
- ✓ Presentations in 58 events with 30.000 attendees across Europe

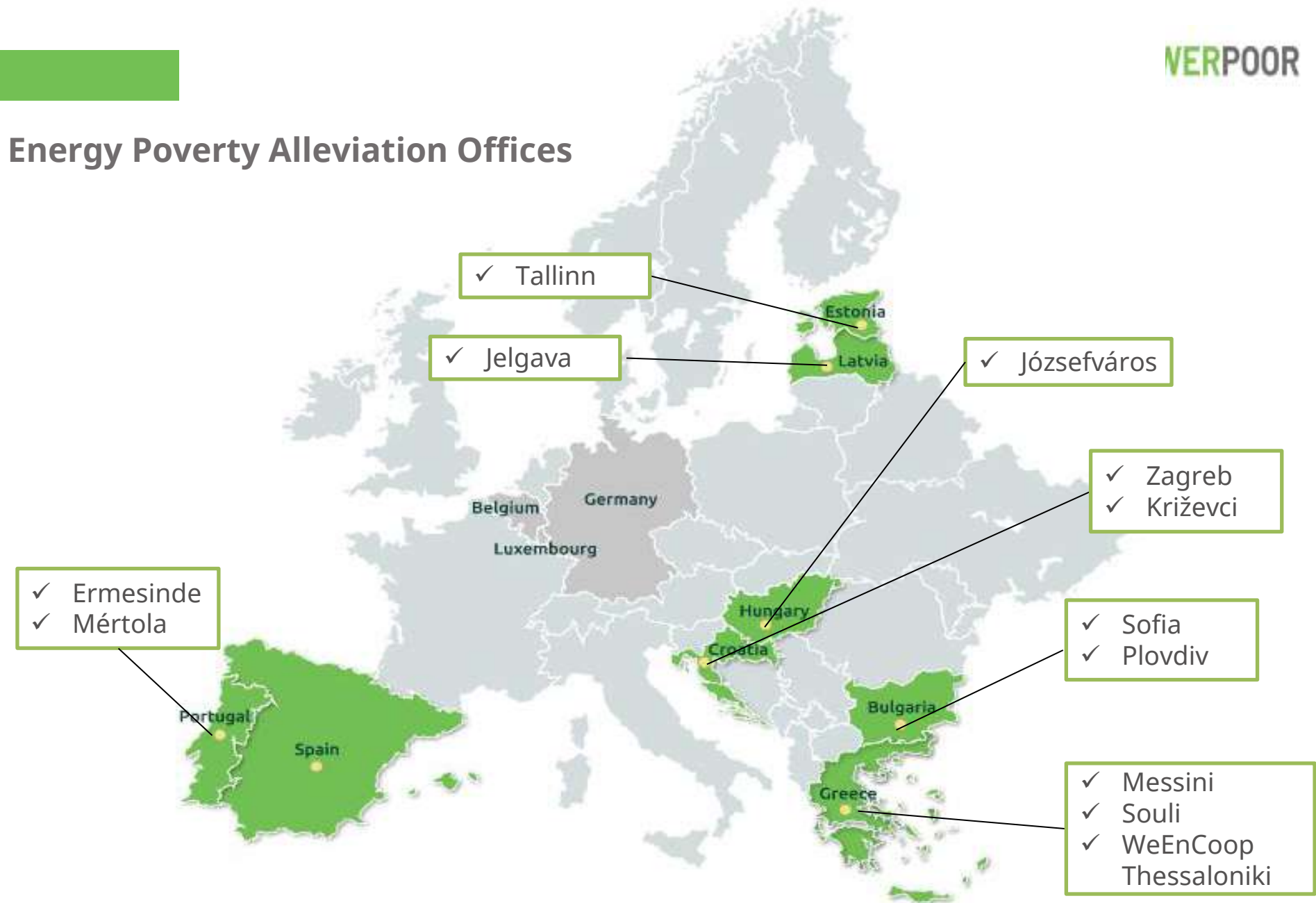
Training Seminars



Energy Supporters and Mentors in action



Energy Poverty Alleviation Offices



Energy Poverty Alleviation Offices



Latvia



Info days

Estonia



Greece



Hungary



Croatia



Thank you!





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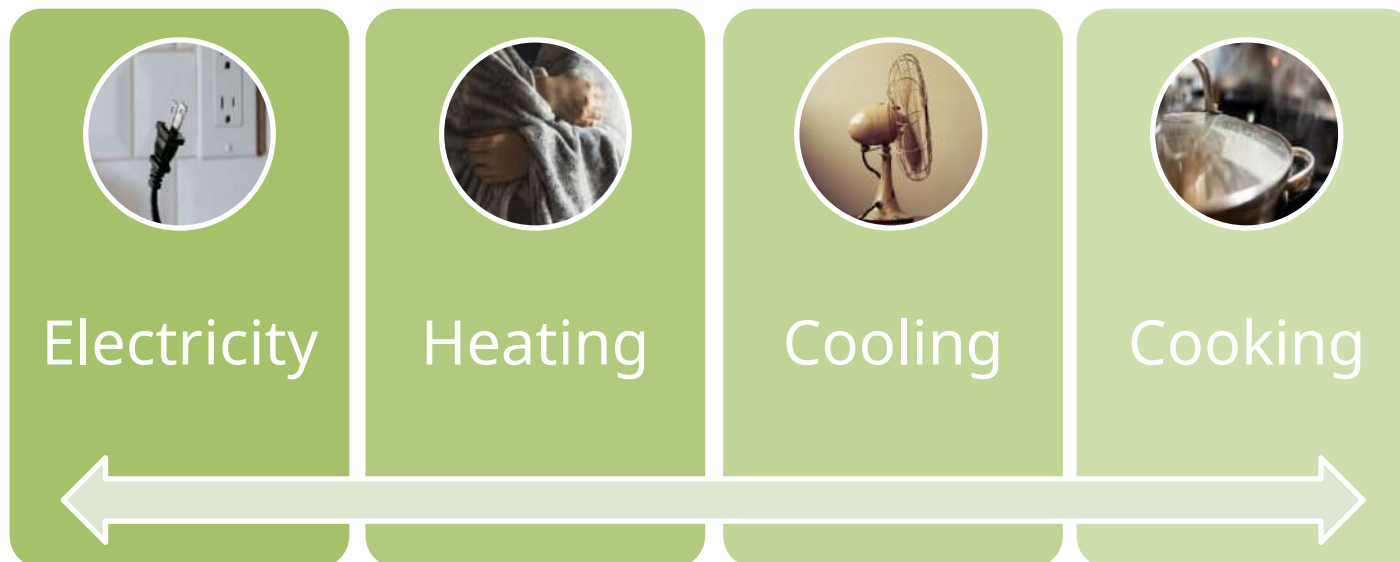
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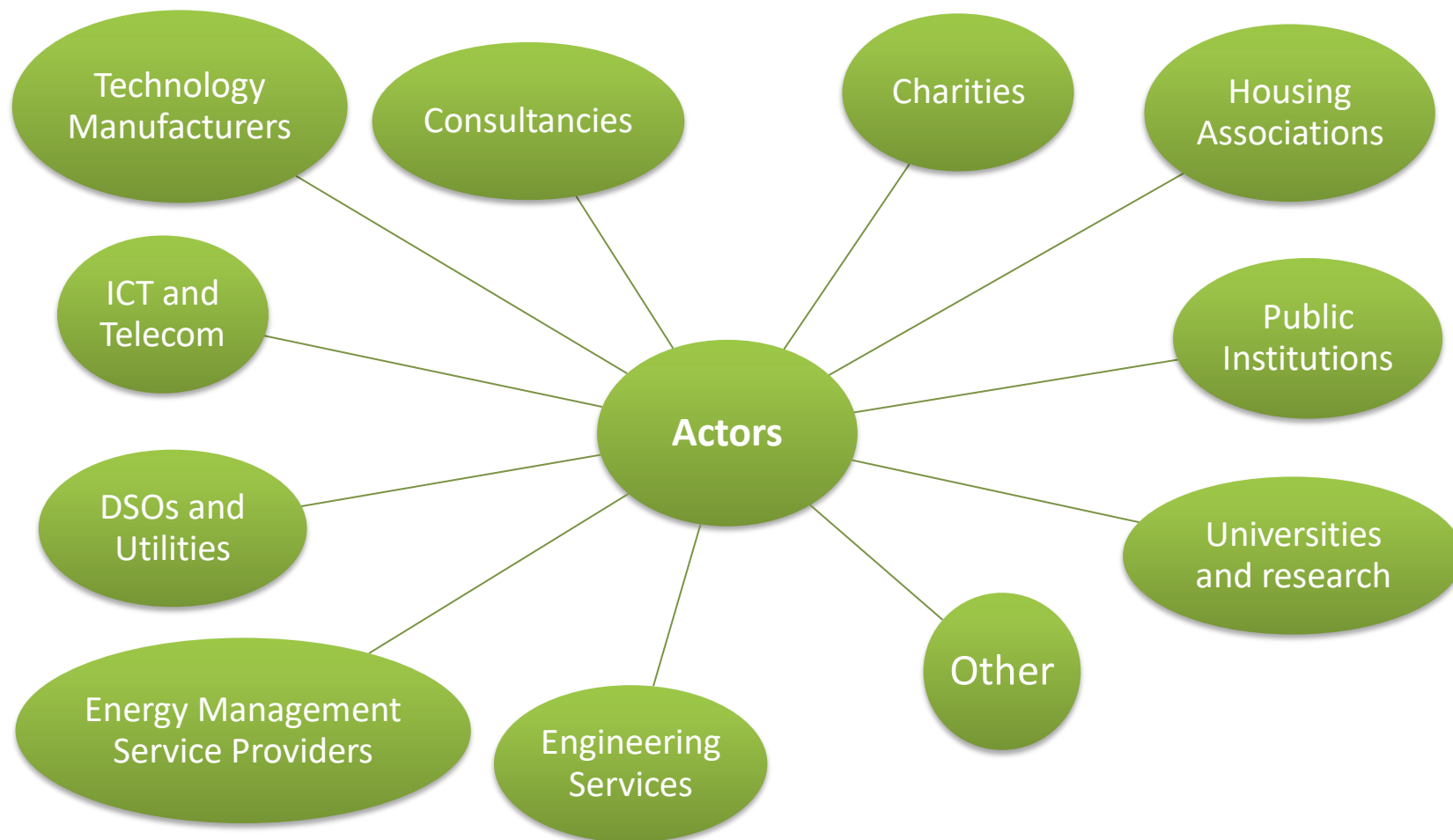
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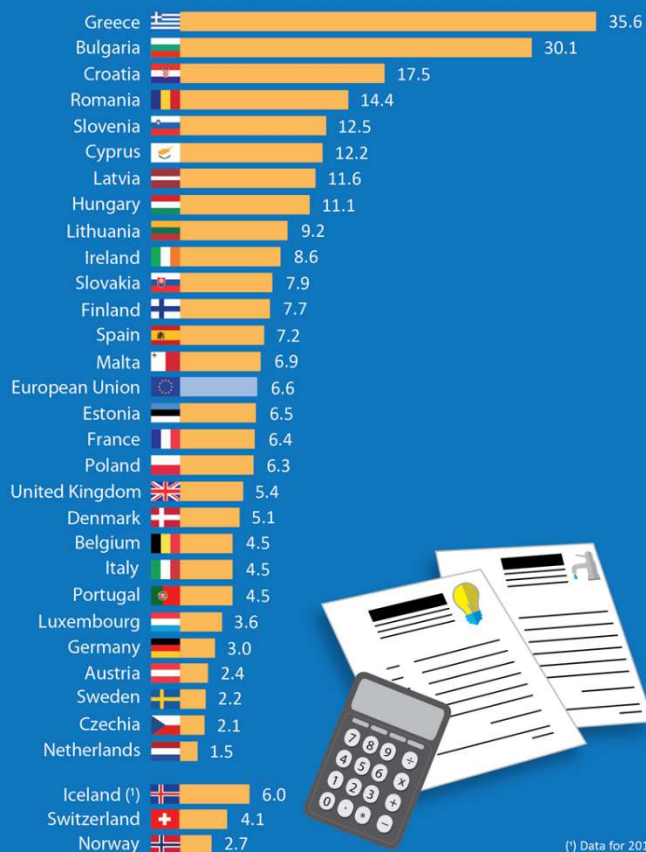
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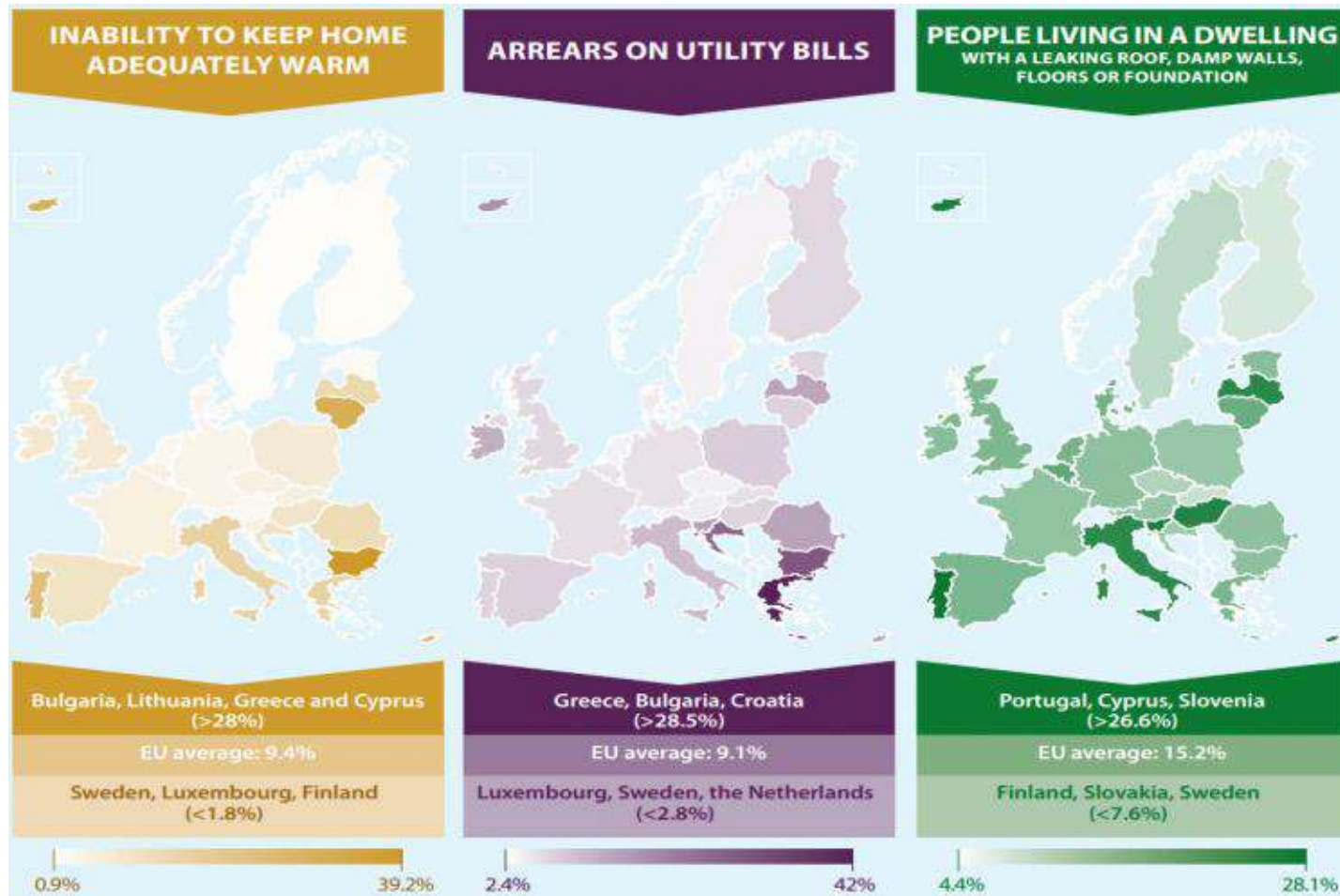
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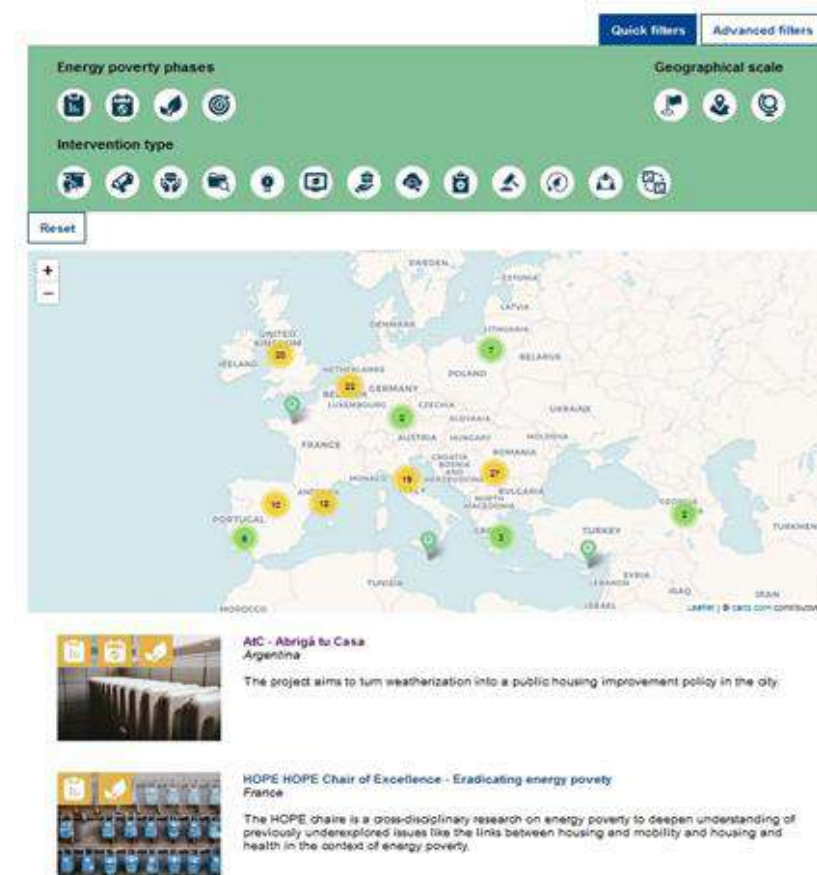
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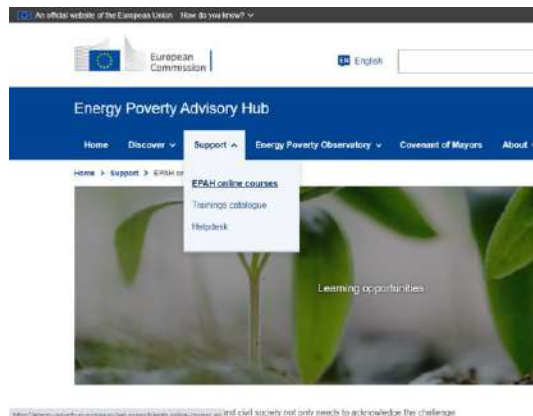
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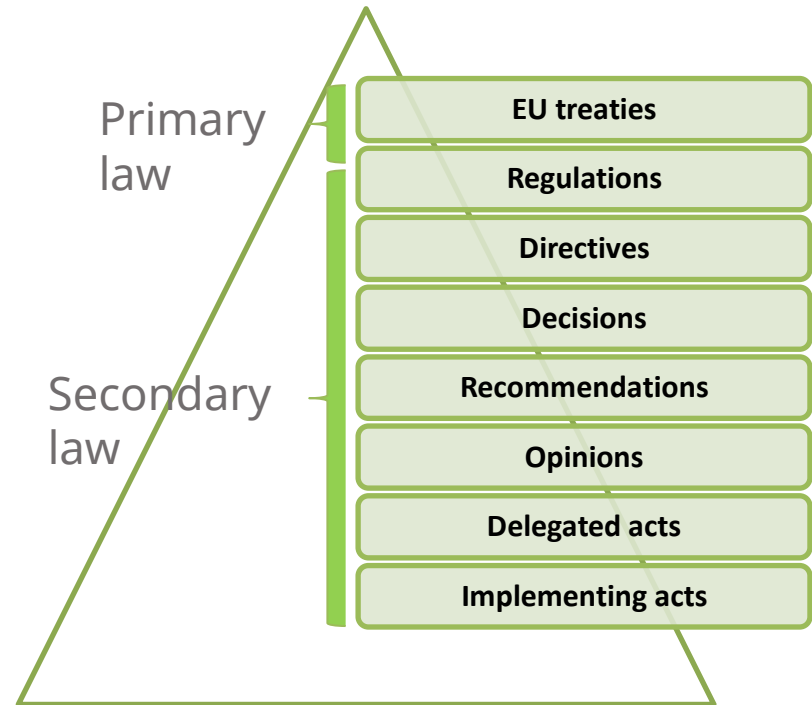
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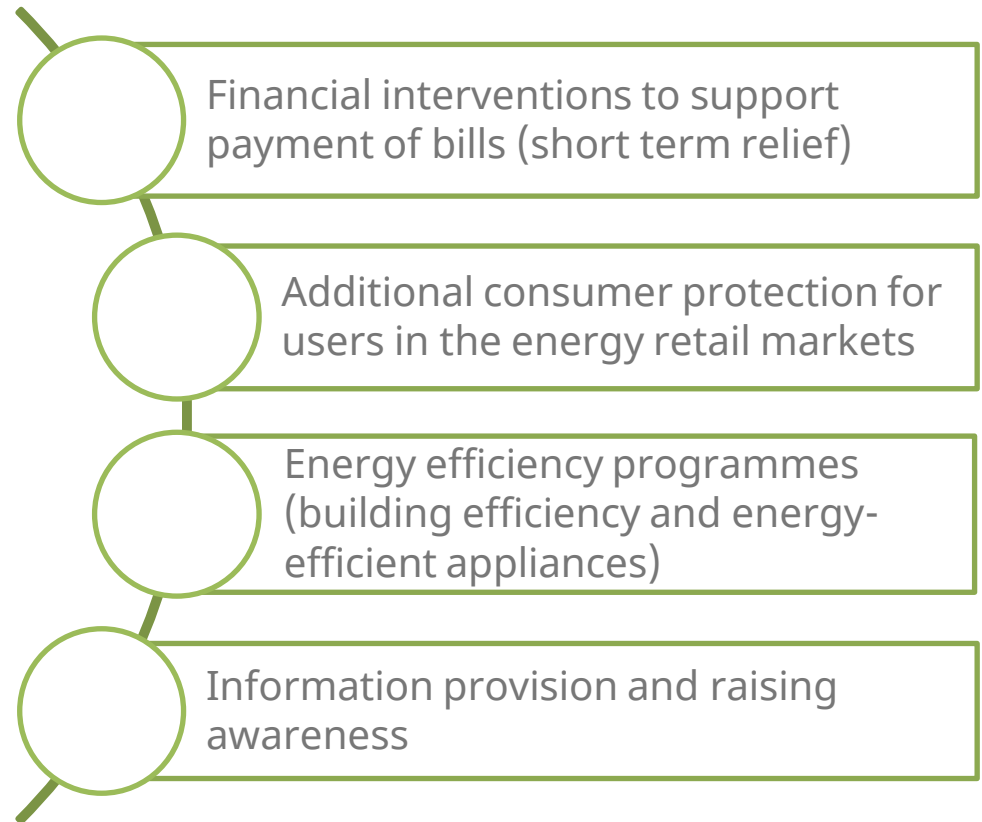


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Directive (EU) 2018/2002 on energy efficiency

“When designing the measures to fulfil energy saving objectives, Member States should take into account the need to **alleviate energy poverty** in accordance with criteria established by them, and they shall include information about the outcome of measures to alleviate energy poverty”

Directive (EU) 2018/844 on energy performance of buildings

“Member States must outline relevant national measures to help **alleviate energy poverty**, as part of their long-term renovation strategies to support the renovation of the national stock of residential and non-residential buildings”

Regulation (EU) 2018/1999. Governance of the Energy Union and Climate Action

“MS must include an objective of energy poverty alleviation in their National Energy and Climate Action Plans (NECPs)”

Source: <https://eur-lex.europa.eu/homepage.html>

EU energy poverty alleviation policies

2. List of energy poverty alleviation policies at the EU level

Directive (EU) 2019/944 Internal market for electricity

Policy plans and measures to **alleviate energy poverty** and ensure that vulnerable consumers have access to energy in critical periods

Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources

Empowering jointly acting renewables self-consumers also provides opportunities for renewable energy communities to advance energy efficiency at household level and helps fight energy poverty through reduced consumption and lower supply tariffs. Member States should take appropriate advantage of that opportunity by, inter alia, assessing the possibility to enable participation by households that might otherwise not be able to participate, including vulnerable consumers and tenants.

Renovation Wave (Area of intervention 6)

“Using renovation as a lever to address **energy poverty** and access to healthy housing for all households (...). The Commission will launch an Affordable Housing Initiative for 100 lighthouse project and will examine whether and how the EU budget resources alongside EU Emissions Trading System (EU ETS) revenues could be used to fund national energy efficiency and savings schemes.”

Source: <https://eur-lex.europa.eu/homepage.html>



EU energy poverty alleviation policies

2. Most recent developments at EU level

- ✓ July 2021 the EC announced its Fit for 55 package, designed to deliver 55% emissions reductions by 2030, tackle energy poverty and ultimately make Europe the “first carbon neutral continent by 2050”
- ✓ Including a new Social Climate Fund that will provide dedicated funding to Member States to support European citizens most affected or at risk of energy poverty.

EU energy poverty alleviation policies

2. Most recent developments at EU level

- The obligation to renovate

EED article 6

Each Member State shall ensure that, at least 3 % of the total floor area of heated and/or cooled buildings owned by public bodies is renovated each year to at least meet at least be transformed into nearly zero energy buildings.

Here public bodies means contracting bodies in the sense of the Public Procurement Directive, which means that social housing providers would have to follow this obligation.

EPBD article 9

Minimum Energy Performance Standards require class G buildings to be renovated and improved to at least energy performance class F at the latest by 2027 and to at least energy performance class E at the latest by 2030, and the worst-performing residential buildings to at least class F by 2030 and to at least class E by 2033.

EU energy poverty alleviation policies

2. Most recent developments at EU level

- The promotion of renewable energy sources

EPBD article 8

a clear legal basis for national bans of boilers based on fossil fuels is introduced, allowing Member States to set requirements for heat generators based on greenhouse gas emissions or the type of fuel used. Several Member States consider such measures as essential to achieve a decarbonised building stock and to improve air quality and health

RED article 15a

Member States shall introduce measures in their building regulations and codes and, where applicable, in their support schemes, to increase the share of electricity and heating and cooling from renewable sources in the building stock, including national measures relating to substantial increases in renewables self-consumption, renewable energy communities and local energy storage, in combination with energy efficiency improvements relating to cogeneration and passive, nearly zero-energy and zero energy buildings

EU energy poverty alleviation policies

2. Most recent developments at EU level

- **Funding for renovation of social housing**

EED article 22

Member States shall implement energy efficiency improvement measures and related consumer protection or information measures, in particular those set out in Article 21 and Article 8(3), as a priority among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing to alleviate energy poverty.

3. To support vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, Member States shall: a) implement energy efficiency improvement measures to mitigate distributional effects from other policies and measures, such as taxation measures implemented according to Article 9 of this Directive, or the application of emission trading in the buildings and transport sector according to the ETS Directive b) make the best possible use of public funding available at national and Union level, including, where applicable, the financial contribution Member State received from the Social Climate Fund and revenues from allowance auctions from emission trading pursuant to the EU ETS, for investments into energy efficiency improvement measures as priority actions

References and further reading

- ✓ POWERPOOR Online Library: <http://powerpoor.eu/library>
- ✓ Energy Poverty Observatory: <https://www.energypoverty.eu>
- ✓ Eurostat: <https://ec.europa.eu/eurostat>

PART II: The POWERPOOR project

Approach, content and concept of the POWERPOOR project

Description of the tools developed within the project

Results and actions until now

The Project at a glance

Start: 01/09/2020

Duration:
36 Months

Empowering Energy
Poor Citizens
through Joint Energy
Initiatives

Coordinator:
National Technical
University of Athens
(NTUA)
Project partners: 14

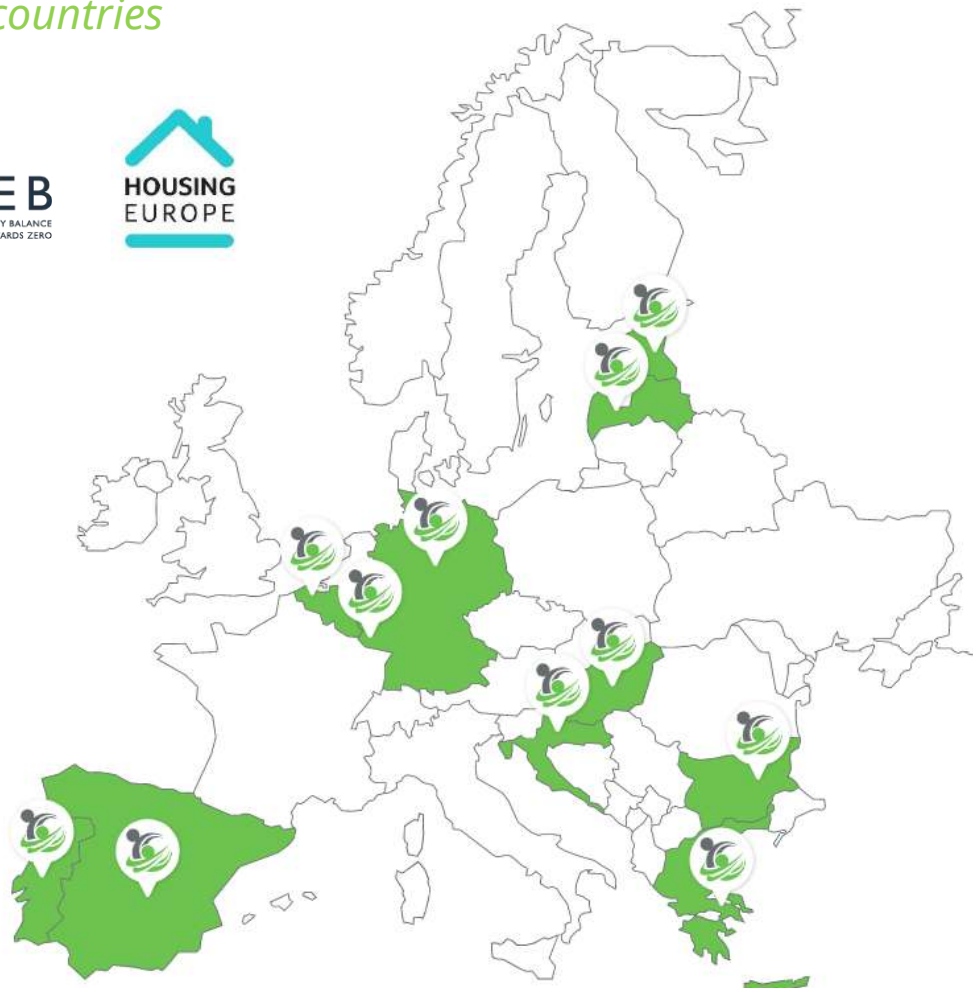
European Union's **Horizon 2020** Research and
Innovation Programme

Budget:
€1,999,812.50

Grant Agreement number:
890437 — POWERPOOR —
H2020-LC-SC3-2018-2019-2020/
H2020-LC-SC3-EE-2019

The POWERPOOR consortium

*14 participating partners – 11 countries
- 8 pilot countries*



POWERPOOR leads the way in

Supporting energy poor citizens to implement energy efficiency interventions and participate in joint energy initiatives, through the development of the POWERPOOR support programmes and tools, with the aim to alleviate energy poverty.

Facilitating behavioural change in energy usage and enabling the uptake of energy efficiency measures through experience and knowledge sharing, as well as through joint energy initiatives and citizen engagement campaigns targeting groups of consumers in energy poor communities.

Promoting energy community projects / alternative financing schemes and assisting citizens to pursue funding opportunities (e.g., energy communities, energy cooperatives & crowdfunding).

Energy poverty alleviation support schemes

will be designed, developed and implemented in 8 pilot countries across Europe, led by a network of certified Energy Supporters and Energy Mentors.

Through energy poverty alleviation support schemes

citizens are positioned at the heart of the solution through a gradual transition from an energy poor citizen towards an informed consumer and later an active prosumer.

Energy Poverty Mitigation Toolkit



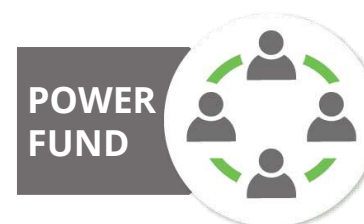
Identify citizens suffering from energy poverty

Module 1 - ENPOV



Enable them to understand their energy use

Module 2 - ACTIONS



Communicate innovative financing

Module 3 - FUND



Incorporate energy poverty mitigation actions into SECAPS

Module 4 - PLAN

Training material

The toolkit can be utilised by citizens suffering from energy poverty, public and national authorities, energy communities or cooperatives, experts in the field, or other stakeholders



Energy poverty support programmes



In each pilot country, energy poor households and citizens will be identified, leveraging the knowledge of the local partners (**POWER-TARGET**).



Energy support programmes will be developed by a certified network of **Energy Supporters**, who will provide energy poor citizens :

(a) Tips and information to encourage behaviour change and/or small-scale interventions (**POWER-ACT**), in addition to



(b) Information on how to take part in innovative financing schemes such as energy communities, cooperatives and crowdfunding campaigns to fund interventions that can alleviate the problem (**POWER-FUND**).



Local Energy Poverty Alleviation Offices will be established in the participating municipalities, run by a certified network of **Energy Mentors**

***Energy Supporters** will directly engage energy-poor citizens and assist them in planning, securing funding and implementing energy efficiency interventions.*

***Energy Mentors** will provide support and expertise in all the key areas associated to the operation and/or creation of an energy community / cooperative of energy poor citizens.*



Engagement activities

- ✓ **Group training seminars** and **a series of webinars** will be organised in the 8 pilot countries (Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, Portugal and Spain) so that interested individuals can become **Energy Supporters and/or Energy Mentors**.
- ✓ Through **face-to-face (F2F) tailor-made training seminars**, the local project partners will also train representatives from cities and regions, members of energy communities/cooperatives and other social service organisations, facilitating the establishment of Local Energy Poverty Offices that can operate as focal points on energy poverty.

Interested individuals may include public authorities (employees of local and regional authorities), members of existing communities/cooperatives, social workers, local consultants, professionals and entrepreneurs in the field of sustainable energy, health practitioners, university graduates and young scientists.

Expected results

- ✓ A total of **1.100 Energy Supporters and Energy Mentors** trained and certified.
- ✓ Establishment of **15 Energy Poverty Alleviation offices**.
- ✓ **8 National Roadmaps** in 8 European countries (Bulgaria, Croatia, Greece, Latvia, Estonia, Portugal, Spain) recommending policies to tackle energy poverty.
- ✓ **1 European Roadmap** aiming to alleviate energy poverty across Europe.
- ✓ Establishment of the **POWERPOOR Alliance** network to support the sustainability of the project results after its completion.

In a nutshell

- ✓ More than 1200 people have attended the 40 training seminars across EU
- ✓ More than 880 people became certified Energy Supporters and Mentors
- ✓ 1400 interactions in the tools
- ✓ Support of about 12.000 households in 54 municipalities, 17 of which have also established an Energy Poverty Alleviation Office
- ✓ More than 700 home visits in energy poor households
- ✓ 16 info days with more than 550 attendees
- ✓ Presentations in 60 events with 30.000 attendees across Europe

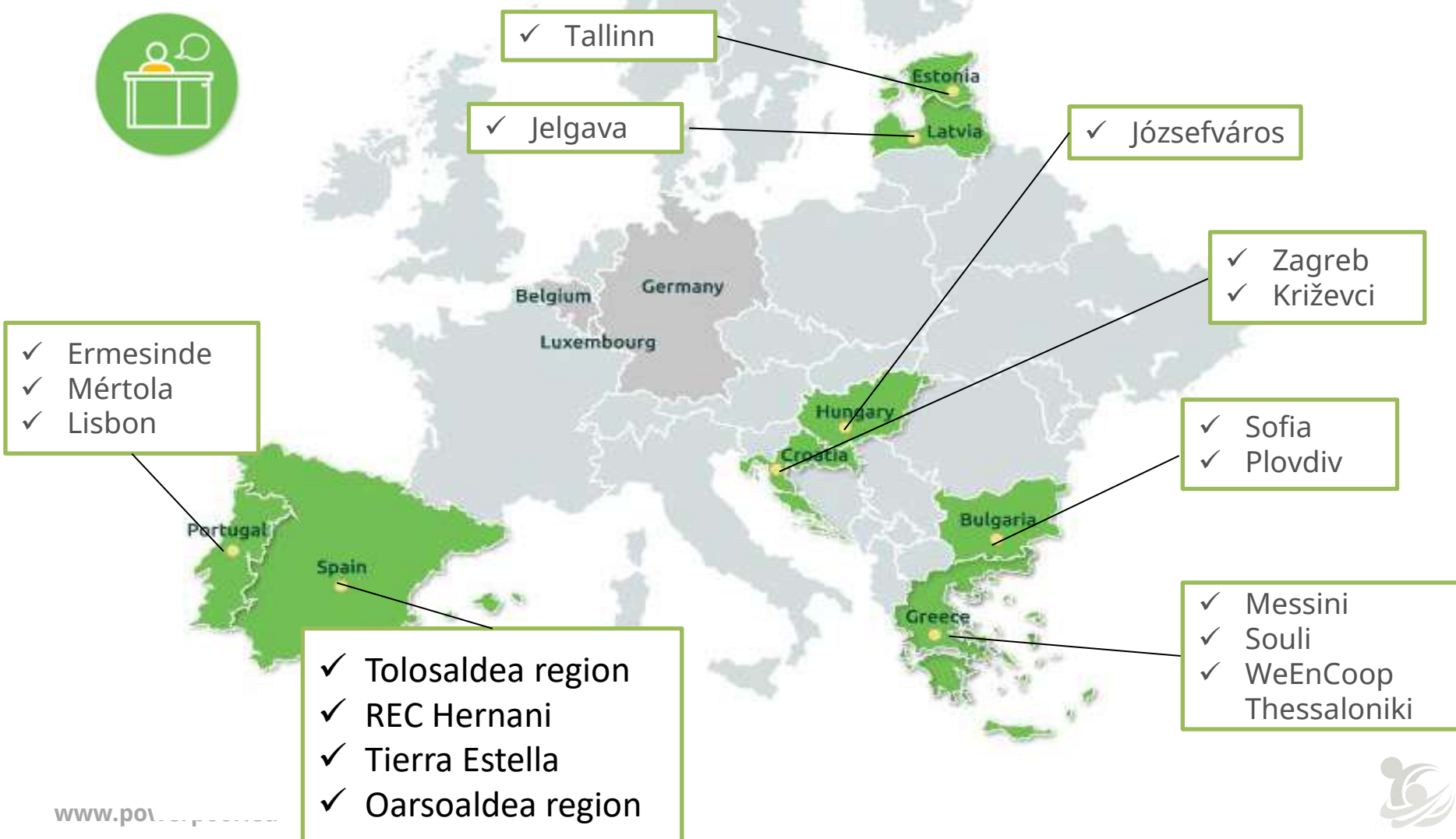
Training Seminars



Energy Supporters and Mentors in action



Energy Poverty Alleviation Offices



Energy Poverty Alleviation Offices



Latvia



Estonia,
Tallinn



Asa Semet
 100% energi yang dihasilkan dari tenaga surya.

POWERPOOR

Asa POWERPOOR merupakan solusi untuk mengatasi permasalahan energi, melalui konsep pemanfaatan tenaga surya sebagai sumber tenaga alternatif yang ramah lingkungan. Asa POWERPOOR telah menerapkan konsep ini untuk membangun sistem tenaga listrik yang ramah lingkungan di kawasan industri, perumahan, gedung perkantoran, dan lain-lain.

Asa POWERPOOR memiliki pengalaman lebih dari 10 tahun dalam membangun sistem tenaga listrik yang ramah lingkungan. Asa POWERPOOR memiliki tim ahli yang berpengalaman dalam membangun sistem tenaga listrik yang ramah lingkungan. Asa POWERPOOR memiliki reputasi yang baik di kalangan masyarakat.

Asa POWERPOOR memiliki pengalaman lebih dari 10 tahun dalam membangun sistem tenaga listrik yang ramah lingkungan. Asa POWERPOOR memiliki tim ahli yang berpengalaman dalam membangun sistem tenaga listrik yang ramah lingkungan. Asa POWERPOOR memiliki reputasi yang baik di kalangan masyarakat.

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5. Terveystieteiden ja sosiaalisen
vetoisuuden osasto (Pääjohtaja)
Pääjohtaja on osaston johtaja ja
vastaa osaston toiminnasta ja
toimintasuunnitelmien laatimisesta. Terveystieteiden osaston johtaja vastaa
osaston toiminnasta ja toimintasuunnitelmien laatimisesta. Terveystieteiden osaston johtaja vastaa osaston toiminnasta ja toimintasuunnitelmien laatimisesta.

[illegible][illegible]

Greece, Souli



Τετάρτη 17 Νοεμβρίου 2021

ΔΗΜΟΣ ΜΕΣΣΙΝΗΣ
Γραφείο Αντιμετώπισης
της Ενεργειακής Φτώχειας

[illegible][illegible]

Info days

Estonia



Greece



Hungary



Croatia



The role of Energy Supporters and Mentors

Energy Supporters

Engage with households and energy poor citizens directly and help them to understand their energy spending, to plan small scale energy efficiency interventions, to adopt behavioural changes that will help them lower their energy consumption and expenses and guide them to further mitigate energy poverty using joint energy initiatives and innovative financing schemes.

Energy Mentors

They are providing support in all the areas that are related with setting up and operating an energy community or cooperative and leveraging innovative financing schemes in a municipality, city, or region level to mitigate energy poverty.

The role of Energy Supporters and Mentors

- ✓ Growing ecosystem of energy communities and of the notion of prosumers across EU, need of people with knowledge.
- ✓ Municipalities, cities, and regions will need guidance in leveraging innovative financing schemes.
- ✓ Energy Supporters and Mentors get a wider view of the energy poverty issue and how it can be addressed with joint energy initiatives leveraging innovative financing schemes.
- ✓ Becoming part of a pan European network that fosters synergies, knowledge and experience exchange

Thank you!





POWERPOOR

Empowering Energy Poor Citizens through Joint Energy Initiatives

Part II - The POWERPOOR toolkit The POWER-TARGET and POWER-ACT tools

Eleni Kanellou NTUA, Greece
19 April 2022



This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 890437

Module 1 – Goals

-  To familiarise the audience with the POWERPOOR Toolkit and in particular the two tools POWER TARGET and POWER ACT
-  Provide practical examples of how to fill them in
-  Provide “Read the utility bills” exercises

The POWER-TARGET and POWER-ACT

The POWERPOOR toolkit

The POWER-TARGET tool

The POWER-ACT tool

Exercises for the proper use of the POWERTARGET and POWERACT tools

The POWERPOOR Toolkit

POWER TARGET



Identify energy poor citizens with a simple data driven approach

POWER ACT



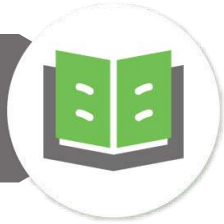
Enable them to understand their energy use and propose tips and tricks to enhance energy efficiency

POWER FUND



Communicate innovative financing – Energy Communities /Cooperatives and Crowdfunding

Energy poverty Guidebook



Incorporate energy poverty mitigation actions into SECAPS – the Energy Poverty Guidebook for Energy Planning

Energy Poverty Mitigation Toolkit



The **POWER-TARGET** toolkit will:

- ✓ Identify citizens suffering from energy poverty using a data-driven approach that facilitates the identification of citizens, communities, neighborhoods or districts and
- ✓ Undertake quantitative and qualitative analyses to support the development of the **POWER-TARGET** tool.

POWER-TARGET

Target energy poor citizens using a data-driven approach that allows for the identification of energy poor citizens, communities, neighbourhoods or districts

[Go to the tool page](#)



Energy Poverty Mitigation Toolkit



POWER - ACT

The **POWER-ACT** toolkit will:

- ✓ Empower citizens suffering from energy poverty to understand their energy use, the benefits associated with energy efficiency interventions and encouraging the installation of renewable power generation capacities,
- ✓ Evaluate users' thermal comfort,
- ✓ Create energy profiles,
- ✓ Evaluate costs and benefits of energy efficiency actions (e.g., payback period), and
- ✓ Encourage behaviour change (e.g., smart tips).

POWER-ACT

Empower energy poor citizens to understand their energy usage, the benefits associated from implementing energy efficient interventions and form installing renewable energy

[Go to the tool page](#)



Energy Poverty Mitigation Toolkit



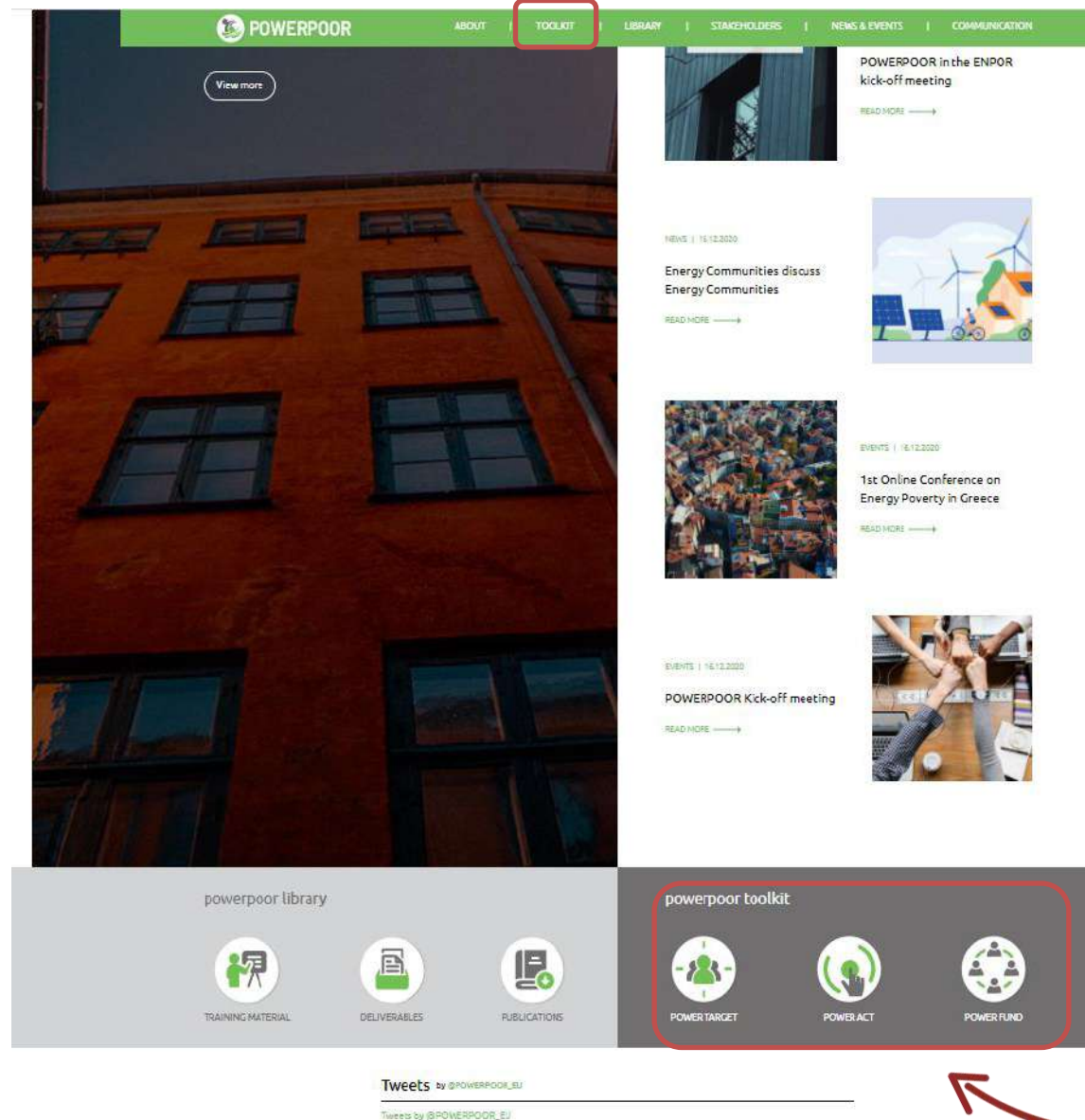
The **POWER-FUND** toolkit will:

- ✓ Communicate innovative financing opportunities to address energy poverty and engage citizens,
- ✓ Collate information on innovative financing opportunities and guide users on how to pursue these,
- ✓ Provide an online marketplace for energy cooperatives in energy poor communities, and
- ✓ Engage users and citizens through the launch of crowdfunding campaigns.



Accessing the POWERPOOR toolkit

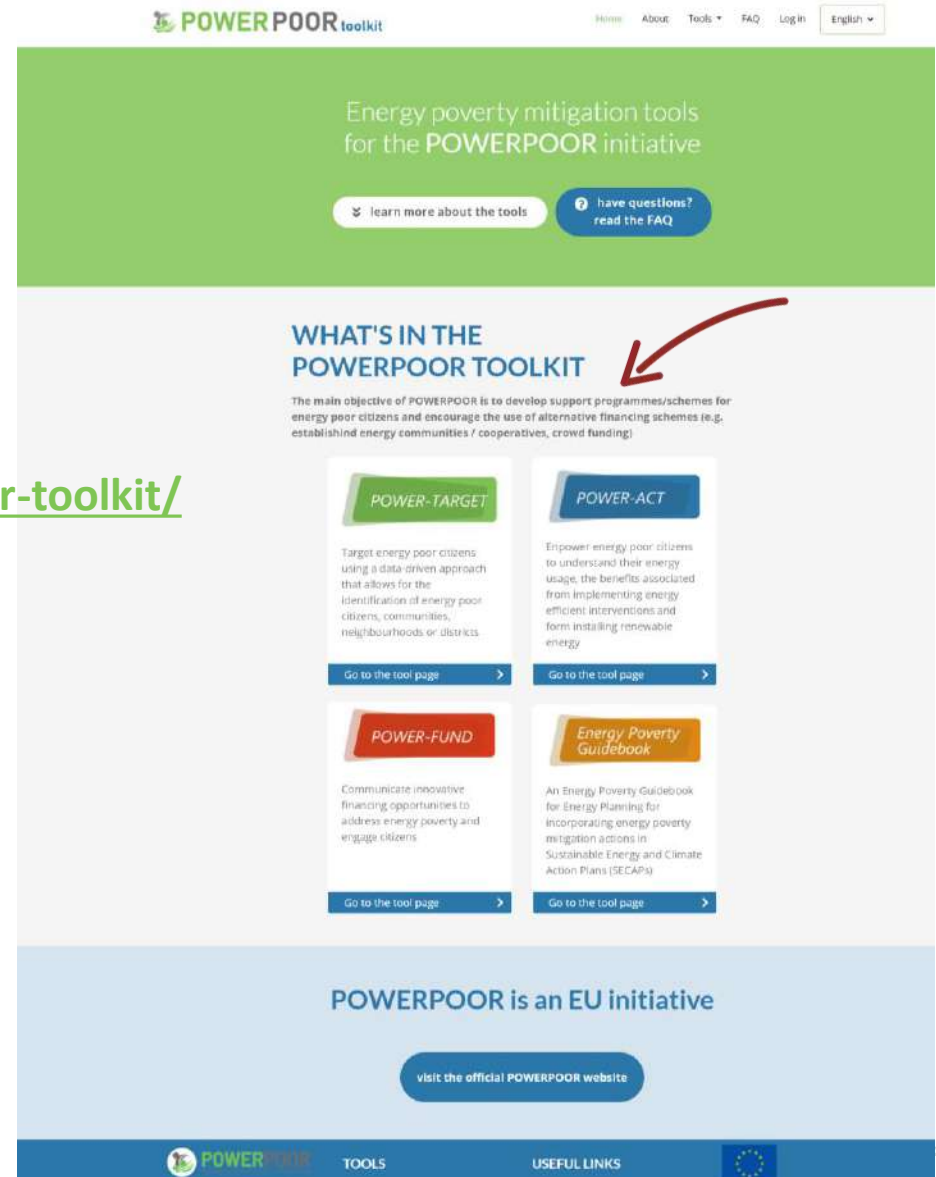
Through the website:
www.powerpoor.eu



Accessing the POWERPOOR toolkit

Through the standalone page:

<http://powerpoor.epu.ntua.gr/powerpoor-toolkit/>



Choose your preferred **Language**

Log In



Email

Password



[Forgot your password?](#)

Login >

Don't have an account yet? [Register](#)

Please **Register** if you are a new user in the POWERPOOR toolkit



Register

☒ Personal Account ☐ Business Account

Email*



Enter your email

Language*



Select preferred language



Country*



Enter country



City*



Enter city

Password*

Enter password



Repeat Password*

Enter password again



* Mandatory fields

Sign up >

Already have an account? [Log in](#)

Fill out all the fields and press **Sign up**



Overview of the My Account page

[Home](#)[About](#)[Tools](#) ▼[Contact](#)

Home / My Account

My Account

[Dashboard](#)[My Dwellings](#)[Vulnerability Assessments](#)[My Behavior Assessments](#)

Personal Information

@		🇬🇧	English ▼
🇬🇷	Ελλάδα ▼	🏠	Athens

[Edit](#)

PowerTarget

Take the survey to evaluate your energy spending and see how you compare with other households in your country.

PowerAct

Receive personalized suggestions and implement energy efficient behaviors to save money.



Overview of the My Account page

Different dwellings can be added by the same user

My Account

[Dashboard](#)

[My Dwellings](#)

[Vulnerability Assessments](#)

[My Behavior Assessments](#)

[Add dwelling +](#)

Add Building

Country*

Enter country

City*

Enter city

Area (m²)*

Enter area (m²)

Type of building*

Select type of building ▾

Number of floors*

Enter number of floors

Build Year*

Enter build year

* Mandatory fields

[Submit >](#)



Overview of the My Account page

Home / My Account

My Account

[Dashboard](#)

[My Dwellings](#)

[Vulnerability Assessments](#)

[My Behavior Assessments](#)

Survey	Delete
Area (m ²)	90.0
Electricity Supplier	ΔEH
Annual Consumption	8000.0
Annual Cost of Electricity Bill	2000.0
Annual Heating Consumption	0.0
Annual Heating Cost	0.0
Ratio	17.19 

Survey	Delete
Area (m ²)	90.0
Electricity Supplier	ΔEH
Annual Consumption	6500.0
Annual Cost of Electricity Bill	1495.0
Annual Heating Consumption (L (litres))	1200.0
Annual Heating Cost	1050.0
Ratio	19.34 



Overview of the My Account page

[Home](#) / [My Account](#)

My Account

[Dashboard](#)

[My Dwellings](#)

[Vulnerability Assessments](#)

[My Behavior Assessments](#)

Assessment	Details	Delete
Area (m ²)	90.0	
Heating fuel	Oil	
Air-conditioning Operation	I do not use air condition	
Annual Heating Consumption (L (litres))	1500.0	
Score	95.0 	

Assessment	Details	Delete
Area (m ²)	85.0	
Heating fuel	Oil	
Air-conditioning Operation	In winter and summer	
Annual Heating Consumption (L (litres))	1200.0	
Score	89.0 	



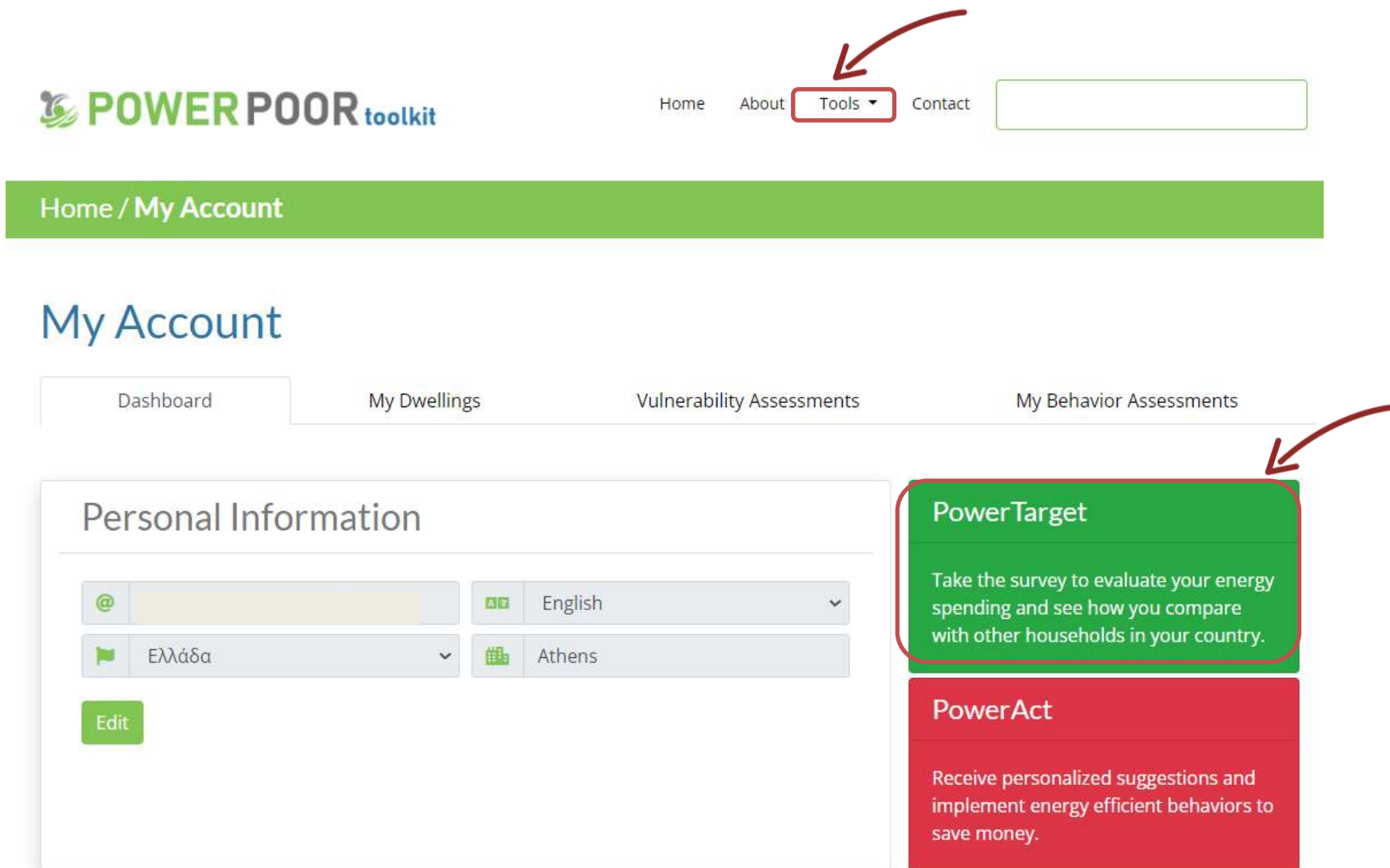
POWER TARGET



- ✓ Identify energy poor citizens using a simple data-driven approach that facilitates the identification of citizens, communities, neighborhoods or districts

Using the POWER TARGET tool

Overview of the personal account page



The screenshot shows the 'POWERPOOR toolkit' website. At the top, there is a navigation bar with links for 'Home', 'About', 'Tools' (highlighted with a red box and a red arrow), and 'Contact'. Below the navigation bar is a green banner with the text 'Home / My Account'. The main content area is titled 'My Account' and features four tabs: 'Dashboard', 'My Dwellings', 'Vulnerability Assessments', and 'My Behavior Assessments'. The 'My Behavior Assessments' tab is active. On the left, there is a 'Personal Information' section with fields for email, language (English), country (Ελλάδα), and city (Athens), along with an 'Edit' button. On the right, there are two tool cards. The 'PowerTarget' card is green and highlighted with a red box and a red arrow; it contains the text: 'Take the survey to evaluate your energy spending and see how you compare with other households in your country.' Below it is a red 'PowerAct' card with the text: 'Receive personalized suggestions and implement energy efficient behaviors to save money.'

POWERPOOR toolkit

Home About Tools Contact

Home / My Account

My Account

Dashboard My Dwellings Vulnerability Assessments My Behavior Assessments

Personal Information

@ [email field] [Language: English] [Country: Ελλάδα] [City: Athens] [Edit button]

PowerTarget

Take the survey to evaluate your energy spending and see how you compare with other households in your country.

PowerAct

Receive personalized suggestions and implement energy efficient behaviors to save money.



Using the POWER TARGET tool

Or accessing it
through the
homepage

<http://powerpoor.epu.ntua.gr/powerpoor-toolkit/>



The screenshot shows the homepage of the POWERPOOR toolkit. At the top, there is a navigation bar with links for Home, About, Tools, FAQ, and Login, along with a language selector set to English. The main header features the text "Energy poverty mitigation tools for the POWERPOOR initiative" and two buttons: "learn more about the tools" and "have questions? read the FAQ". Below this, a section titled "WHAT'S IN THE POWERPOOR TOOLKIT" explains the main objective of the initiative. It then displays four tool cards: POWER-TARGET, POWER-ACT, POWER-FUND, and the Energy Poverty Guidebook. Each card includes a brief description and a "Go to the tool page" button. At the bottom, a blue banner states "POWERPOOR is an EU initiative" with a button to "visit the official POWERPOOR website". The footer contains the POWERPOOR logo, the word "TOOLS", a link to "USEFUL LINKS", and the European Union flag.

POWERPOOR toolkit

Home About Tools FAQ Login English

Energy poverty mitigation tools
for the POWERPOOR initiative

learn more about the tools have questions?
read the FAQ

WHAT'S IN THE POWERPOOR TOOLKIT

The main objective of POWERPOOR is to develop support programmes/schemes for energy poor citizens and encourage the use of alternative financing schemes (e.g. established energy communities / cooperatives, crowd funding)

POWER-TARGET

Target energy poor citizens using a data-driven approach that allows for the identification of energy poor citizens, communities, neighbourhoods or districts

Go to the tool page

POWER-ACT

Empower energy poor citizens to understand their energy usage, the benefits associated from implementing energy efficient interventions and from installing renewable energy

Go to the tool page

POWER-FUND

Communicate innovative financing opportunities to address energy poverty and engage citizens

Go to the tool page

Energy Poverty Guidebook

An Energy Poverty Guidebook for Energy Planning for incorporating energy poverty mitigation actions in Sustainable Energy and Climate Action Plans (SECAPs)

Go to the tool page

POWERPOOR is an EU initiative

visit the official POWERPOOR website

POWERPOOR TOOLS USEFUL LINKS

Using the POWER TARGET tool

Welcome to PowerTarget

Is your energy spending high?
Find help to decrease it now!

➤ [Start Survey](#)

How it Works?

- 01** Complete the survey
- 02** Assess your energy expenses
- 03** Receive recommendations to decrease your energy costs

The POWER TARGET survey

The 3 sections that need to be filled in

1

2

3

POWERPOOR toolkit Home About Tools Contact

Home / PowerTarget / Survey

Personal Details

Country: Greece City: Athens

Income Information

Annual Income*: Enter annual income € Age*: Enter your age Number of dependant children*: Enter number of dependent children
Marital status*: Select marital status

Electricity Consumption

☐ I only use electricity to heat/cool my house

Select building

ID	Place	Details
39	Greece, Athens	60.0m ² , Apartment

Choose

Property Size (m²): Enter property size (m²) m² Energy Supplier: Enter energy supplier

Annual Consumption (kWh)*: Enter annual consumption (kWh) kWh Annual Cost of Electricity Bill*: Enter annual cost of electricity bill €

☐ I do not use thermostat

My air conditioning thermostat is set at:
In winter: Degrees Celsius In summer: Degrees Celsius

Heat Consumption

Heating fuel: Select heating fuel Annual Consumption: Enter annual consumption

Annual Cost of Heating Bill: Enter annual cost of heating bill € My thermal comfort during winter is*: Select thermal comfort

* Mandatory fields

Submit >



The POWER TARGET survey

Section 1 – Income information

1

Income Information

Annual Income*

Enter annual income

€

Age*

Enter your age

Number of dependent children*

Enter number of dependent children

Marital status*

Select marital status



... if there is a spouse fill in their income here

Income Information

Annual Income*

Enter annual income

€

Age*

Enter your age

Number of dependent children*

Enter number of dependent children

Marital status*

Married



Spouse Annual Income*

Enter spouse annual income

€



The POWER TARGET survey

Section 2 – Electricity consumption

Fields with an * are mandatory to fill in

Electricity Consumption

☐ I only use electricity to heat/cool my house

Select building

ID	39
Place	Greece, Athens
Details	60.0m ² , Apartment
Choose	

Property Size (m²)*
Enter property size (m²) m²

Energy Supplier
Enter energy supplier

Annual Consumption (kWh)*
Enter annual consumption (kWh) kWh

Annual Cost of Electricity Bill*
Enter annual cost of electricity bill €

☐ I do not use thermostat

My air conditioning thermostat is set at:

In winter:
Degrees Celsius

In summer:
Degrees Celsius



! Temperature in the house in winter and in summer



The POWER TARGET survey

Section 3 – Heat consumption

3

Heat Consumption

Heating fuel	Annual Consumption
Select heating fuel	Enter annual consumption
Annual Cost of Heating Bill	My thermal comfort during winter is:*
Enter annual cost of heating bill €	Select thermal comfort

* Mandatory fields

Are all the fields filled in with no errors?
Press the **Submit** button

Submit >



The POWER TARGET survey

Results...



[Home](#) [About](#) [Tools](#) [Contact](#)

[Home](#) / [PowerTarget](#) / [Survey](#) / [Results](#)

Results



Red classification



Your energy spending is critically high. You could greatly improve your living standard by participating in support actions to reduce your spending.

Classification according to the ratio of energy expenses to the income

Red (Very high)

Orange (high)

Yellow (Medium)

Green (Low)

Proposed Actions



Apply best practices to decrease energy consumption



Join an Energy Community as protected member



Programs to improve energy efficiency of your home



The POWER TARGET survey

Results...

Score	Description
0-6.99%	Green Classification: Not close to the energy poverty threshold
7%-9.99%	Yellow Classification: Not technically energy poor, but close to the energy poverty threshold (At risk of energy poverty)
10%-15%	Orange Classification: Energy Poor, adjusted percentage of energy spending is above threshold
>15%	Red classification: Energy Poor, adjusted percentage of energy spending significantly above threshold



POWER ACT



- ✓ Empowers energy poor citizens to understand their energy use, the benefits associated with energy efficiency interventions and encourages the installation of renewable power generation capacities

Overview of the My Account page



[Home](#)

[About](#)

[Tools](#) ▼

[Contact](#)

[Home](#) / [My Account](#)

My Account

[Dashboard](#)

[My Dwellings](#)

[Vulnerability Assessments](#)

[My Behavior Assessments](#)

Personal Information

@		🇬🇧	English	▼
🇬🇷	Ελλάδα	🏠	Athens	

[Edit](#)

PowerTarget

Take the survey to evaluate your energy spending and see how you compare with other households in your country.

PowerAct

Receive personalized suggestions and implement energy efficient behaviors to save money.



Using the POWER ACT tool

Or accessing it through the homepage

<http://powerpoor.epu.ntua.gr/powerpoor-toolkit/>



The screenshot shows the homepage of the POWERPOOR toolkit. At the top, there is a navigation bar with links for Home, About, Tools, FAQ, and Login, along with a language selector set to English. The main header features the text "Energy poverty mitigation tools for the POWERPOOR initiative" and two buttons: "learn more about the tools" and "have questions? read the FAQ". Below this, a section titled "WHAT'S IN THE POWERPOOR TOOLKIT" is highlighted with a red arrow. This section describes the main objective of the initiative and lists four tools: POWER-TARGET, POWER-ACT, POWER-FUND, and the Energy Poverty Guidebook. Each tool has a brief description and a "Go to the tool page" button. The bottom of the page features a blue banner stating "POWERPOOR is an EU initiative" with a button to "visit the official POWERPOOR website". The footer contains the POWERPOOR logo, links to TOOLS and USEFUL LINKS, and the European Union flag.

POWERPOOR toolkit

Home About Tools FAQ Login English

Energy poverty mitigation tools for the POWERPOOR initiative

learn more about the tools have questions? read the FAQ

WHAT'S IN THE POWERPOOR TOOLKIT

The main objective of POWERPOOR is to develop support programmes/schemes for energy poor citizens and encourage the use of alternative financing schemes (e.g. establishing energy communities / cooperatives, crowd funding)

POWER-TARGET

Targets energy poor citizens using a data-driven approach that allows for the identification of energy poor citizens, communities, neighbourhoods or districts

Go to the tool page

POWER-ACT

Empower energy poor citizens to understand their energy usage, the benefits associated from implementing energy efficient interventions and from installing renewable energy

Go to the tool page

POWER-FUND

Communicate innovative financing opportunities to address energy poverty and engage citizens

Go to the tool page

Energy Poverty Guidebook

An Energy Poverty Guidebook for Energy Planning for incorporating energy poverty mitigation actions in Sustainable Energy and Climate Action Plans (SECAPs)

Go to the tool page

POWERPOOR is an EU initiative

visit the official POWERPOOR website

POWERPOOR TOOLS USEFUL LINKS



Using the POWER ACT tool

Welcome to PowerAct

Assess your energy consumption
at home and save!

[> Start Assessment](#)

How it Works?

- 01** Take a short survey regarding the consumption in your home
- 02** Receive personalized suggestions for single behavior changes
- 03** Participate in funding programs for efficiency improvements



The POWER ACT survey

The 4 sections to be filled in

1

Building Selection

+ Add new	ID	38
	Place	Greece, Athens
	Details	60.0m ² , Apartment
Choose		

2

Building Information

Property Size (m ²) Enter Property Size (m ²) m²	Electricity Supplier* Enter electricity supplier
Number of household members* Enter number of household members	Cumulative hours spent at home / day* Enter cumulative hours spent at home / day *Enter a household with 3 members that each spends 16 hours at home on average, note about 42 hours/day

3

Heating

☐ I do not use a thermostat	
Heating fuel* Select heating fuel	Heating thermostat* I set my heating thermostat at Celsius
Last year consumption* Last year I consumed	Last boiler service* I serviced my boiler years ago Minimum 3 (years) if you do not have a boiler
When sat near a closed window in winter* Select	

4

Air-conditioning Operation

Do you use an electric air condition unit? Select	I last changed my air condition air filters* I last changed my air-condition air filters
My air conditioning thermostat is set at: In winter* Degrees Celsius	In summer* Degrees Celsius

Electric Appliances

For my lighting appliances I use* Select	To heat water I use* Select
Electric appliances that I use often* Select	

* Mandatory fields

Submit >



The POWER ACT survey

Section 1 – Building information

...choose one of the existing buildings or add a new one

Building Selection

+

Add new

ID	39
Place	Greece, Athens
Details	60.0m ² , Apartment
Choose	

Building Information

Property Size (m²)*

m²

Electricity Supplier*

Number of household members*

Cumulative hours spent at home / day*

Hint: A household with 3 members that each spends 14 hours at home on average, note down 42 hours/day

Fields with an * are mandatory



The POWER ACT survey

Section 2 – Heating

2

The screenshot shows the 'Heating' section of the survey. A green bracket on the left groups the 'Heating fuel*', 'Last year consumption*', and 'When sat near a closed window in winter: *' fields. A callout box for 'Heating fuel*' shows a dropdown menu with options: 'Select heating fuel', 'Natural Gas', 'Oil', 'Wood', 'Pellet', 'Propane', 'District Heating', and 'Electric Heating Appliances'. Another callout points to the 'I do not use a thermostat' checkbox. A third callout points to the 'Last boiler service*' field, with a note below it: 'Insert 0 (zero) if you do not use a boiler'.

Heating

Heating fuel*

Select heating fuel

Last year consumption*

Last year I consumed

When sat near a closed window in winter: *

Select

☐ I do not use a thermostat

Heating thermostat*

I set my heating thermostat at

Celsius

Last boiler service*

I serviced my boiler

years ago

Insert 0 (zero) if you do not use a boiler

! Qualitative assessment relevant to thermal comfort

When sat near a closed window in winter: *

The callout shows a dropdown menu with the following options: 'Select', 'I feel considerably colder than in other areas of my home', 'I feel slightly colder than in other areas of my home', and 'I do not notice any difference in my thermal comfort'.

Select

Select

I feel considerably colder than in other areas of my home

I feel slightly colder than in other areas of my home

I do not notice any difference in my thermal comfort

According to the selected fuel
e.g., litters for oil or kWhs for gas

The POWER ACT survey

Section 3 – Air conditioning operation

3

Air-conditioning Operation

Do you use an electric air-condition unit?*

Select

Do you use an electric air-condition unit?*

Select

Select

Only in summer

In winter and summer

I do not use air condition

I last changed my air-condition air filters:*

I last changed my air-condition air filters:

My air conditioning thermostat is set at:

In winter:*

Degrees

Celsius

In summer:*

Degrees

Celsius

I last changed my air-condition air filters:*

I last changed my air-condition air filters:

I last changed my air-condition air filters:

I changed them less than 1 year ago

I changed them less than 2 years ago

I changed them more than 2 years ago

I do not know



The POWER ACT survey

Section 4 – Electric appliances

Electric Appliances

For my lighting appliances I use:*

Select

To heat water I use:*

Select

Electric appliances that I use often:*

Select

* Mandatory fields

Electric appliances that I use often:*

Select

Select

Remain in standby mode

Are turned off when not used

Are sometimes kept in standby mode when not used

For my lighting appliances I use:*

Select

Select

Halogen light bulbs

Both halogen and LED bulbs

LED bulbs

Incandescent lamps

CFL bulbs

To heat water I use:*

Select

Select

Electric water boiler

Electric water boiler and solar boiler

Natural gas boiler and solar boiler

Natural gas boiler only

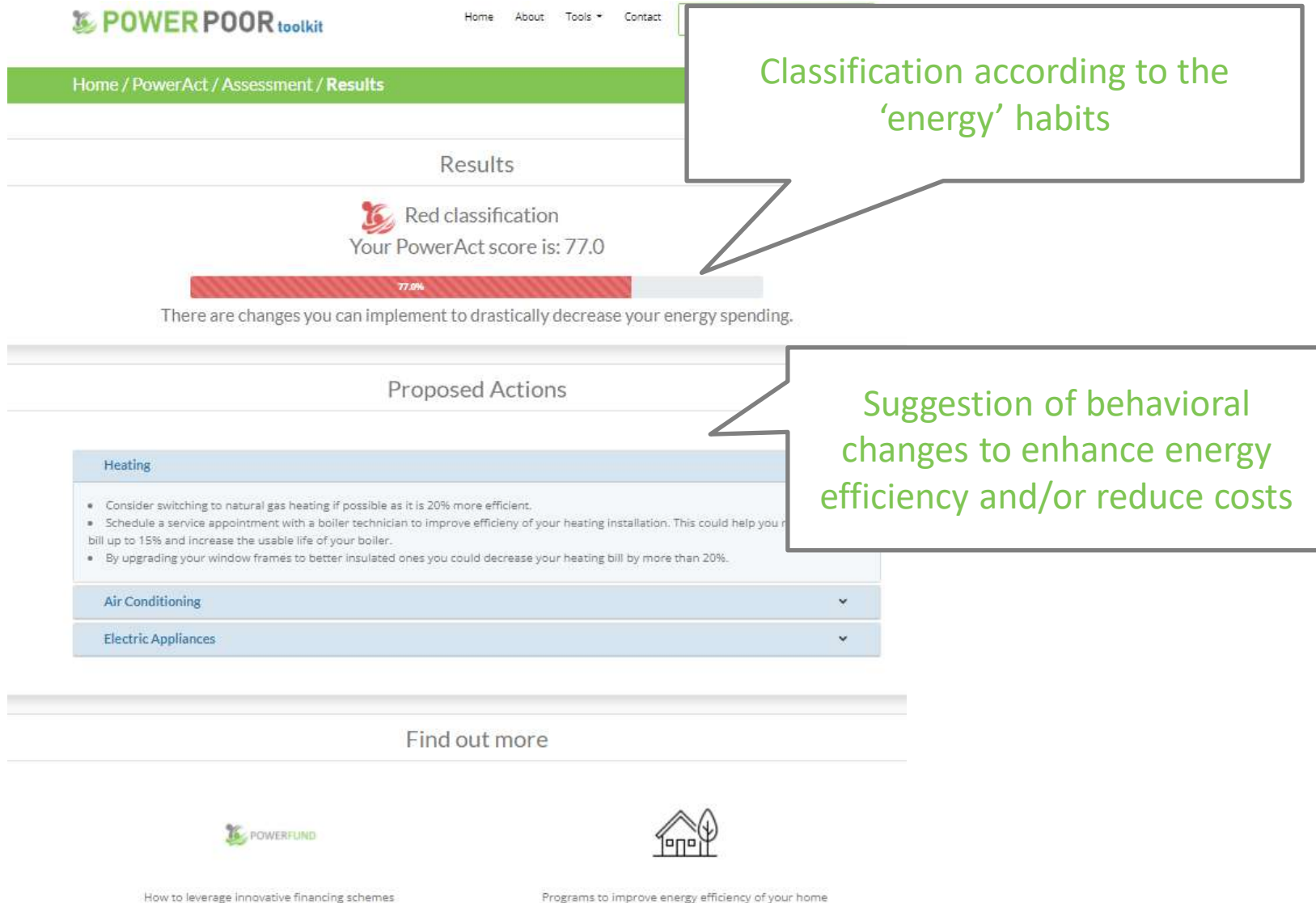
District heating system

Are all the fields filled in with no errors?
Press the **Submit** button

Submit >

The POWER ACT survey

Results...



The POWER ACT survey

Results...

Score	Description
0-30	Red classification: Responses to multiple structured questions indicate significant margin for improvement in the behavioural aspect.
30-50	Yellow Classification: Responses indicate user has adopted a limited number of energy efficient practices but substantial margin for improvement remains.
50-75	Blue Classification: Responses from structured questions indicate adoption of multiple energy efficient practices. There is still some margin of improvement.
75-100	Green classification: Responses from structured questions indicate exceptional adoption of energy efficient practices. There is very limited room for improvement with implementing only behavioural changes.





Exercise

Reading a utility bill



Reading a utility bill

1. Electricity bill
2. Energy (kWh) spent for a specific time period
3. The time period

Tip!

To calculate the **annual electricity bill** (kWh), add the respective kWhs spent and the cost during the last year.

For the specific Greek supplier (DEH) the time period is 4 moths. That way we can use the last 4 bills and they will add up to the expenses of a year.

ΔΕΗ Α.Ε.
Χαλκοκονδύλη 30, 104 32 Αθήνα,
Α.Φ.Μ. 090000045, Δ.Ο.Υ. ΦΑΕ ΑΘΗΝΩΝ
dei.gr

ΕΞΥΠΗΡΕΤΗΣΗ ΠΕΛΑΤΩΝ ΔΕΗ
800 900 1000 (ΔΩΡΕΑΝ)
ΚΑΤΑΣΤΗΜΑ ΚΟΡΩΠΙΟΥ
Β.ΚΩΝ/ΝΟΥ 250-Γ.ΚΟΥΛΟΧΕΡΗ 194 00

ΕΞΥΠΗΡΕΤΗΣΗ ΔΕΔΔΗΕ
11500
2111900500
Πληροφορίες | Βλάβες |
Καταμέτρηση

183 170098

ΠΑΠΑΔΟΠΟΥΛΟΥ ΜΑΡΙΑ
ΔΕΛΦΩΝ 99
888 88 ΚΑΡΔΙΤΣΑ

Κωδικός ηλεκτρονικής πληρωμής
RF959077380008212345XXXXX

00000231,00 1

Εκκαθαριστικός λογαριασμός

Τιμολόγιο:	Γ1 Οικιακό Τιμολόγιο
Διεύθυνση ακινήτου:	ΘΑΣΟΥ 14 121 35 ΓΕΡΑΚΑΣ
Επόμενη καταμέτρηση:	
Αριθμός παροχής	1 23456789-012
Χρεώσεις προμήθειας ΔΕΗ	138,27€
Ρυθμιζόμενες χρεώσεις	83,05€
Έναντι Κατανάλωσης	-37,07€
Διάφορα - Δήμος - ΕΡΤ	22,39€
ΦΠΑ	24,36€
Προηγούμενο Ανεξόφλητο Ποσό	
*Αγνοήστε το εάν έχει πληρωθεί	
Συνολικό ποσό πληρωμής	*231,00€

ΠΟΣΟ ΠΛΗΡΩΜΗΣ
***231,00€**

ΕΞΟΦΛΗΣΗ ΕΩΣ
04/10/2018
Λογαριασμός εξοφλούμενος από την EUROBANK

Σκανάρετε για άμεση εξόφληση

Η κατανάλωσή σας

Κατανάλωση Ηλεκτρικής Ενέργειας	1445 kWh
Περίοδος Κατανάλωσης	11/05/2018 - 11/09/2018
Ημέρες	124
Ημ/νία Έκδοσης	11/09/2018
Α/Α Λογαριασμού	111111111

Reading a utility bill

1. Natural Gas bill
2. Total energy spent in a specific time period
3. The time period



ΕΤΑΙΡΕΙΑ ΠΡΟΜΗΘΕΙΑΣ ΑΕΡΙΟΥ ΘΕΣΣΑΛΟΝΙΚΗΣ - ΘΕΣΣΑΛΙΑΣ Α.Ε.
ΓΡΑΦΕΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ: 28ης ΟΚΤΩΒΡΙΟΥ 54-56, Τ.Κ. 54627, ΘΕΣΣΑΛΟΝΙΚΗ
Α.Φ.Μ. 999306648 Δ.Ο.Υ. Φ.Α.Ε. ΘΕΣΣΑΛΟΝΙΚΗΣ
ΓΡΑΦΕΙΟ ΘΕΣΣΑΛΙΑΣ: ΦΑΡΕΛΛΩΝ 217, Τ.Κ. 41335, ΛΑΡΙΣΑ
ΤΗΛ. ΕΞΥΠ. ΠΕΛΑΤΩΝ: 18321



POWERPOOR

ΛΟΓΑΡΙΑΣΜΟΣ ΦΥΣΙΚΟΥ ΑΕΡΙΟΥ
ΤΥΠΟΣ ΛΟΓΑΡΙΑΣΜΟΥ Εκκαθαριστικός

ΥΠΟΔΕΙΓΜΑ

ΑΡΜΟΔΙΟ ΓΡΑΦΕΙΟ ΕΞΥΠΗΡΕΤΗΣΗΣ ΠΕΛΑΤΩΝ

Επωνυμία/Διεύθυνση Ακινήτου
ΠΑΠΑΔΟΠΟΥΛΟΣ ΓΕΩΡΓΙΟΣ
ΑΘΑΝΑΣΙΟΥ ΔΙΑΚΟΥ
ΕΥΟΣΜΟΣ
Α.Φ.Μ. 123456789 Δ.Ο.Υ. ΑΜΠΕΛΟΚΗΠΩ
ΕΓΓΥΗΣΗ 228,00 €

Επωνυμία/Διεύθυνση Αποστολής
ΠΑΠΑΔΟΠΟΥΛΟΣ ΓΕΩΡΓΙΟΣ
ΑΘΑΝΑΣΙΟΥ ΔΙΑΚΟΥ 69 /ΙΣΟΓΕΙΟ
56224 ΕΥΟΣΜΟΣ

ΑΡ. ΕΓΓΡΑΦΟΥ	ΗΜ. ΕΚΔΟΣΗΣ	ΧΡΗΣΗ	ΚΑΤΗΓΟΡΙΑ ΤΙΜΟΛΟΓΗΣΗΣ	ΕΠΟΜΕΝΗ ΚΑΤΑΜΕΤΡΗΣΗ
ΛΦΑ180000220	26/01/2018	Εμπορική	T3	21-31 ΙΑΝΟΥΑΡΙΟΥ
ΚΩΔΙΚΟΣ ΠΕΛΑΤΗ	ΜΕΤΡΗΣΗΣ	ΣΥΝΤ. ΔΙΟΡΘΩΣΗΣ	ΗΜΕΡΕΣ ΑΝΑΦΡΑΣ	ΠΕΡΙΟΔΟΣ ΚΑΤΑΝΑΛΩΣΗΣ
11E348255	004801756	0,98653	18	ΑΠΟ 05/12/2017 ΕΩΣ 22/12/2017
ΤΥΠΟΣ ΜΕΤΡΗΣΗΣ	ΗΚΑΔΠ	ΟΡΙΑ ΔΥΝΑΜΙΚΟΤΗΤΑ	ΠΡΟΗΓΟΥΜΕΝΗ ΚΑΤΑΝΑΛΩΣΗ	ΤΕΛΕΥΤΙΑ ΚΑΤΑΝΑΛΩΣΗ
G6	20190002927926	111,50	4,644	4,946
			ΔΙΑΦΟΡΑ (m³)	302
			ΚΑΤΑΝΑΛΩΣΗ (Nm³)	297,93

ΣΥΝΟΠΤΙΚΟΣ ΛΟΓΑΡΙΑΣΜΟΣ

Χρεώσεις Προμήθειας	
Προμήθεια Φ.Α.-Zenith	86,65
Ρυθμιζόμενες Χρεώσεις	
Διανομή Φ.Α. (ΕΔΑ)	42,10
Μεταφορά Φ.Α. (ΔΕΣΦΑ)	9,85
Διάφορες Χρεώσεις / Πιστώσεις	
Φόροι-Τέλη	19,01
Αξία Φ.Π.Α.	20,39
Σύνολο Τρέχοντος Λογαριασμού	178,00
Προηγούμενο Ανεξόφλητο Υπόλοιπο (Αγνοήστε το αν έχει πληρωθεί ή διακανονισθεί)	435,72



Μάθετε πρώτοι για τα νέα προγράμματα ηλεκτρικής ενέργειας της Zenith.

POWER HOME

POWER HOME NIGHT

POWER HOME PACK

Ο 1ος πάροχος ολοκληρωμένης ενέργειας
Και φυσικό αέριο και ρεύμα!

ΛΗΞΗ ΠΛΗΡΩΜΗΣ	ΠΙΣΤΟ ΠΛΗΡΩΜΗΣ
14/02/2018	613,72 €

ΚΩΔΙΚΟΣ ΠΛΗΡΩΜΗΣ ΣΕ ΤΡΑΠΕΖΑ / ΕΛΤΑ XXXXXXXXXXXXXXXXXXXX

ΚΩΔΙΚΟΣ ΑΝΑΘΕΣΗΣ ΠΑΓΙΑΣ ΕΝΤΟΛΗΣ XXXXXXXXXXXXXXXXXXXX



Εκρεμεί η αποπληρωμή προηγούμενων οφειλών συνολικού 435,72 €
ΠΡΟΣΟΧΗ!!! Ενδεχόμενη διακοπή παροχής αερίου σε περίπτωση προηγούμενων ληξιπρόθεσμων οφειλών σας.
Εάν η παραπάνω εκκρεμότητα έχει ήδη τακτοποιηθεί, παρακαλούμε αγνοήστε το παρόν μήνυμα.



Thank you!

Eleni Kanellou, NTUA,
ekanellou@epu.ntua.gr





POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part III - From theory to practice. Good practices and case studies - Energy-saving measures, behavioural changes, visits to vulnerable households

Eleftheria Touloupaki,
Architect Engineer PhD cand., Scientific Associate INZEB
26 October 2022



This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 890437

Household energy performance

1. Introduction: household energy consumption, terminology
2. Simple energy audit
3. Simple energy efficiency measures and practical tips

PART III: Household energy performance

1. Introduction: household energy consumption, terminology

BASIC TERMS

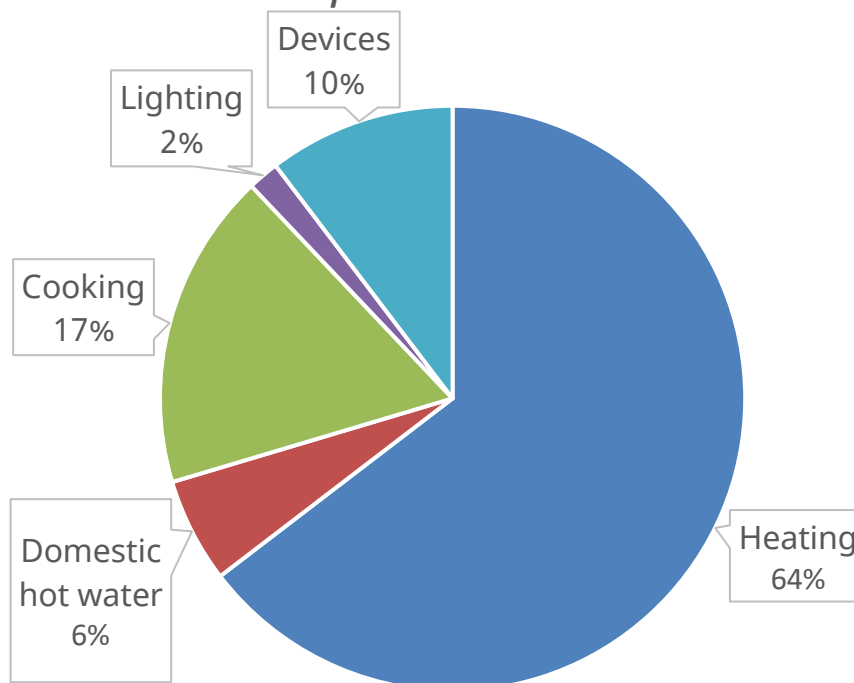
Energy (kWh) = Power (kW) x time (h)

1kWh:

- 10W LED bulb x 100h (~4 days)
- 2kW electric water heater x 0.5h
 - Energy to heat 21l of water from 10C to 50C
- 2kW electric convection heater x 0.5h

The typical non-energy efficient home in Greece consumes
~250kWh/m²

Average household energy consumption in Greece



Source: Hellenic Statistical Authority

PART III: Household energy performance

1. Introduction: household energy consumption, terminology

BASIC TERMS

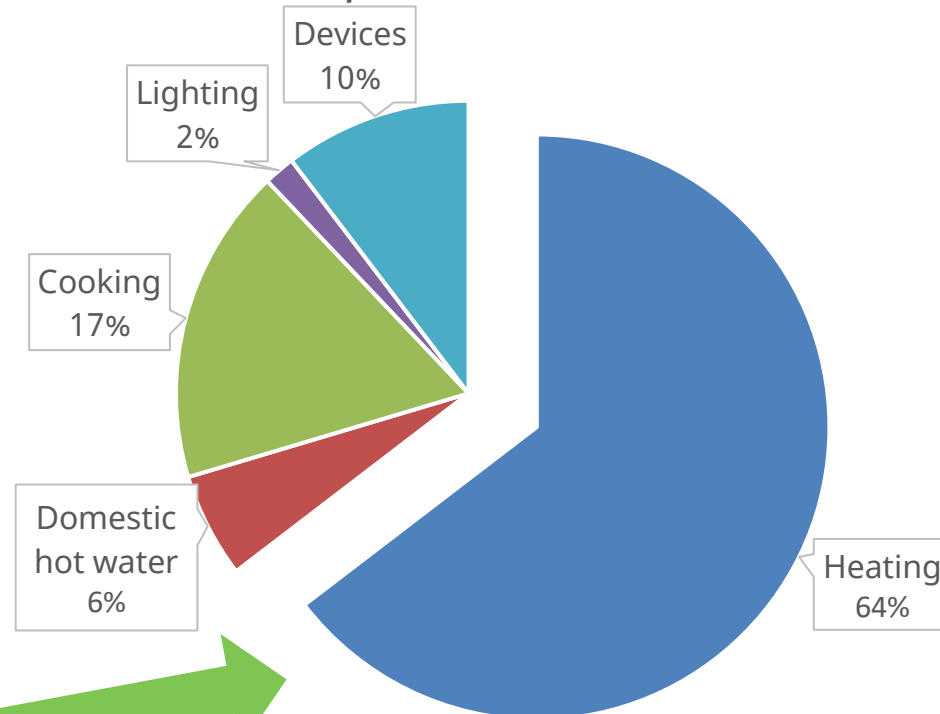
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- 2kW electric water heater x 0.5h
 - Energy to heat 21l of water from 10C to 50C
- 2kW electric convection heater x 0.5h

The typical non-energy efficient home in Greece consumes
~250kWh/m²

Why is it important to focus on heating when talking about energy efficiency?

Average household energy consumption in Greece



Source: Hellenic Statistical Authority

PART III: Household energy performance

1. Introduction: household energy consumption, terminology

Most common heating sources of energy:

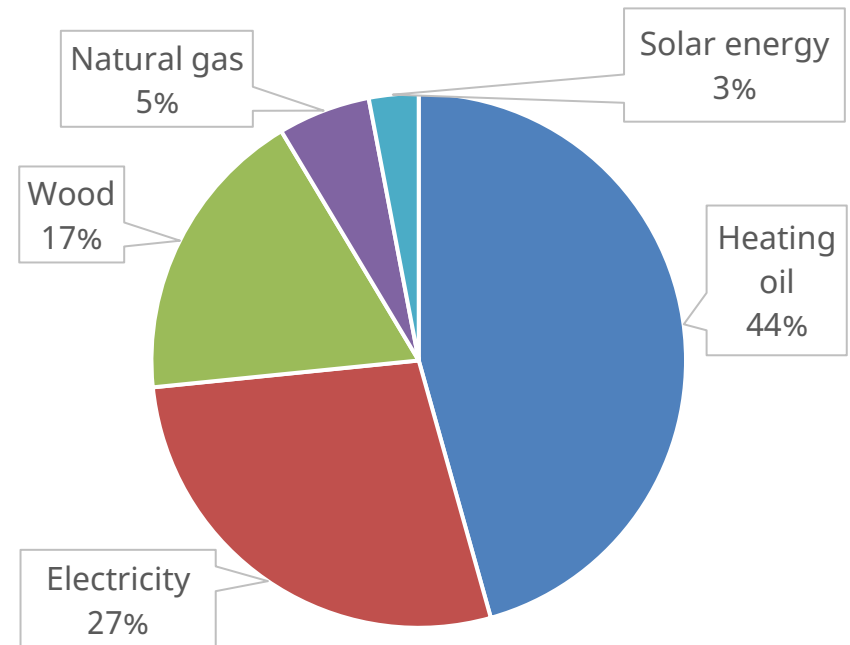
Wood

- Direct heating (stove, fireplace)
- Furnace connected to hot water tank + radiators

Electric

- Electric resistive heating
 - Convection heaters
 - Radiating heaters
 - Thermal storage heaters
- Air to air heat pumps – air conditioning devices

Final energy fuel distribution in Greece



Source: Hellenic Statistical Authority

PART III: Household energy performance

1. Introduction: household energy consumption, terminology

Most common heating sources of energy:

Natural gas

- Typically furnace connected to hot water tank + radiators

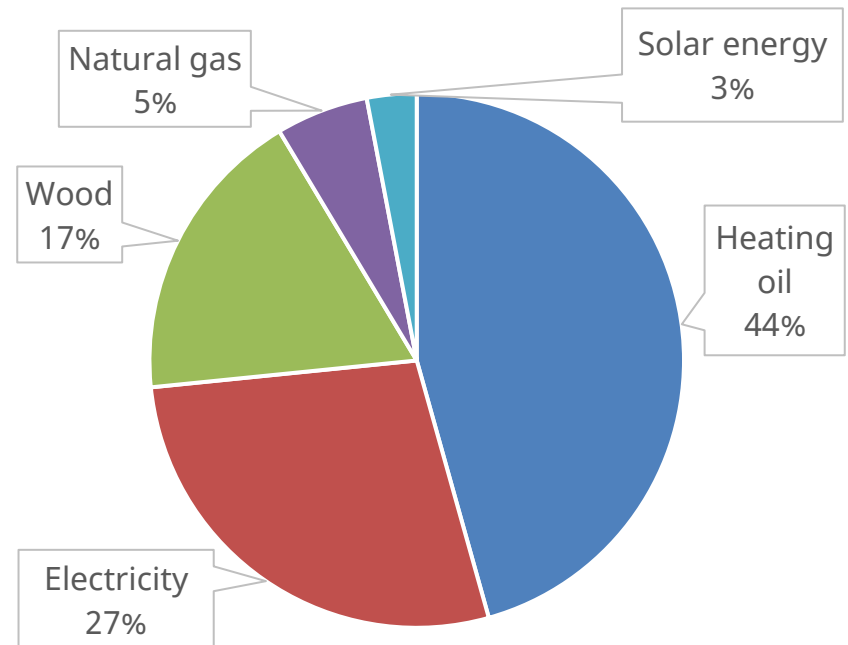
District heating

- Urban areas, apartment buildings
- Fuel source is typically fossil fuel

Light distillate (heating) oil & Liquid Petroleum Gas (LPG)

- Typically furnace connected to hot water tank + radiators

Final energy fuel distribution in Greece



Source: Hellenic Statistical Authority

PART III: Household energy performance

1. Introduction: Heating technology overview

	UNIT	COST*	FEATURES	SAFETY
Wood	m3 for raw wood Kg/ton for pellets	~0.035EUR/kWh ✓ important to use properly dried wood	• Direct heating (stove in living space) or • Central heating (furnace + water distribution to radiators) • 1 „spatial meter of wood“ =1575 kWh	• Carbon monoxide (CO) suffocation risk if chimney is not regularly maintained • Fire hazard if stove is faulty
Electric – resistive	kWh	Day: ~0.22EUR/kWh Night: ~0.13EUR/kWh	• Simple to use • Thermal electric storage heaters taking advantage of lower tariff	• Fire hazard if devices are faulty or if heaters are covered
Electric – heat pump (Air-Air)	kWh	Day: ~0.22EUR/kWh Night: ~0.13EUR/kWh	• Coefficient of Performance 2.5-4: for 1kWh electricity, 2.5-4kWh thermal energy is pumped into indoor space. • Lower efficiency at lower outdoor temperatures	• Some devices cannot operate at low outdoor temperatures (-5C or lower)



PART III: Household energy performance

1. Introduction: Heating technology overview

	UNIT	COST*	FEATURES	SAFETY
Natural gas	m ³ /kWh	~0.12EUR/kWh	- Regulations allow only condensation boilers to be sold, which have higher requirements for chimneys. Customers often need chimney reconstruction and delay replacing old boilers 1 m³ = 9,4-10,2 kWh	- Some gas boilers need minimal water pressure to operate properly, water reactors can cause issues - Carbon monoxide (CO) suffocation risk if chimney is not regularly maintained
District heating	kWh, kW, m ²	~0.025EUR/kWh	- Confusing billing methods reduced customer trust in district heating schemes - Cannot cover all areas	
Heating oil & LPG	Liters, kg	~0.12EUR/kWh ~0.15EUR/kWh	- Local storage tank required 1 L heating oil = 11,86 kWh 1 kg LPG= 12,80 kWh	Fire hazard due to storage of flammable fuel

* Reference values only (for Greece), actual prices vary due to multiple factors

PART III: Household energy performance

1. Introduction: Building thermal envelope

Thermal insulation

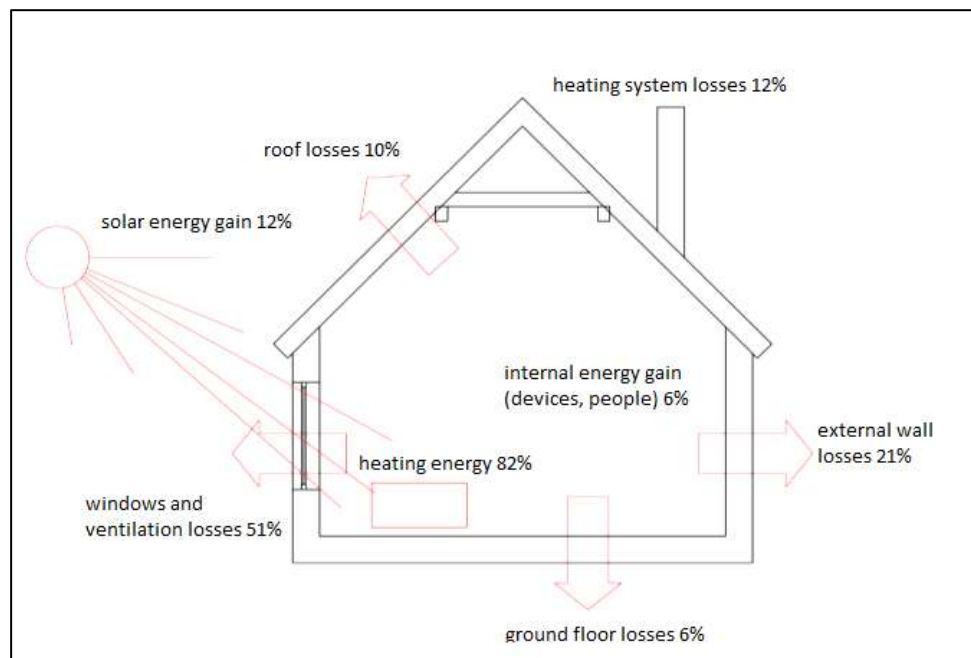
- Walls, roofs, windows, floors
- Important to avoid thermal bridges

Thermal mass

- More thermal mass indoors increases thermal inertia and makes the space more thermally passive
- E. g. solar thermal energy can be stored by the floor below the window

Heating system efficiency

- Regular maintenance is important for efficient heating system operation
- Correct temperature setpoint regulation can reduce energy consumption
- Is the heat distributed in equally or concentrated in one spot?



Reference values for thermal energy gains and losses / Source: REACH

Air-tightness

- Gaps on windows & doors cause drafts & thermal energy leaks
- Bathroom and kitchen extraction fans need non-return flaps to reduce draft

PART III: Household energy performance

1. Introduction: Building thermal envelope

Geographic orientation

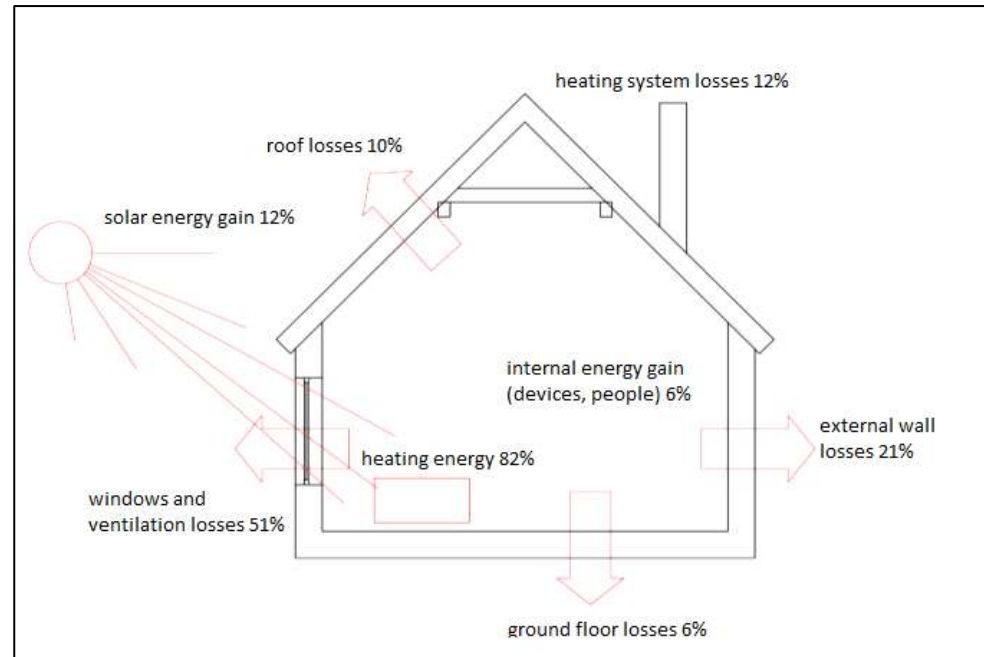
- Orientation towards south results in more solar energy gain
- Eaves above windows allow low angle winter sun to enter the windows, while keeping out high-angle summer sun

Shape / form factor

- Compact space distribution with minimal surfaces exposed to outside conditions result in less energy losses

Neighboring dwellings

- Walls shared with heated areas lose less energy



Reference values for thermal energy gains and losses / Source: REACH

PART III: Household energy performance

1. Introduction: Building thermal envelope

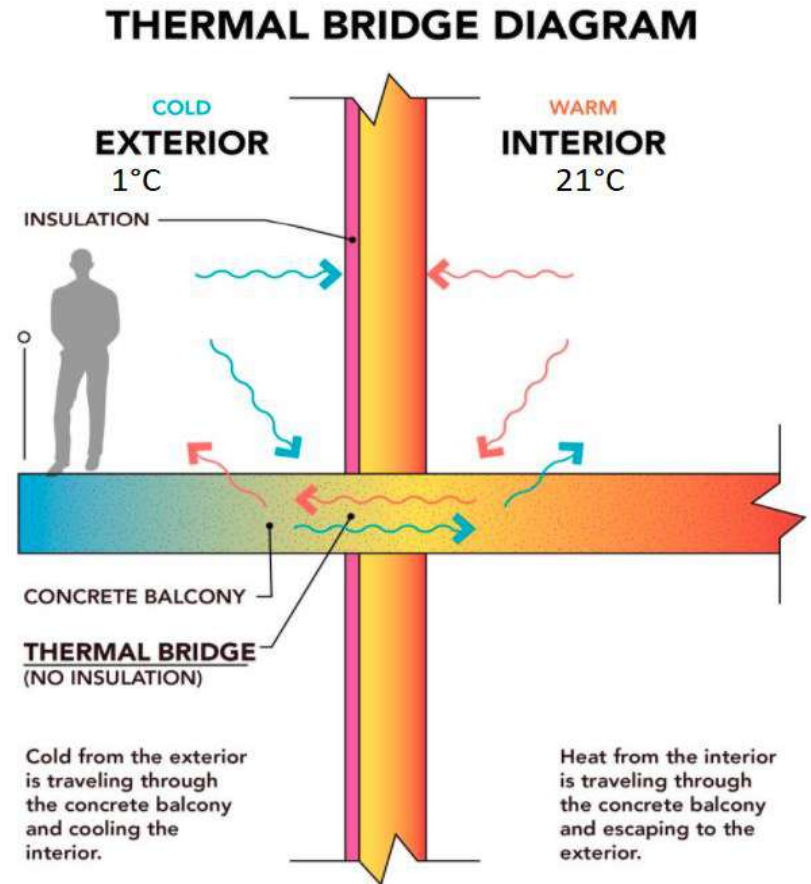
Thermal bridge

- Thermal conductive connection between interior and exterior of the building
- Non-insulated walls, concrete balconies

Water vapour, air tightness & mold

- 1 person can generate ~1.5kg water vapour per day
- Cooking, showering, drying clothes, dishwashing also generate water vapour
- If living space is air-tight and not ventilated, water remains trapped inside
- Mold often occurs on cold spots where water vapour condensates (thermal bridges)

<https://www.isse.org.uk/articles/dampness>



<https://civilengineering4u.wordpress.com/2017/05/29/thermal-bridging/>



PART III: Household energy performance

2. Simple energy audit

Goal of the simple energy audit is to gather key information **to determine the existing energy situation** in the household.

After the audit, energy supporters should be able **to propose measures to reduce energy costs and increase quality of life.**

Checklist

Heating/cooling
system

Energy
performance of
the building

Energy
appliances

Energy
behaviour

Safety
considerations

Energy bill
analysis

PART III: 2. Simple energy audit

Key steps

DATA COLLECTION

Find:

Energy consumption for heating, electricity, water (kWh, l.)

Energy use: heating types (gas, wood!, district heating, oil, electricity), electric devices (how many, stand-by consumption...)

Energy performance of the building envelope: insulation, outer walls, roof, chimney, thermal bridges.



ENERGY ANALYSIS

Define:

Consumption patterns (e.g. season, daily, monthly)

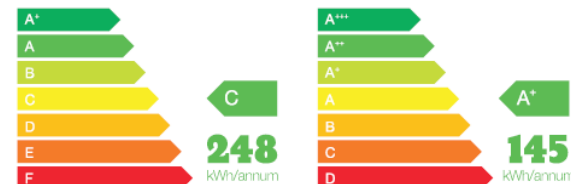
Significant energy use (will lead to best EE measure pay-off)

Benchmarks (using the latest energy performance indicators kWh/m2)



PRESENTATION OF RESULTS

Report to beneficiary
Certification



PART III: Household energy performance

2. Simple energy audit

POINTS TO KEEP IN MIND

HEATING

- Heating type – gas/district heating/electricity/wood/pellets
- Positioning of heat emission devices in the living/working space – are heating devices close to cold walls that act as heat sinks? What is the heat distribution in the room?
- Heating system service periods

BUILDING ENERGY PERFORMANCE

- Wall composition from inside to outside with focus on thermal insulation and thermal mass properties; detection of potential thermal bridges
- Windows and doors – air tightness inspection, glass type (single/double/triple)
- Ventilation openings – air flow inspection in the kitchen and bathroom extraction fan openings

PART III: Household energy performance

2. Simple energy audit

POINTS TO KEEP IN MIND

ENERGY BEHAVIOR

- What are the biggest “energy pain points”?
- Parts of the house/flat that feel cold
- Any activities that are avoided because of cold – e.g. sitting at the table for too long
- Body parts that feel cold – feet, hands, back
- Determine if there are any applicable government energy poverty alleviation schemes
- How long will the tenants live in the property?
- Any renovation needed/planned soon?

SAFETY

- State of the chimney - Carbon monoxide hazard
- Old electric heaters, obstructing airflow around heaters
- Electric installation (e.g. if high-power electric heaters are used)



PART III: Household energy performance

2. Simple energy audit

USEFUL TOOLS



- Distance meter
- kWh meter
- Photo camera
- Infrared thermometer



PART III: Household energy performance

2. Simple energy audit

COMMUNICATION TIPS when performing household visits

BENEFICIARIES COULD BE:

- Elderly people,
- People with various health problems (physical and mental): hearing or visually impaired, anxious, depressive.

DO's and DONT's of household visit

- First contact is important: smile, introduce yourself, make eye contact, shake hands (but be aware of COVID-19 measures!)
- Explain the purpose of the visit and what will happen during the visit.
- DO NOT enter the house prior to invitation!
- DO NOT enter the rooms without the presence of the beneficiary!
- Repeat that the energy visit is FREE of CHARGE, you are not selling anything!
- Up to 2 persons are optimal for the visit
- Adapt the communication based on beneficiary health status (hearing, vision, invalid person...)
- Leave contact details and inform them about the next steps
- Respect the dignity of the beneficiary, their home, privacy, values.
- DO NOT share private data with third persons (GDPR).
- Listen to the beneficiary patiently, but allow yourself to leave (if you have enough data, or if it is not comfortable for you).
- Inform mentor if any problem occurs.



PART III: Household energy performance

3. Energy efficiency measures and practical tips

How to save energy?

REDUCE TOTAL ENERGY CONSUMPTION but do not reduce comfort (improve it)

FIND SIGNIFICANT ENERGY USERS

- **Replace with EE**
New A rating (2020) consumes up to 100 kWh less per year or
- **Reduce their operation time**
Using timer for electric water heater

FIND THERMAL BRIDGES or HOLES like windows, entrance door, outer walls, ceiling toward non-heated attic

- **“Patch” them**

Insulation strips, reflexive foils, thermal insulation

USE NATURAL LIGHTING AND SUN RADIATION OPTIMALLY by adjusting room orientation/use, shading devices

PROTECT HOUSE FROM OVERHEATING IN SUMMER by using blinds, eaves, trees on south side of the house

Simple measures will show quick results with small investment, but low impact.

Optimal measure is one with quick results, lower investment and higher impact

= SHORT PAYBACK PERIOD

ENERGY RENOVATION as a long-term approach



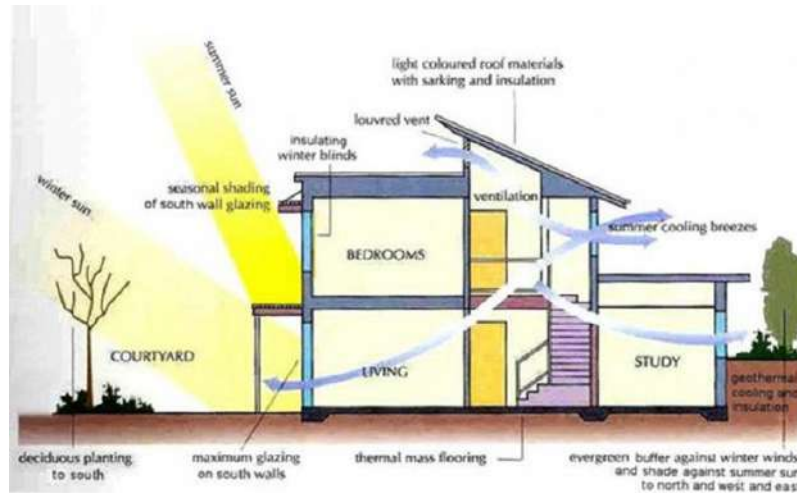
PART III: Household energy performance

3. Energy efficiency measures and practical tips

EXAMPLE: Passive solar retrofit 250 kWh/m² to 15 kWh/m² annually

MAXIMIZE

- solar gain in heating season
- thermal insulation (cost effective!)
- use of wasted heat (heat exchangers)
- use of renewable sources



MINIMIZE

- solar gain in cooling season (no need for air conditions)
- air leaks (but allow fresh air to come in!)
- thermal bridges

OPTIMIZE

- thermal mass (slows down temperature change!)



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house
250 kWh to 90 kWh per m²

LARGE investments

1. **THERMAL INSULATION** of outer envelope
2. **EE** windows and doors
3. **HEATING SYSTEM** renewed
4. **SOLAR THERMAL** system

SMALL and MEDIUM investments:

EE lighting, EE appliances, draft proofing, water saving devices

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION

MEASURE	INVESTMENT	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
10 cm mineral wool/EPS on outer wall	40-45 Eur/m ²	~15 (depends on energy used)	50
20 cm mineral wool in roof	10 Eur/m ²	3-5 (depends on energy used)	50

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION

- MOISTURE problems if material with **low vapour diffusion factor** is used
- **Good ventilation** is crucial
- THERMAL BRIDGES - High quality installation reduces risk of TB on windows, doors, roofs



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION



Natural materials increase sustainability by reducing embedded energy
(recycled cellulose, sheep wool, straw bale)

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

ENERGY EFFICIENT windows and doors

U value – heat transfer coefficient: lower U – better insulation - higher price

MEASURE	INVESTMENT	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
ENERGY EFFICIENT windows • PVC, alu, wood • U value less than 1,2 W/m²K)	300-400 EUR/m ²	~15-20 (depends on type installed and energy used)	50



PART III: Household energy performance

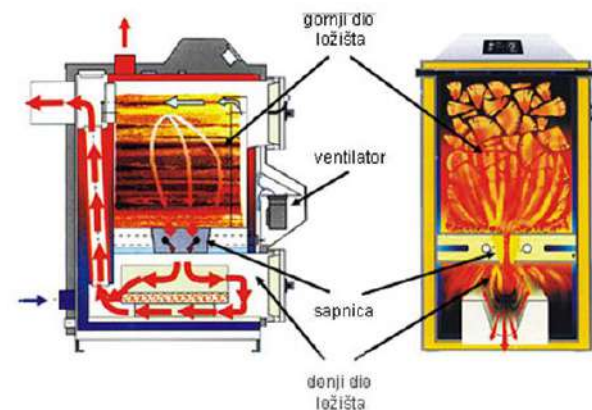
3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

HEATING SYSTEM – change of energy source from heating oil to biomass

MEASURE	INVESTMENT	ANNUAL ENERGY SAVINGS	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
BIOMASS pirolitic instead of heating oil boiler	5800 EUR	2600 L oil	3-4	15
BIOMASS pelet instead of heating oil boiler	3000 EUR	2100 L	2-3	15

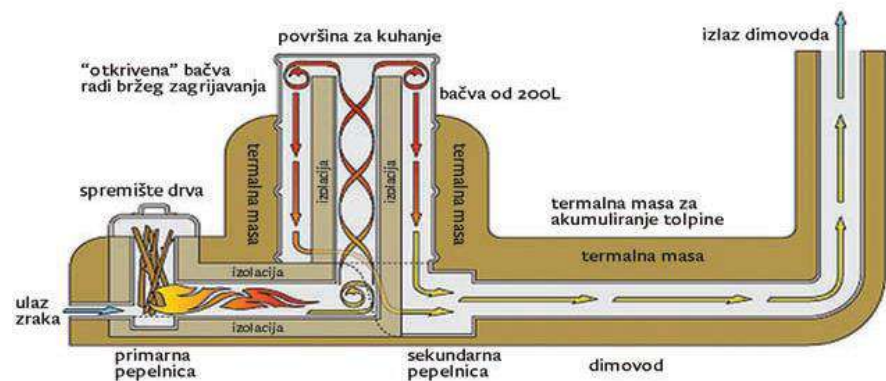
Sources: DOOR, <https://door.hr/>
<https://www.centrometal.hr/>



PART III: Household energy performance

3. Energy efficiency measures and practical tips

HEATING SYSTEM – standard wood burning furnace vs. high efficient „Rocket stove”



Sources: DOOR, <https://door.hr/>
<https://www.zmag.hr/>



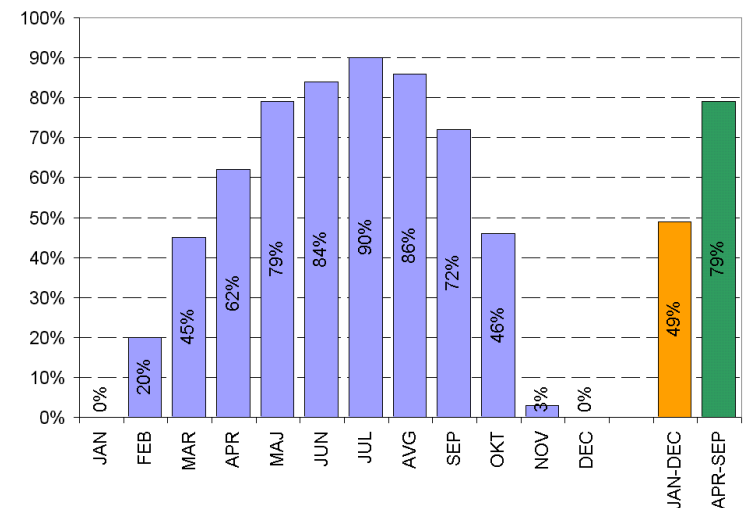
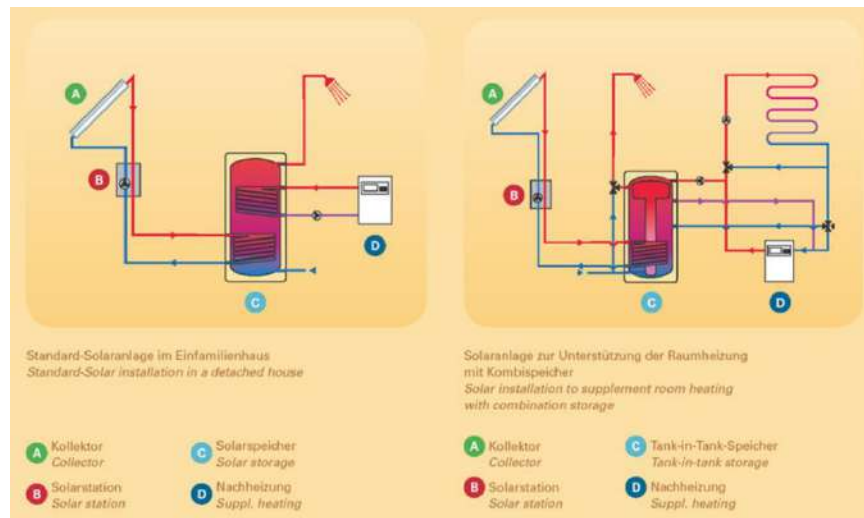
PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

MEASURE	INVESTMENT	ANNUAL ENERGY SAVINGS	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
SOLAR THERMAL SYSTEM instead of ELECTRIC BOILER for sanitary water and/or heating backup	3000 EUR	2000 kWh	10 (no incentives or change in electricity price)	25

Source: DOOR, <https://door.hr/>



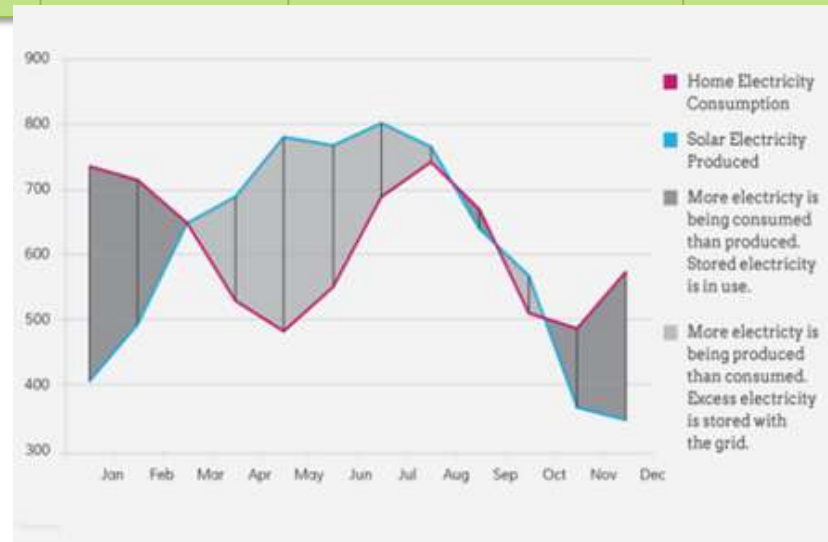
PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

MEASURE	INVESTMENT (design, equipment, transport, installation, insurance)	ANNUAL FINANCIAL SAVINGS	SIMPLE PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
Photovoltaic power plant for own supply (4 kW)	~ 3500 EUR	385 EUR	9 years	25

Source: DC



Thank you for your attention!

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POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part III - From theory to practice. Good practices and case studies - Working on the ground with energy-poor households and policymakers on lowering energy poverty levels

Anamari Majdandžić (DOOR)

26th October 2022



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Module 2 – Structure and content

-  Module content
 -  PART I – EU energy poverty alleviation policies
 -  PART II - Energy poverty alleviation actions
 -  PART III - Household Energy Performance
-  Module summary
 -  Key takeaways
 -  Further reading

Module 2 – Goals

-  To identify the types of energy poverty alleviation policies and measures adopted by different stakeholders, with emphasis on their results and benefits for citizens facing energy poverty episodes
-  To provide trainers, supporters and mentors information, tips and tools to improve Household Energy Performance

PART I: European energy poverty alleviation policies

1. Types and categories of energy poverty alleviation policies

2. Key energy poverty alleviation policies at the EU level

3. Summary of all national policies + case studies/actions/best practices from partners

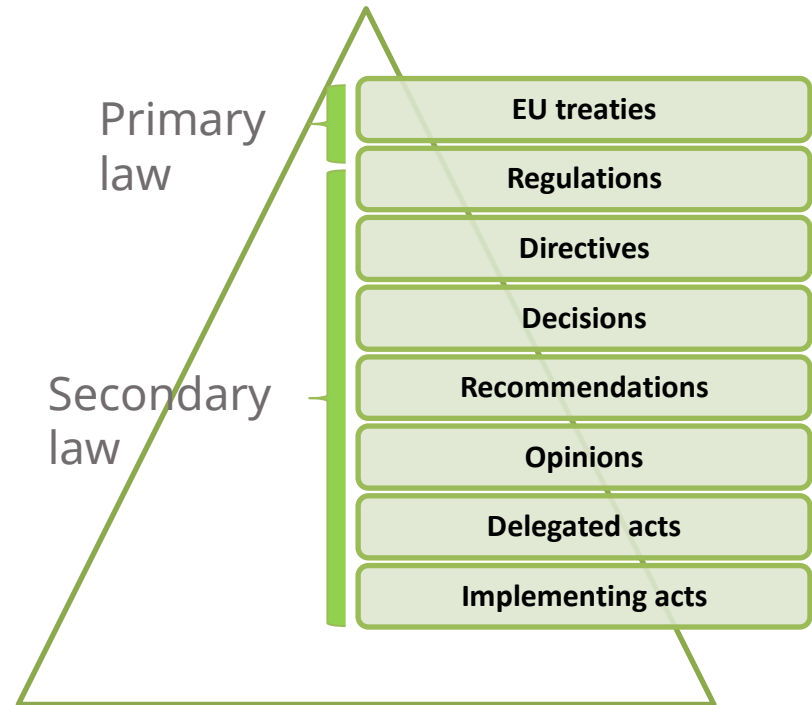
PART I: EU energy poverty alleviation policies

1. Types and categories of energy poverty alleviation policies

The rule of law is one of the fundamental values of the European Union. This means that every action taken by the EU is based on treaties that have been democratically approved by its members.

EU laws help the Union achieve objectives established in EU treaties and put EU policies into practice. There are two main types of EU laws:

- ✓ **Primary and secondary laws**
- ✓ **Legislative and non-legislative acts**

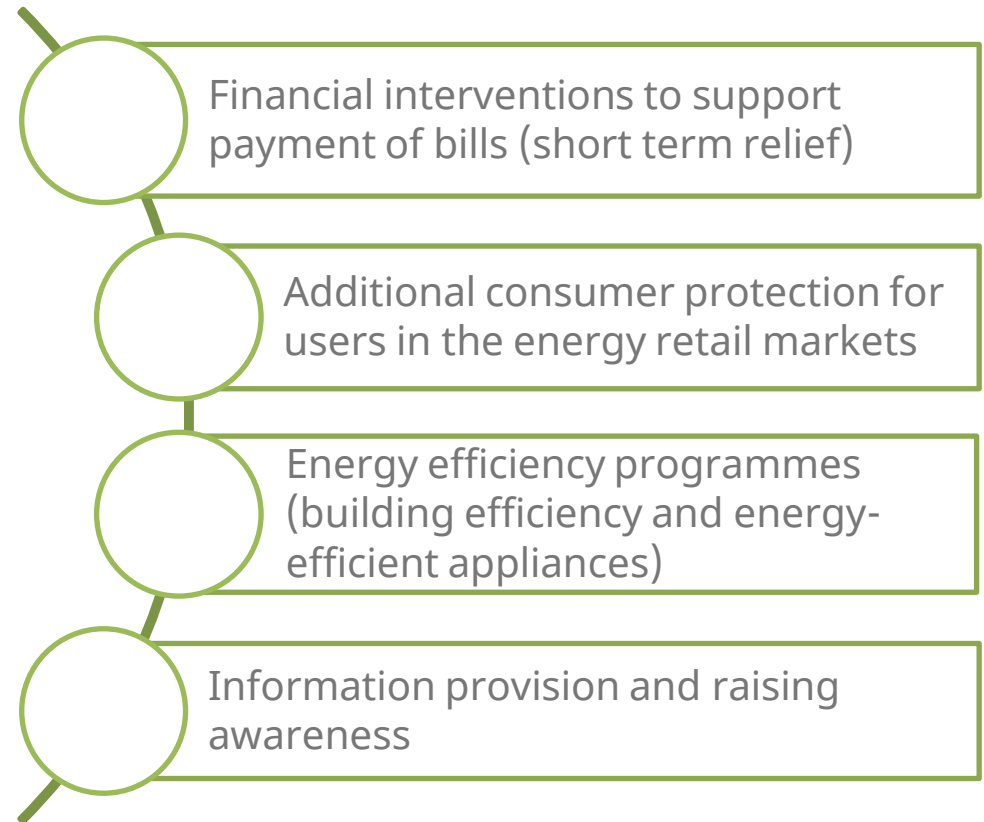


PART I: EU energy poverty alleviation policies

1. Types and categories of energy poverty alleviation policies

**Energy Poverty
Handbook (2016)**

**POLICIES are reflected
in different types of
measures**



Source: <http://bpie.eu/wp-content/uploads/2016/11/energypovertyhandbook-online.pdf>

PART I: EU energy poverty alleviation policies



Key stakeholders implementing policy measures on a national level in alignment with national and EU policy frameworks

Source: <http://bpie.eu/wp-content/uploads/2016/11/energypovertyhandbook-online.pdf>

PART I: EU energy poverty alleviation policies

2. List of energy poverty alleviation policies at the EU level

Directive (EU) 2019/692 Internal Market for Natural Gas Directive	Directive (EU) 2018/2002 on energy efficiency	Directive (EU) 2018/844 on energy performance of buildings	Regulation (EU) 2018/1999. Governance of the Energy Union and Climate Action
States that “ energy poverty is a problem and Member States should take action”	“When designing the measures to fulfil energy saving objectives, Member States should take into account the need to alleviate energy poverty in accordance with criteria established by them, and they shall include information about the outcome of measures to alleviate energy poverty”	“Member States must outline relevant national measures to help alleviate energy poverty , as part of their long-term renovation strategies to support the renovation of the national stock of residential and non-residential buildings”	“MS must include an objective of energy poverty alleviation in their National Energy and Climate Action Plans (NECPs)”

Source: <https://eur-lex.europa.eu/homepage.html>

PART I: EU energy poverty alleviation policies

2. List of energy poverty alleviation policies at the EU level

Directive (EU) 2019/944 Internal market for electricity

Policy plans and measures to **alleviate energy poverty** and ensure that vulnerable consumers have access to energy in critical periods

Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources

Empowering jointly acting renewables self-consumers also provides opportunities for renewable energy communities to advance energy efficiency at household level and helps fight energy poverty through reduced consumption and lower supply tariffs. Member States should take appropriate advantage of that opportunity by, inter alia, assessing the possibility to enable participation by households that might otherwise not be able to participate, including vulnerable consumers and tenants.

Renovation Wave (Area of intervention 6)

“Using renovation as a lever to address **energy poverty** and access to healthy housing for all households (...). The Commission will launch an Affordable Housing Initiative for 100 lighthouse project and will examine whether and how the EU budget resources alongside EU Emissions Trading System (EU ETS) revenues could be used to fund national energy efficiency and savings schemes.”

Source: <https://eur-lex.europa.eu/homepage.html>



PART I: European energy poverty alleviation policies

3. Summary of all national policies and case studies/actions/best practices from partners

Summary of all national policies from partners

A total of 32 different national policy instruments are analysed: **Bulgaria** (4), **Croatia** (9), **Estonia** (3), **Greece** (2), **Hungary** (2), **Latvia** (4), **Portugal** (3) and **Spain** (5). Energy poverty or some other synonyms such as energy vulnerable customers or people at risk of energy poverty or households at risk of energy poverty or energy efficiency of homes of energy poor consumers or vulnerable group of citizens and citizens at risk of energy poverty are mentioned in 22 of the policies analysed. The other 10 policies in their description may not include directly the term of energy poverty but, in some way, they target **energy poverty** (e.g. through the energy renovation of buildings).

Summary of all case studies/actions/best practices from partners

A total of **xy** energy poverty case studies/actions/best practices are mapped: **Bulgaria** (**xy**), **Croatia** (6), **Estonia** (**xy**), **Greece** (**xy**), **Hungary** (**xy**), **Latvia** (**xy**), **Portugal** (**xy**) and **Spain** (**xy**).

Summary of all active energy poverty project from partners

A total of **xy** all active energy poverty project are mapped: **Bulgaria** (**xy**), **Croatia** (5), **Estonia** (**xy**), **Greece** (**xy**), **Hungary** (**xy**), **Latvia** (**xy**), **Portugal** (**xy**) and **Spain** (**xy**).



PART II: Energy poverty alleviation actions

Croatia

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Greece

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Hungary

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Estonia

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Latvia

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Bulgaria

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Portugal

1. policies
2. best case studies/ best practices
3. active energy poverty projects

Spain

1. policies
2. best case studies/ best practices
3. active energy poverty projects



PART II: Energy poverty alleviation actions

1. Croatia - Policies

Key national policies	Name of policy affecting energy poverty	Coordinating authority	Short description	Category
Energy Act (Official Gazette, No. 120/12, 14/14, 102/15, 68/18)	Regulation on the monthly allowances for vulnerable energy customers, the manner of participation in reimbursement of the energy costs of the beneficiary and the actions of the competent social welfare centres (Official Gazette, number: 102/2015)	Minister of Labor, Pension System, Family and Social Policy	- Co-financing of electricity costs to a maximum of 200 HRK per month (26,39 euro per month) - solidarity fee paid by electricity customers from the household category in the amount of 0.03 HRK for each kWh of electricity consumed	Additional consumer protection Financial interventions
Energy Act (Official Gazette, No. 120/12, 14/14, 102/15, 68/18)	Regulation on the criteria for acquiring the status of vulnerable energy customers from networked systems (Official Gazette, number: 120/12, 14/14, 95/15, 102/15, 68/18)	Ministry of Economy and Sustainable Development	Definition of the status of “vulnerable customer”	Additional consumer protection
Energy Act (Official Gazette, No. 120/12, 14/14, 102/15, 68/18)	Regulation on the criteria for acquiring the status of a protected customer in conditions of crisis in gas supply (Official Gazette, number: 65/2015)	Ministry of Economy and Sustainable Development	- Definition of “protected customer” - Regulation to protect certain categories of end users of gas in crisis in gas supply → required quantities of gas for all protected customers and allocates them to suppliers	Additional consumer protection

Source: <https://www.zakon.hr/>



PART II: Energy poverty alleviation actions

1. Croatia - Policies

Key national policies	Name of policy affecting energy poverty	Coordinating authority	Short description	Category
Energy Act (Official Gazette, No. 120/12, 14/14, 102/15, 68/18)	2015 Agreement of Cooperation in Combating Energy Poverty Measures	Ministry of Economy and Sustainable Development	The agreement on cooperation in measures to combat energy poverty by which HEP took over the costs of solidarity compensation, was established by agreement between the Government of the Republic of Croatia and suppliers and may expire at any time	Additional consumer protection
Electricity Market Act (Official Gazette, Nos. 22/13, 102/15, 68/18, 52/19)	Decision on the amount of the fee for the use of space used by production plants for the production of electricity (Official Gazette, No. 84/2013, 101/2013, 72/2015)	Ministry of Economy and Sustainable Development	Owners of production plants for electricity production are obliged to pay compensation to the premises where power plants are built to local self-government units → municipalities and cities, which should be used for social welfare programs	Financial interventions
Energy Efficiency Act (Official Gazette, No. 127/14, 116/18, 25/20)	Regulation on the obligation system of energy efficiency (Official Gazette, No. 41/2019)	Ministry of Economy and Sustainable Development	The fee for vulnerable energy customers (in accordance with the regulation on social welfare) is increased by 20% for an energy-saving customer or 10% for residential energy-saving customer	Financial interventions

Source: <https://www.zakon.hr/>

www.powerpoor.eu



PART II: Energy poverty alleviation actions

1. Croatia - policies

Key national policies	Name of policy affecting energy poverty	Coordinating authority	Short description	Category
Social Welfare Act care (OG 157/13, 152/14, 99/15, 52/16, 16/17, 130/17, 98/19)	The Guaranteed Minimal Support programme (Social Welfare Act (Official Gazette, number: 157/13, 152/14, 99/15, 52/16, 16/17, 130/17, 98/19, 64/20, 138/20)	Minister of Labour, Pension System, Family and Social Policy	The right to financial assistance for a single person or a household to meet their basic living needs	Additional consumer protection Financial interventions
Social Welfare Act care (OG 157/13, 152/14, 99/15, 52/16, 16/17, 130/17, 98/19)	Decision on the basis for calculating the amount of the minimum fee (Official Gazette, No. 157/2013)	Minister of Labor, Pension System, Family and Social Policy	- guaranteed minimum financial assistance → 800.00 HRK (107 EUR) - single parent → 100% (800.00 HRK) for an adult member of the household → 60% (480.00 HRK = 64 EUR) for a child → 40% (320.00 HRK = 43 EUR) and for a child of a single parent → 55% (440.00 HRK = 59 EUR) - single person or household - using wood for heating (3 m³ of wood or approved monetary amount to cover that cost)	Additional consumer protection Financial interventions
Act on Write-Off of Debts to Natural Persons (Official Gazette, No. 62/2018)	/	Croatian Electricity Company (HEP)	writes off debts to persons up to the maximum amount of debt of HRK 5,000	Additional consumer protection Financial interventions

Source: <https://www.zakon.hr/>



PART II: Energy poverty alleviation actions

1. Croatia - policies

Key national policies – future strategy and actions plans	Name of policy affecting energy poverty	Coordinating authority	Short description	Category
Long-term strategy for the renovation of the national building stock until 2050	Programme of energy renovation of family houses 2014 – 2020 - programme is planned to continue according to the Energy Renovation Programme for Single-family Houses 2021-2027	Environmental Protection and Energy Efficiency Fund	- Public Call in 2020: Public call for citizens at risk of energy poverty - there will be a new Program for the energy renovation of family houses from vulnerable groups of citizens from 2021-2027	Energy efficiency programmes
Long-term strategy for the renovation of the national building stock until 2050	Programme of energy renovation of multi-apartment buildings for the period 2014 – 2020 – programme is planned to continue according to the Energy renovation programme for multi-apartment buildings 2021-2027	Environmental Protection and Energy Efficiency Fund	the Program lacks concrete measures to meet the needs of energy-poor citizens in the energy renovation of apartment buildings	Energy efficiency programmes
Climate Change and Ozone Protection Act (Official Gazette, No. 127/19)	Act establishes a <u>new plan</u> for the use of funds obtained from the sale of emission allowances.	Ministry of Economy and Sustainable Development	measures to combat energy poverty will be co-financed with funds obtained from the sale of emission allowances through auctions	Ministry of Economy and Sustainable Development

Source: <https://www.zakon.hr/>



PART II Energy poverty alleviation actions

1. Croatia - policies

Key national policies – future strategy and actions plans	Name of policy affecting energy poverty	Coordinating authority	Short description	Category
Energy development strategy of the Republic of Croatia until 2030 with a view to 2050 (Official Gazette, No. 25/2020)	Energy Poverty Reduction Program until 2026	Ministry of Economy and Sustainable Development	- no active policy - it is planned to implement energy efficiency measures in 50,000 households	Financial interventions Energy efficiency programmes
Integrated National Energy and Climate Plan for the Republic of Croatia for the period from 2021 to 2030 (NECP)	Program to combat energy poverty, which includes the use of renewable energy sources in residential buildings in assisted areas and areas of special state concern for the period 2019-2021	Ministry of Economy and Sustainable Development	currently there is no public information available on the stage of development of this Program	Financial interventions Energy efficiency programmes

PART II: Energy poverty alleviation actions

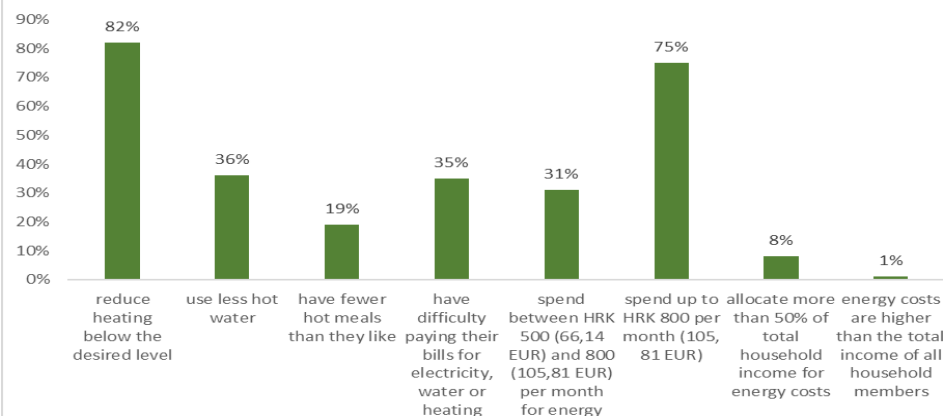
2. Croatia - case studies/ actions/best practices

CASE STUDY	ENERGY POVERTY ACTION FER (Fair Solutions for Better Community)	LOCATION
		Zagreb, Croatia
DESCRIPTION	- Project implementation period: 03/2018.-03/2020 - Budget: - 1.167.759,73 HRK (154.090,43 EUR) - Partners: DOOR, Faculty of Electrical Engineering and Computing, University of Zagreb and City of Zagreb - Stakeholders: students, professors, NGOs, energy poor citizens - Source of funding: European Social Fund (ESF) and State Budget (UZUVRH) - Description: investigating energy consumption habits in energy-poor households, implementing energy efficiency measures, educating energy advisors	
SOLUTION	- A methodology has been developed for the systematic engagement of associations as a subject in college - A policy proposal has been made for the City of Zagreb to combat energy poverty - Developed a model for calculating energy consumption	
IMPACT	- Students performed energy audits of 102 energy-poor households in the City of Zagreb and installed energy-saving equipment - identification of a vulnerable customers	



Source: <https://door.hr/portfolio/fer-rjesenja-za-bolju-zajednicu/>

Field analysis of households



PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION Na sunčanoj strani - "On the sunny side"	LOCATION
		Croatia
DESCRIPTION	• Consumer cooperative organized by the Green Energy Cooperative (ZEZ) • Local equipment manufacturers, suppliers, and installers • Small solar power plant that will suit citizens' needs and capabilities. • Solar energy used primarily to supply household electricity needs (net metering) • Improving the status of renewables in Croatia	
SOLUTION	• 1000 solar power plants installed onto roofs by the beginning of 2022 • Average power of 3-6 kW • Average price of 1330 EUR/kW (design, equipment, transport, instalment) • Lower price and less complicated procedure due to „One-stop shop” solution	
IMPACT	• Reduced energy consumption • Lower household electricity costs • CO2 emissions reduction from energy savings	

Source: <https://www.nasuncanojstrani.hr/>

www.powerpoor.eu



PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION REACH - Reduce Energy use And Change Habits	LOCATION Bulgaria, Croatia, North Macedonia, Slovenia
DESCRIPTION	• Contributing to energy poverty abatement at practical and structural levels • Empowering energy-poor households to take actions to save energy and change their habits, • Establishing energy poverty as an issue that demands structural solutions at local, national and EU levels • Implementing project activities at national level (investigating energy consumption habits in energy-poor households, implementing energy efficiency measures, educating energy advisors) • Participating in EU-level activities (international conferences, public policy advocacy)	
SOLUTION	• Established overview of fuel poverty for 4 countries • Local workshops for local actors, trainings for teachers and trainings for energy advisors • Implemented 1600 visits of households with tailor-made advice, package of energy saving devices, guidebook and post-visit support	
IMPACT	• 20 local actors engaged in local actions, 20 trained teachers and 250 trained energy advisors • 3200 hours of energy audits, 3200 hours of energy advising, 4800 installed EE devices, • Savings of 1280 t CO₂, • 768 toe of energy and 512.000 EUR • Recommendations reach out to at least 160 decision makers and about 400.000 people, engaging the decision-makers in triggering policies and measures for fuel poverty	

Source: REACH – Reduce Energy use And Change Habits (door.hr)

PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION Znanjem do toplog doma „Through knowledge to warm home”	LOCATION Sisačko-Moslavačka County, Croatia
DESCRIPTION	• Goal: to initiate an innovative social service - energy consultancy for poor households - and enable energy-poor households to save energy and change their habits. • Project implementation period: 02/2012-04/2016 • Budget: ~102.572 EUR • Partners: DOOR (project coordinator), City of Petrinja, Youth society „Novi Svijet” (Lušćani) • Source of funding: European Social Fund, Croatian national budget	
SOLUTION	• The implementation of the described activities aimed to focus on energy poverty as a problem that requires tailor-made policies and measures at local, national and EU levels due to the high prevalence of energy-poor households in Sisak-Moslavina County	
IMPACT	• Educational activities conducted on energy poverty and energy efficiency • Report on energy poverty in Sisačko Moslavačka County, public policy analysis • Organized meetings between local government and local NGOs focused on energy poverty • Simple energy audits conducted in 80 households, data collection • Recommendations issued to consider energy poverty in local energy and social policies • Public discussion and round table conducted	

Source:
<https://door.hr/portfolio/zn-anjem-do-toplog-doma/>



Utility cost share compared to household income



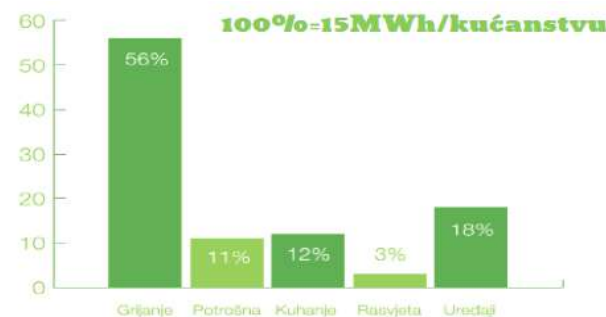
PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION Together to more comfortable housing 1-4	LOCATION Zagreb, Croatia
DESCRIPTION	• Project implementation period: 2016-2020 • Budget: 11.200 EUR (over 4 years) • Partners: Local NGOs working with vulnerable citizens • Source of funding: City of Zagreb, Social protection and disability fund • Description: Project is focused on visits to energy poor households in city of Zagreb. Project has been renewed for 4 consecutive years, with specific vulnerable groups addressed every year. For example, women-only households or homes from disabled people.	
SOLUTION	• Household visits consist of acquiring data, giving advice on energy efficiency and giving out small energy efficiency aid packs (LED bulbs, sealants for windows...).	
IMPACT	• ~10 households visited each year • Reduced energy consumption (not quantified) • Increased quality of life (not quantified) • Policy recommendations to the city administration to address energy poverty affecting vulnerable citizens	



Energy
efficiency
aid packs



Slika 1. Prikaz potrošnje energije u tipičnom kućanstvu²

PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION ENPOR – Action to Mitigate Energy Poverty in the Private Rented Sector poverty	LOCATION Velika Gorica, Croatia
DESCRIPTION	• Project implementation period: 09/2020-09/2023 • Budget: 1.999.966,25 EUR • Source of funding: HORIZON 2020 • Partners: Netherlands, Germany, Belgium, United Kingdom, Greece, Croatia, Italy, Estonia and Austria • Description: The general objective of the ENPOR project is to draw attention to energy poverty in the private rental sector (PRS), taking into account the needs of landlords and tenants and to include them in the wider political context	
SOLUTION	• an assessment of the extent of the energy poverty problem in the PRS at the EU level • supporting the development of policies tailored to the specific needs of households in the PRS • Pilot city Velika Gorica → Target so-called free – based tenancy, which always includes two separate families/households in the same dwelling. This subgroup has not been targeted yet and rented apartments were mainly out of policy focus due to lack of information.	
IMPACT (expected)	• highlighted innovative and "win-win" ways to increase energy efficiency for vulnerable households in the PRS with special emphasis on creating synergies between landlords and tenants and sustainable solutions • establishment of a REACT group to enable the exchange of local and national knowledge on energy poverty in the PRS at EU level	

PART II: Energy poverty alleviation actions

3. Croatia - active energy poverty projects

CASE STUDY	ENERGY POVERTY ACTION EmpowerMed- Empowering women to take action against energy poverty	LOCATION
		Zadar, Croatia
DESCRIPTION	• Project implementation period: 09/2019-09/2023 • Budget: 1.982.150 EUR • Source of funding: HORIZON 2020 • Partners: Slovenia, Croatia, Italy, Spain; France, Germany, Albania • Description: The main objective of the project is to contribute to energy poverty abatement in the Mediterranean	
SOLUTION	• implementing a set of practical energy efficiency and RES measures, tailored to empower households in energy poverty and specifically focused on women and health • assessing their efficiency and impacts to formulate policy recommendations • promoting policy solutions among key actors for stimulating action against energy poverty at local and EU level.	
IMPACT (expected)	• 10,200 participants empowered to fight energy poverty in 6 pilot areas • Primary energy savings - 6.5 GWh/yr, CO2 emission reduction 1.600 tCO2/yr • 160.000 € investment in sustainable energy, 780.000 € wider economic savings • 50 women and men freed of debt or disconnection from power grid • At least 60% women participating in project activities • Public policy and best practices advocacy to fight energy poverty	



Source: www.empowermed.eu/
www.powerpoor.eu



PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION SocialWatt	LOCATION Croatia
DESCRIPTION	- Project implementation period: 09/2019-09/2022 - Budget: 1.998.297,50 EUR - Partners: EU (Greece, Netherlands, Belgium, Austria, Romania, France, Spain, Ireland, Latvia, Croatia, Italy) - Source of funding: HORIZON 2020 - Description: SocialWatt will develop and provide utilities and energy suppliers with appropriate tools for effectively engaging with their customers and working together towards alleviating energy poverty	
SOLUTION	SocialWatt will also enable obligated parties under Article 7 of the Energy Efficiency Directive across Europe to develop, adopt, test and spread innovative energy poverty schemes	
IMPACT (expected)	- Identify energy poor households - Develop innovative schemes to alleviate energy poverty - Build the capacity of utilities, energy suppliers and social services - Implement the schemes to alleviate energy poverty - Replicate the project's outcomes and provide policy recommendations	

SocialWatt Tools



Energy poverty in the SocialWatt targeted countries



PART II: Energy poverty alleviation actions

2. Croatia - case studies/actions/best practices

CASE STUDY	ENERGY POVERTY ACTION ENGAGER - European Energy Poverty: Agenda Co-Creation and Knowledge Innovation	LOCATION
		Croatia
DESCRIPTION	• Project implementation period: 2017-2021 • Source of funding: The COST Association • Research network funded via the European <u>Co-operation in Science and Technology</u> (COST) scheme	
SOLUTION	• It is aimed at developing and strengthening an international community of researchers and practitioners focused on combating energy poverty	
IMPACT (expected)	• Involves currently more than 200 members from over 40 countries	



Source: <http://www.engager-energy.net/>

PART III: Household energy performance

1. Introduction: household energy consumption, terminology
2. Simple energy audit
3. Simple energy efficiency measures and practical tips
4. Understanding energy and electricity utility bills and costs

PART III: Household energy performance

1. Introduction: household energy consumption, terminology

BASIC TERMS

Energy (kWh) = Power (kW) x time (h)

1kWh:

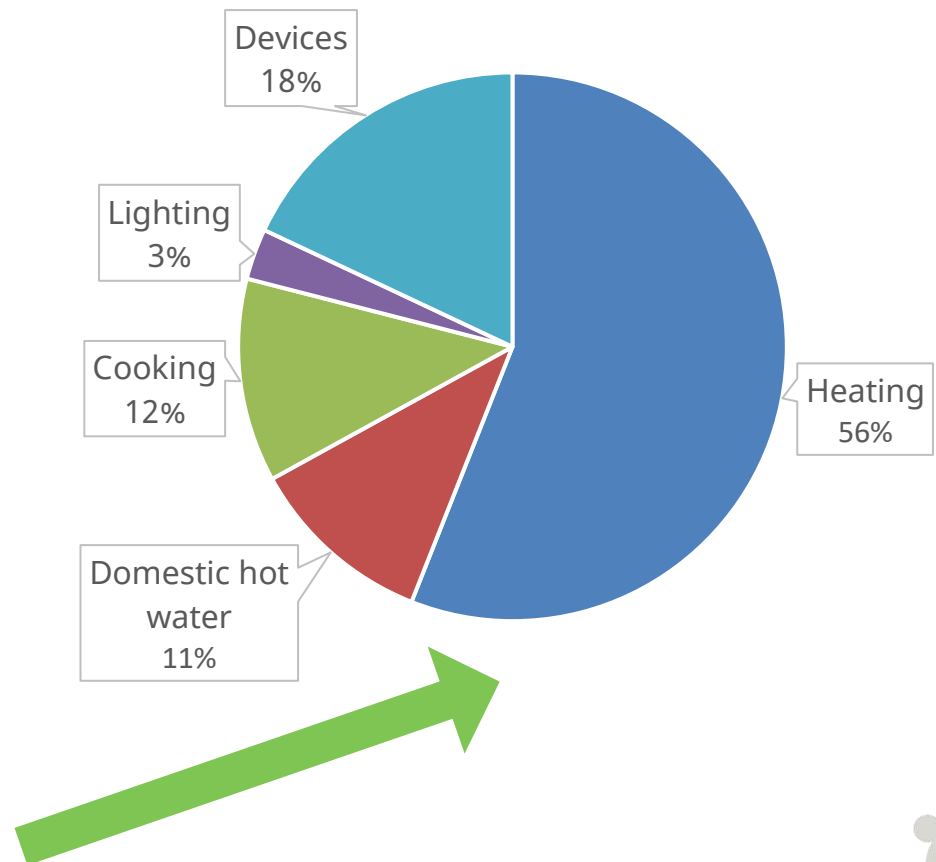
- 10W LED bulb x 100h (~4 days)
- 2kW electric water heater x 0.5h
 - Energy to heat 21l of water from 10C to 50C
- 2kW electric convection heater x 0.5h

The typical non-energy efficient home in Croatia consumes
~250kWh/m²

Why is it important to focus on heating when talking about energy efficiency?

www.powerpoor.eu

Average household energy consumption in Croatia



PART III: Household energy performance

1. Introduction: household energy consumption, terminology

Most common heating sources of energy:

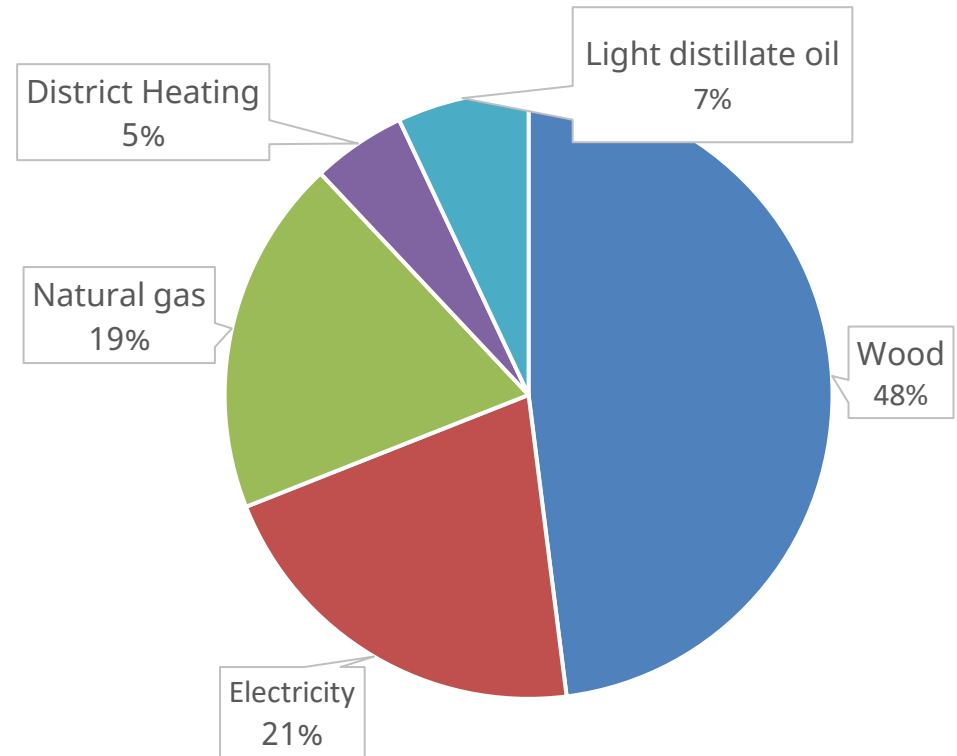
Wood

- Direct heating (stove, fireplace)
- Furnace connected to hot water tank + radiators

Electric

- Electric resistive heating
 - Convection heaters
 - Radiating heaters
 - Thermal storage heaters
- Air to air heat pumps – air conditioning devices

Heating distribution in Croatia (1)



(1) Program for using potential for efficiency in heating and cooling for 2016-2030

https://ec.europa.eu/energy/sites/ener/files/documents/croatia_report_eed_art_141update_hr.pdf



PART III: Household energy performance

1. Introduction: household energy consumption, terminology

Most common heating sources of energy:

Natural gas

- Typically furnace connected to hot water tank + radiators

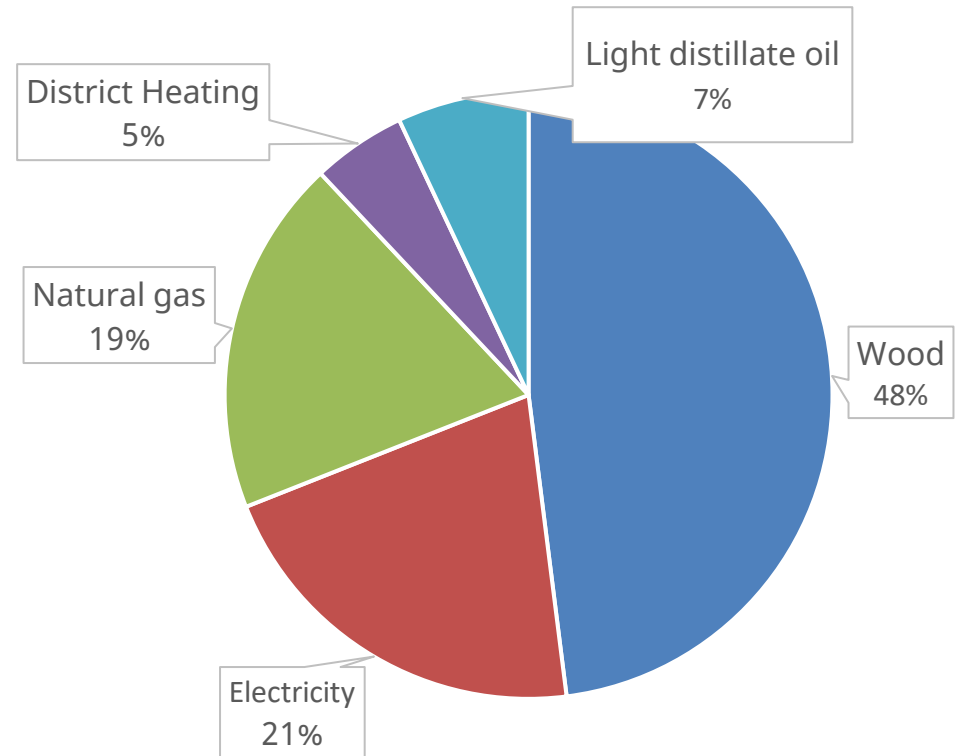
District heating

- Urban areas, apartment buildings
- Fuel source is typically fossil fuel

Light distillate oil & Liquid Petroleum Gas (LPG)

- Typically furnace connected to hot water tank + radiators

Heating distribution in Croatia (1)



(1) Program for using potential for efficiency in heating and cooling for 2016-2030

https://ec.europa.eu/energy/sites/ener/files/documents/croatia_report_eed_art_141update_hr.pdf



PART III: Household energy performance

1. Introduction: Heating technology overview

	UNIT	COST	FEATURES	SAFETY
Wood	m3 for raw wood Kg/ton for pellets	~0.03EUR/kWh *important to use properly dried wood	• Direct heating (stove in living space) or • Central heating (furnace + water distribution to radiators) • 1 „spatial meter of wood“ =1575 kWh	• Carbon monoxide (CO) suffocation risk if chimney is not regularly maintained • Fire hazard if stove is faulty
Electric – resistive	kWh	Day: ~0.15EUR/kWh Night: ~0.8EUR/kWh	• Simple to use • Thermal electric storage heaters taking advantage of lower tariff	• Fire hazard if devices are faulty or if heaters are covered
Electric – heat pump (Air-Air)	kWh	Day: ~0.13EUR/kWh Night: ~0.7EUR/kWh	• Coefficient of Performance 2.5-4: for 1kWh electricity, 2.5-4kWh thermal energy is pumped into indoor space. • Lower efficiency at lower outdoor temperatures	• Some devices cannot operate at low outdoor temperatures (-5C or lower)

* Reference values only, actual prices vary due to multiple factors

PART III: Household energy performance

1. Introduction: Heating technology overview

	Unit	Cost	OTHER	SAFETY
Natural gas	m ³ /kWh	~0.04EUR/kWh	- Regulations allow only condensation boilers to be sold, which have higher requirements for chimneys. Customers often need chimney reconstruction and delay replacing old boilers 1 m³ = 9,4 kWh	- Some gas boilers need minimal water pressure to operate properly, water reactors can cause issues - Carbon monoxide (CO) suffocation risk if chimney is not regularly maintained
District heating	kWh, kW, m ²	~0.025EUR/kWh	Confusing billing methods reduced customer trust in district heating schemes	
Heating oil & LPG	Liters, kg	~0.07EUR/kWh	- Local storage tank required 1 L heating oil = 11,86 kWh 1 kg LPG= 13,73 kWh	Fire hazard due to storage of flammable fuel

* Reference values only, actual prices vary due to multiple factors

PART III: Household energy performance

H1. Introduction: Building thermal envelope

Thermal insulation

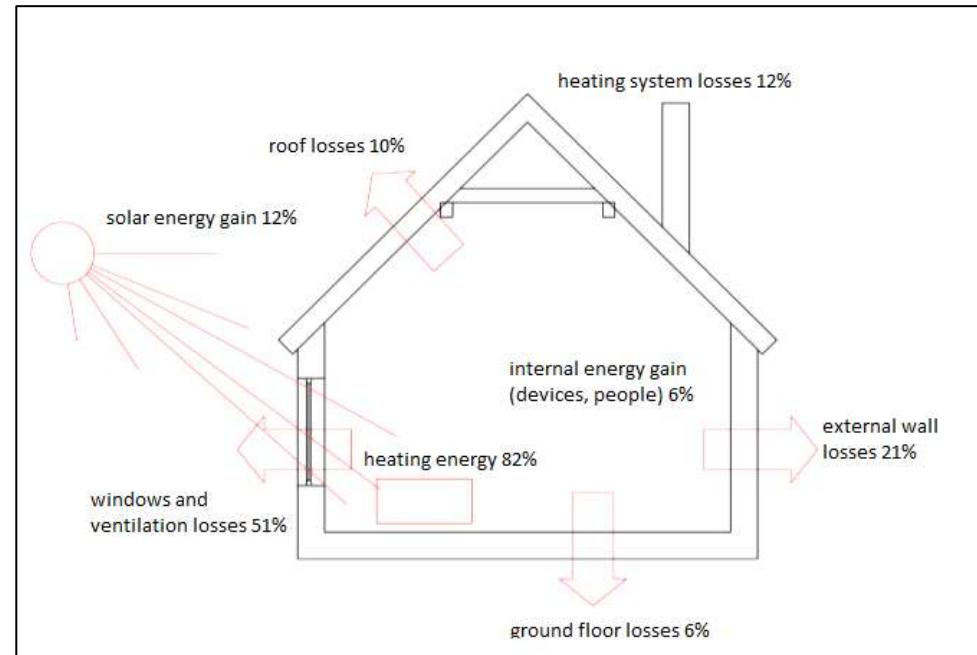
- Walls, roofs, windows, floors
- Important to avoid thermal bridges

Thermal mass

- More thermal mass indoors increases thermal inertia and makes the space more thermally passive
- E. g. solar thermal energy can be stored by the floor below the window

Heating system efficiency

- Regular maintenance is important for efficient heating system operation
- Correct temperature setpoint regulation can reduce energy consumption
- Is the heat distributed in equally or concentrated in one spot?



Reference values for thermal energy gains and losses / Source: REACH

Air-tightness

- Gaps on windows & doors cause drafts & thermal energy leaks
- Bathroom and kitchen extraction fans need non-return flaps to reduce draft

PART III: Household energy performance

1. Introduction: Building thermal envelope

Geographic orientation

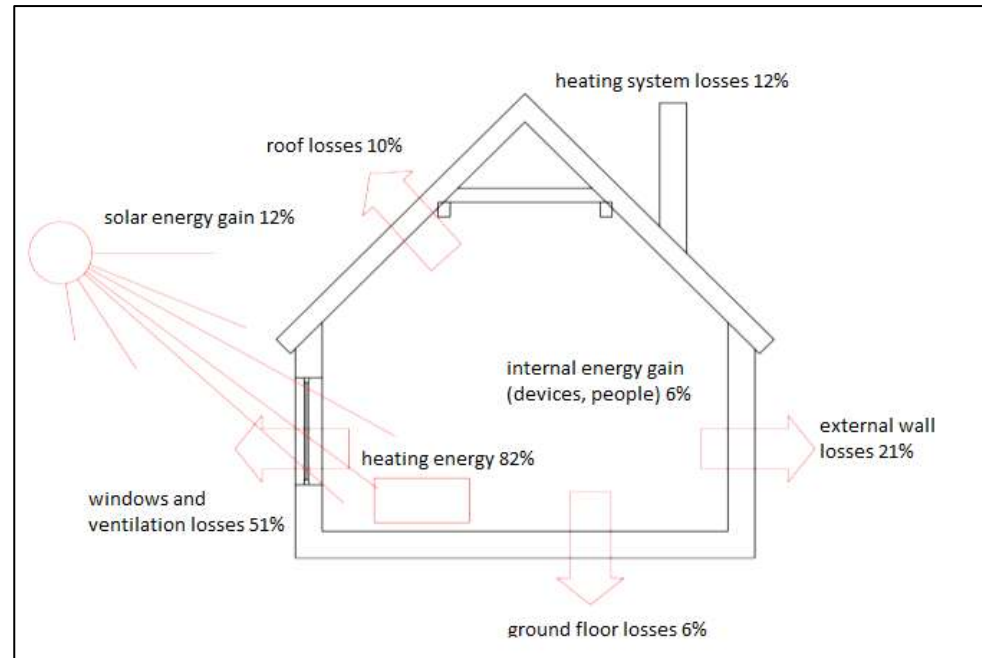
- Orientation towards south results in more solar energy gain
- Eaves above windows allow low angle winter sun to enter the windows, while keeping out high-angle summer sun

Shape / form factor

- Compact space distribution with minimal surfaces exposed to outside conditions result in less energy losses

Neighboring dwellings

- Walls shared with heated areas lose less energy



Reference values for thermal energy gains and losses / Source: REACH

PART III: Household energy performance

1. Introduction: Building thermal envelope

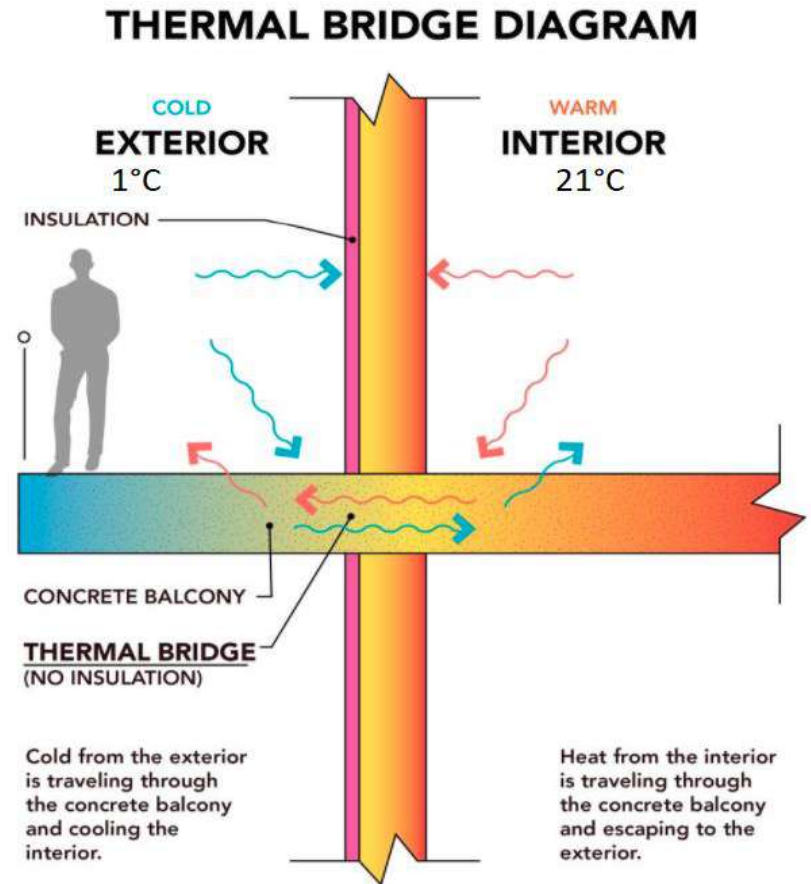
Thermal bridge

- Thermal conductive connection between interior and exterior of the building
- Non-insulated walls, concrete balconies

Water vapour, air tightness & mold

- 1 person can generate ~1.5kg water vapour per day
- Cooking, showering, drying clothes, dishwashing also generate water vapour
- If living space is air-tight and not ventilated, water remains trapped inside
- Mold often occurs on cold spots where water vapour condensates (thermal bridges)

<https://www.isse.org.uk/articles/dampness>



<https://civilengineering4u.wordpress.com/2017/05/29/thermal-bridging/>



PART III: Household energy performance

2. Simple energy audit

Goal of the simple energy audit is to gather key information **to determine the existing energy situation** in the household.

After the audit, energy supporters should be able **to propose measures to reduce energy costs and increase quality of life.**

Checklist



PART III: 2. Simple energy audit

Key steps

DATA COLLECTION

Find:

Energy consumption for heating, electricity, water (kWh, l.)

Energy use: heating types (gas, wood!, district heating, oil, electricity), electric devices (how many, stand-by consumption...)

Energy performance of the building envelope: insulation, outer walls, roof, chimney, thermal bridges.



ENERGY ANALYSIS

Define:

Consumption patterns (e.g. season, daily, monthly)

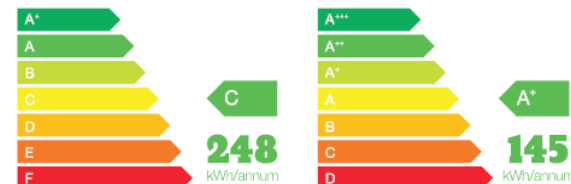
Significant energy use (will lead to best EE measure pay-off)

Benchmarks (using the latest energy performance indicators kWh/m2)



PRESENTATION OF RESULTS

Report to beneficiary
Certification



PART III: Household energy performance

2. Simple energy audit

POINTS TO KEEP IN MIND

HEATING

- Heating type – gas/district heating/electricity/wood/pellets
- Positioning of heat emission devices in the living/working space – are heating devices close to cold walls that act as heat sinks? What is the heat distribution in the room?
- Heating system service periods

BUILDING ENERGY PERFORMANCE

- Wall composition from inside to outside with focus on thermal insulation and thermal mass properties; detection of potential thermal bridges
- Windows and doors – air tightness inspection, glass type (single/double/triple)
- Ventilation openings – air flow inspection in the kitchen and bathroom extraction fan openings

PART III: Household energy performance

2. Simple energy audit

POINTS TO KEEP IN MIND

ENERGY BEHAVIOR

- What are the biggest “energy pain points”?
- Parts of the house/flat that feel cold
- Any activities that are avoided because of cold – e.g. sitting at the table for too long
- Body parts that feel cold – feet, hands, back
- Determine if there are any applicable government energy poverty alleviation schemes
- How long will the tenants live in the property?
- Any renovation needed/planned soon?

SAFETY

- State of the chimney - Carbon monoxide hazard
- Old electric heaters, obstructing airflow around heaters
- Electric installation (e.g. if high-power electric heaters are used)

PART III: Household energy performance

2. Simple energy audit

USEFUL TOOLS



- Distance meter
- kWh meter
- Photo camera
- Infrared thermometer



PART III: Household energy performance

2. Simple energy audit

COMMUNICATION TIPS when performing household

visits

BENEFICIARIES COULD BE:

- Elderly people,
- People with various health problems (physical and mental): hearing or visually impaired, anxious, depressive.

DO's and DONT's of household visit

- First contact is important: smile, introduce yourself, make eye contact, shake hands (but be aware of COVID-19 measures!)
- Explain the purpose of the visit and what will happen during the visit.
- DO NOT enter the house prior to invitation!
- DO NOT enter the rooms without the presence of the beneficiary!
- Repeat that the energy visit is FREE of CHARGE, you are not selling anything!
- Up to 2 persons are optimal for the visit
- Adapt the communication based on beneficiary health status (hearing, vision, invalid person...)
- Leave contact details and inform them about the next steps
- Respect the dignity of the beneficiary, their home, privacy, values.
- DO NOT share private data with third persons (GDPR).
- Listen to the beneficiary patiently, but allow yourself to leave (if you have enough data, or if it is not comfortable for you).
- Inform mentor if any problem occurs.

PART III: Household energy performance

3. Energy efficiency measures and practical tips

How to save energy?

REDUCE TOTAL ENERGY CONSUMPTION but do not reduce comfort (improve it)

FIND SIGNIFICANT ENERGY USERS

- **Replace with EE**
New A rating (2020) consumes up to 100 kWh less per year or
- **Reduce their operation time**
Using timer for electric water heater

FIND THERMAL BRIDGES or HOLES like windows, entrance door, outer walls, ceiling toward non-heated attic

- **“Patch” them**

Insulation strips, reflexive foils, thermal insulation

USE NATURAL LIGHTING AND SUN RADIATION OPTIMALLY by adjusting room orientation

PROTECT HOUSE FROM OVERHEATING IN SUMMER by using blinds, eaves, trees on south side of the house

Simple measures will show quick results with small investment, but low impact.

Optimal measure is one with quick results, lower investment and higher impact

= SHORT PAYBACK PERIOD

ENERGY RENOVATION as a long-term approach



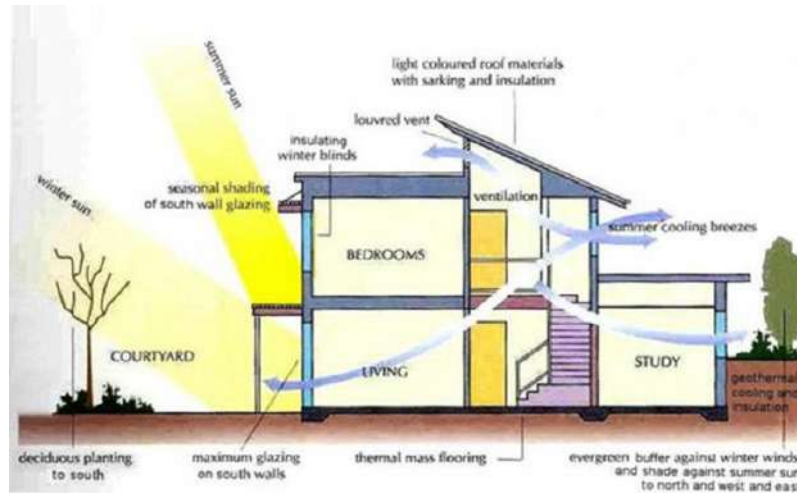
PART III: Household energy performance

3. Energy efficiency measures and practical tips

EXAMPLE: Passive solar retrofit 250 kWh/m² to 15 kWh/m² annually

MAXIMIZE

- solar gain in heating season
- thermal insulation (cost effective!)
- use of wasted heat (heat exchangers)
- use of renewable sources



MINIMIZE

- solar gain in cooling season (no need for air conditions)
- air leaks (but allow fresh air to come in!)
- thermal bridges

OPTIMIZE

- thermal mass (slows down temperature change!)



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house
250 kWh to 90 kWh per m²

LARGE investments

1. **THERMAL INSULATION** of outer envelope
2. **EE** windows and doors
3. **HEATING SYSTEM** renewed
4. **SOLAR THERMAL** system

SMALL and MEDIUM investments:

EE lighting, EE appliances, draft proofing, water saving devices

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION

MEASURE	INVESTMENT	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
10 cm mineral wool on outer wall	30 Eur/m ²	10-15 (depends on energy used)	50
20 cm mineral wool in roof	10 Eur/m ²	3-5 (depends on energy used)	50

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION

- MOISTURE problems if material with **low vapour diffusion factor** is used
- **Good ventilation** is crucial
- THERMAL BRIDGES - High quality installation reduces risk of TB on windows, doors, roofs



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

Outer envelope THERMAL INSULATION



Natural materials increase sustainability by reducing embedded energy
(recycled cellulose, sheep wool, straw bale)

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

ENERGY EFFICIENT windows and doors

U value – heat transfer coefficient: lower U – better insulation - higher price

MEASURE	INVESTMENT	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
ENERGY EFFICIENT windows • PVC, alu, wood • U value less than 1,2 W/m²K)	200 - 300 EUR/m ²	15-20 (depends on type installed and energy used)	50



PART III: Household energy performance

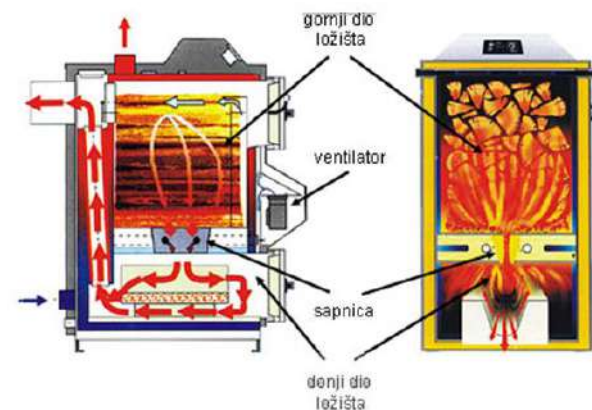
3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

HEATING SYSTEM – change of energy source from heating oil to biomass

MEASURE	INVESTMENT	ANNUAL ENERGY SAVINGS	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
BIOMASS pirolitic instead of heating oil boiler	5800 EUR	2600 L oil	3-4	15
BIOMASS pelet instead of heating oil boiler	3000 EUR	2100 L	2-3	15

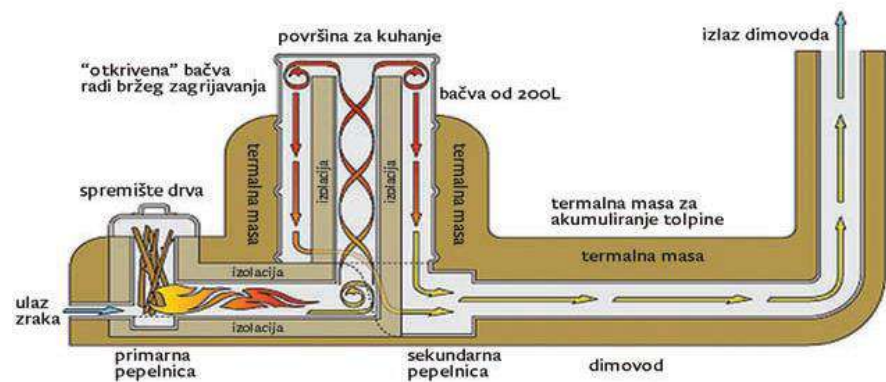
Sources: DOOR, <https://door.hr/>
<https://www.centrometal.hr/>



PART III: Household energy performance

3. Energy efficiency measures and practical tips

HEATING SYSTEM – standard wood burning furnace vs. high efficient „Rocket stove”



Sources: DOOR, <https://door.hr/>
<https://www.zmag.hr/>

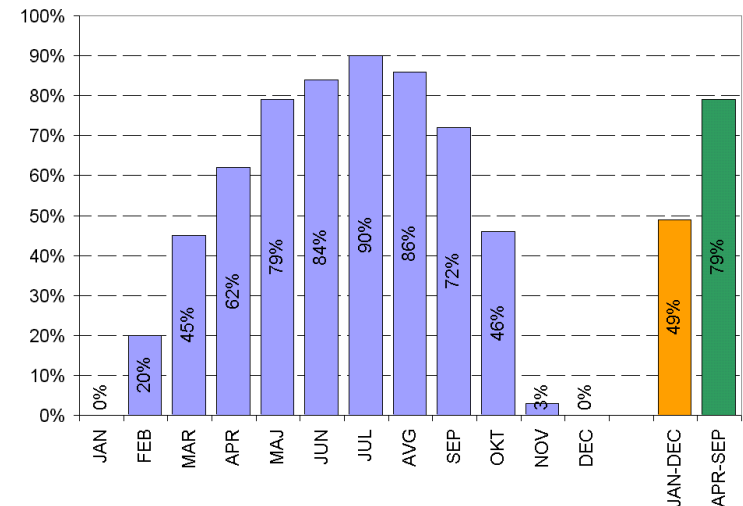
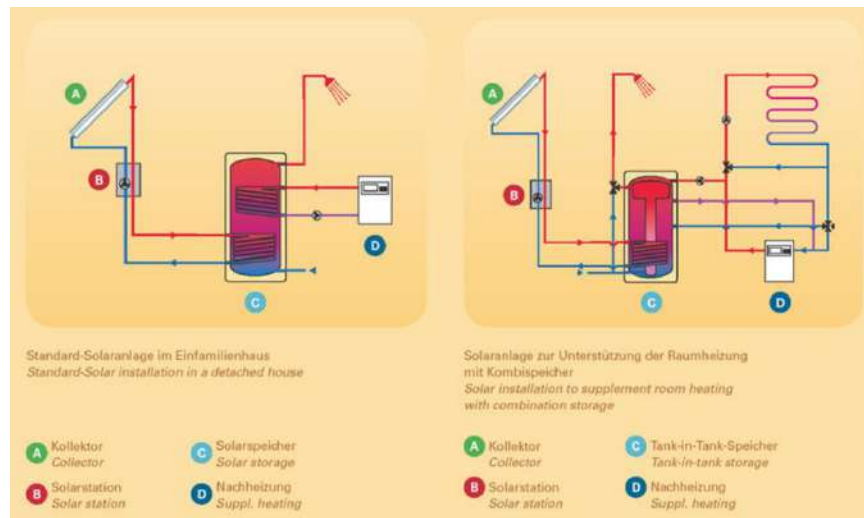
PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

MEASURE	INVESTMENT	ANNUAL ENERGY SAVINGS	PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
SOLAR THERMAL SYSTEM instead of ELECTRIC BOILER for sanitary water and/or heating backup	3000 EUR	2000 kWh	10 (no incentives or change in electricity price)	25

Source: DOOR, <https://door.hr/>

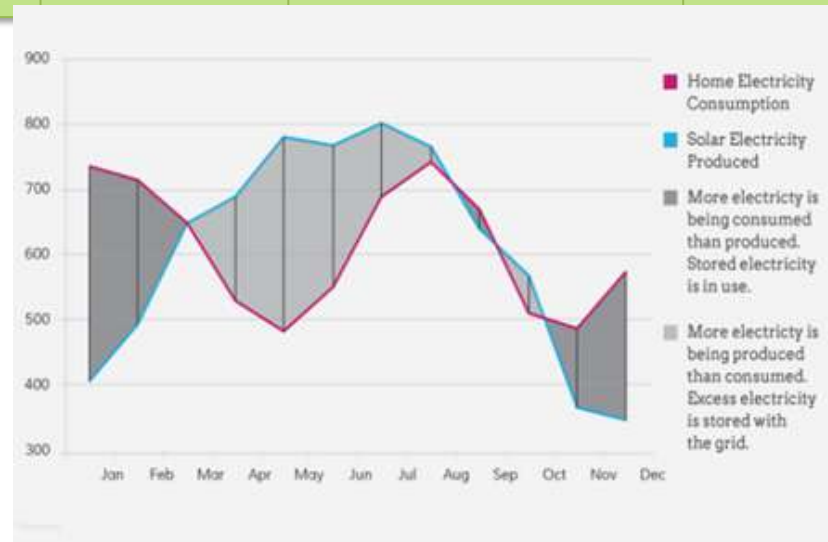


PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

MEASURE	INVESTMENT (design, equipment, transport, installation, insurance)	ANNUAL FINANCIAL SAVINGS	SIMPLE PAYBACK PERIOD (YEARS)	EXPECTED LIFETIME (YEARS)
Photovoltaic power plant for own supply (4 kW) Source: DOOR, https://door.hr/	~ 3500 EUR	385 EUR	9 years	25



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investment :

- **Standby appliances**
- Draftproofing, reflective foils
- EE lighting
- EE appliances
- Water-saving devices

Typical stand-by consumption	
TV	6-7 W
DVD	5 W
Alarm clock	1 - 3 W
Microwave oven	2 - 6 W
Battery charger	2 - 4 W
Phone station	2 - 4 W
Laptop (sleep)	3-11 W
Router	8 W
TOTAL	~39 W x 24 h = 936Wh

1kWh per day, 48 EUR per year

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investments:

- Standby appliances
- **Draftproofing, reflective foils**
- EE lighting
- EE appliances
- Water saving devices

3-4 windows,
20 EUR investment,
Payback period of 1 year



3 radiators
20 Eur investment,
Payback period of
1 year

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investments:

- Standby appliances
- Draftproofing, reflective foils
- **EE lighting**
- EE appliances
- Water saving devices



2 LED bulbs,
14 EUR investment,
Payback period of 1 year

PART III: Household energy performance

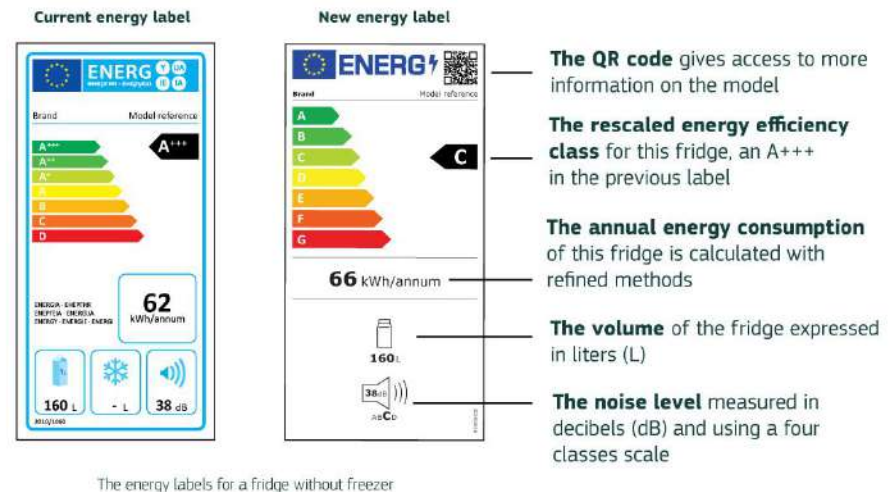
3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investment:

- Standby appliances
- Draftproofing, reflective foils
- EE lighting
- **EE appliances**
- Water saving devices

How to recognise a rescaled product ?



New 2021 energy labels

Source: https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/product-database/qr-code-new-energy-label_en



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investments:

- Standby appliances
- Draftproofing, reflective foils
- EE lighting
- EE appliances
- **Water saving devices**



10 m³ potential savings compared to normal tap

PART III: Household energy performance

3. Energy efficiency measures and practical tips

HEATING – practical tips

WOOD HEATING

- When buying a furnace, select one that fits the size of the room.
- Close air intake whenever the furnace is not in use to avoid heat loss through the chimney
- Make sure that there is no exhaust gas leakage into the living space (!)
- Make sure that the wood is dry enough to be used as fuel
- Regularly inspect and clean the chimney
- Don't overfill the furnace with wood
- Consider stovepipe heat reclaim radiators to increase heat transfer to the room

GAS/ CENTRAL HEATING

- Reduce thermostat set points for unused rooms
- Insulate hot water piping, especially if passing through “cold” areas
- Service the system regularly

PART III: Household energy performance

3. Energy efficiency measures and practical tips

ELECTRICITY – practical tips

- Use night/"cheap" electricity tariff for heating – especially for electric thermal storage heaters and electric water heaters
- Use socket timers to heat only rooms that are in use at certain part of the day
- Keep heating elements clean and free of airflow obstruction
- Use insulation + reflective pads between heating element and the wall

PART III: Household energy performance

3. Energy efficiency measures and practical tips

SANITARY HOT WATER – practical tips

- Use night/"cheap" electricity for water heaters
- Limit water heater temperature – around 60C is enough for most household needs
- Avoid excessively low water heater temperatures to prevent the growth of Legionella bacteria
- If the existing water heater is poorly insulated, consider additional insulation
- The size of the water heater should match the needs of the household – water heaters larger than necessary are less efficient
- Take a shower instead of a bath
- Remove lime scale (especially in case of hard water) from electric heating elements to increase efficiency
- Check pipe fittings – faulty water mixers and shower heads cause hot water leakages

PART III: Household energy performance

3. Energy efficiency measures and practical tips

INSULATION and BUILDING ENVELOPE – practical tips

- Use insulation + reflective pads between heating elements and the wall
- Use rubber seals on doors/windows to eliminate unwanted airflow
- Utilize window blinds for passive energy efficiency
- Close blinds during the night to reduce heat loss through the windows
- Open blinds to allow the sun to warm up the rooms
- Look for mold and damp walls to determine cold spots on the walls – consider additional insulation around these spots
- Thick carpets can reduce heat loss through the floors

PART III: Household energy performance

3. Energy efficiency measures and practical tips

HOME APPLIANCES – practical tips

- When buying a new appliance, pay attention to the appliance energy class
- Defrost refrigerators regularly
- Keep refrigerators away from heat sources and leave enough empty space behind them to allow efficient heat rejection
- Check if the refrigerator doors are airtight
- Don't set refrigerator setpoint too low – suggested values are 4C for refrigerators and -18C for freezers
- Use laundry washing machines and dryers during low electricity tariff periods
- Consider using lower water temperature while doing laundry
- Consider natural drying instead of electric dryer
- Induction stoves are more efficient than electric resistance ones
- Keep pot lids on when cooking to reduce required energy
- Shut down electronic devices when not in use; avoid leaving them on or in standby mode

PART III: Household energy performance

3. Energy efficiency measures and practical tips

LIGHTING – practical tips

- Turn off the lights in unoccupied rooms
- Use natural lighting when possible
- Correct light fixture can reduce power required for lighting a room

PART III: Household energy performance

4. Understanding energy and electricity utility bills - Electrical

- Electricity price in Croatia:

- Day: ~0.15EUR/kWh
- Night: ~0.8EUR/kWh

- Actual electricity readings are taken several times per year, while bills are issued monthly based on assumptions. Consumers are often confused by the balancing accounting.

- Items explained in the bill:

- 1: customer information
- 2: billing period
- 3: measurement units
- 4: energy consumed, high/low tariff
- 5: unit prices (energy, grid usage, renewables surcharge, "solidarity surcharge")
- 6: subtotals per each item
- 7: total for energy
- 8: total for renewables surcharge
- 8a: total for "solidarity surcharge"
- 9, 10: Value Added Tax (VAT)
- 11: total bill for the billing period
- 12: issued bills for the period based on estimates – obsolete for new meters
- 13: difference between estimated and real energy consumption
- 14: balance – can be positive or negative, depending on how much is owed or overpaid
- 15: total due payment

1

HEP ELEKTRA d.o.o.
Matični broj: 04622430
OIB: 43965974818

ZAGREB, Ulica grada Vukovara 37
TEL.: bespl. potroš. tel.: 0800 300 303
FAX: 00385 (0)1 460 00385 (0)1 460 1
RAČUN: HR9223400091510077598

Datum računa: 31.12.2017
Mjesto izdavanja: ZAGREB
Datum dospijeća: 30.01.2018
Broj dokumenta: 124000002206
R-1

JOSIP JOSIPOVIĆ
Zagrebačka avenija bb
10 000 ZAGREB

Podaci o kupcu:

1a

Ugovorni račun: 2212345678
Poslovni partner: 1000034567
Kupac: JOSIP JOSIPOVIĆ
Ulica i kbr.: Zagrebačka avenija bb kat: 1 stan: 1
Mjesto: ZAGREB
OIB: 11111111111111

2

RAČUN br: 2212345678-180120-3, razdoblje: 13.06.2017. - 28.12.2017.

Opis	Jed. mjere	Količina	Jed. Cijena kn	Iznos kn
Električna energija viša dnevna tarifna stavka	kWh	###	0,84	2.470,44
Električna energija niža dnevna tarifna stavka	kWh	###	0,41	604,34
Naknada za obračunsko mjerno mjesto	mjesec	6,5	17,40	112,75
Iznos za električnu energiju				3.187,53
Naknada za policanje proizvodnje iz obnovljivih izvora	kWh	###	0,105	463,58
Solidarna naknada	kWh	###	0,03	83,97
Popust za solidarnu naknadu				-83,97
Porezna osnovica				3.651,11
PDV 13% (osnovica: 3.651,11)				474,64
A. UKUPAN IZNOS RAČUNA				4.125,75
B. Zbroj izdanih rata za obračunsko razdoblje 13.06.2015. - 28.12.2016.				3.507,60
C. RAZLIKA (A-B)				618,15
D. Dugovanje na dan obračuna (31.12.2017.)				0,00
Ukupno za platiti (C + D)				618,15

Oslobođeno od plaćanja trošarina sukladno članku 101. stavku 8. točki 5. Zakona o trošarinama.

DRUGA STRANA RAČUNA:

OBRAČUN POTROŠNJE

Obračunsko mjesto: JOSIP JOSIPOVIĆ ZAGREB, Zagrebačka avenija bb
Broj obračunskog mjesta: 12345677890 Kategorija potrošnje: Kućanstvo Tarifni model: BIJELI Obr.:1

Broj broja	Tar. Stavka	Datum od	Datum do	Br. mjeseci	Stanje od	Stanje do	Konstanta	Potrošak
6 A 111111	RVT R1	13.6.2017	1.10.2017	3,61	72.020	73.097 - procjena	1	1.077
	RVT R2				44.982	45.521 - procjena	1	539
	RVT R1	1.10.2017	28.12.2017	2,87	73.097	74.961	1	1.864
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Source: https://www.hep.hr/elektra/UserDocsImages/dokumenti/cesta-pitanja/Pojasnenje_racuna_2_2018.pdf

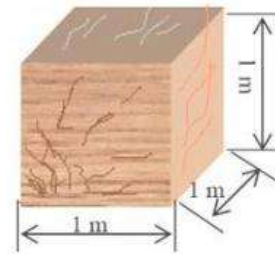


PART III: Household energy performance

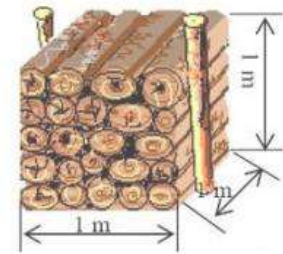
4. Understanding energy and electricity

- Cubic meter vs spatial meter of wood
- When buying wood, spatial meter measure is used
- 1 spatial meter of wood is $\sim 0.7\text{m}^3$, depending on cutting shape
- 1 "spatial meter of wood" = 1575 kWh
- 1 kWh derived from burning wood: $\sim 0.03\text{EUR/kWh}$

- Wood must be properly dried before being used as fuel (less than 20% humidity)
- burning wet wood causes energy loss and can lead to deposits of creosote building up in the chimney
- Wood should be stored exposed to south, exposed to wind, protected from rain and snow, separated from the ground, with enough space around it to allow enough airflow



1m³
wood



1 spatial meter
wood

Drying time	Oblice (cylindric pieces of wood) outdoors	Oblice (cylindric pieces of wood) stored after 3 months	Cjepanice (1/4 oblice) stored after 3 months
Starting humidity	76%	76%	76%
6 months	46%	44%	28%
12 months	35%	32%	23%
15 months	32%	27%	20%
18 months	27%	22%	15%
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Sources:

<http://kamin.16mb.com/savjeti/kupovina-drвета-za-ogrijev/>

<https://algoritam.home.blog/2020/01/19/zasto-kubik-drva-nije-isto-sto-i-metar/>



MODULE SUMMARY

Key takeaways

Exercise (if applicable)

References and further reading



Module Key Learnings

Supporters and mentors learned all about:

- EU legislation related to energy poverty
- National legislation related to energy poverty
- Case studies/actions/best practices in their country
- Tools and tips to understand household energy performance

Module Exercise

- **Discussion/debate**

Discuss the following issues with your fellow participants: Which energy policy from another country do you like most? How could you compare it to national policies from your country? Which case study from a different country should be replicated in your country?

- **Role play and simulation of a home visit and simple energy audit**

Form a group of two people – one will act as the energy supporter and the other as a citizen. The energy supporter will conduct a simple energy audit based on the information given to him by the citizen and recommended best simple energy measures to the citizen.

- **Reading electricity and heating bills**

Each country will choose an example of its own electricity and heating bill. Based on what they have learned in Part 3 of Module 2, participants will individually analyse each bill component.

References and further reading

- POWERPOOR Online Library:
<http://powerpoor.eu/library>

Thank you for your attention!

Name of Presenter(s)
Name of Organisation, Country
e-mail -



POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part III - From theory to practice. Good practices and case studies.

Edit Lakatos, Housing Europe

26 October 2022

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

SMALL and MEDIUM investments:

- Standby appliances
- **Draftproofing, reflective foils**
- EE lighting
- EE appliances
- Water saving devices

3-4 windows,
20 EUR investment,
Payback period of 1 year



3 radiators
20 Eur investment,
Payback period of
1 year

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Energy box



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

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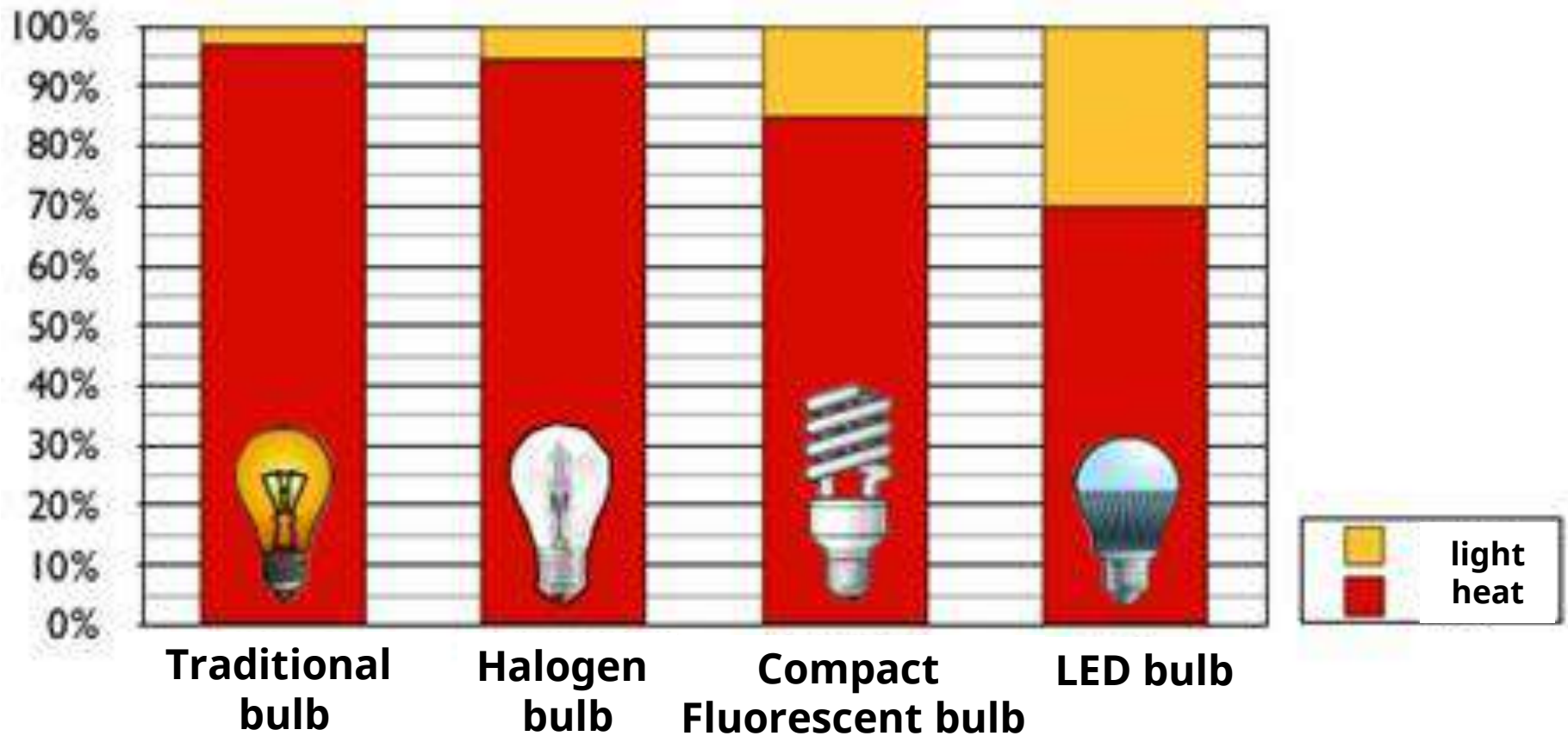


2 LED bulbs,
14 EUR investment,
Payback period of 1 year

PART III: Household energy performance

3. Energy efficiency measures and practical tips

Keep in mind!
EE $\neq$ energy saving



Also, lifetime and durability matter!

PART III: Household energy performance

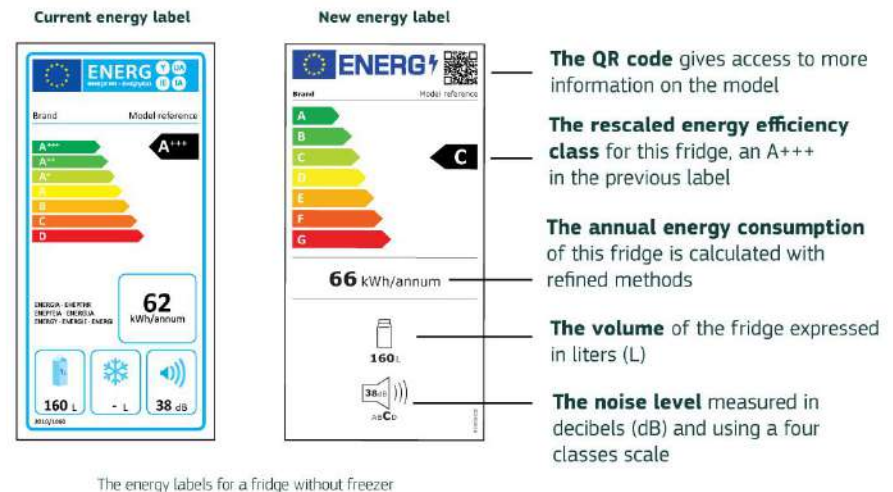
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How to recognise a rescaled product ?



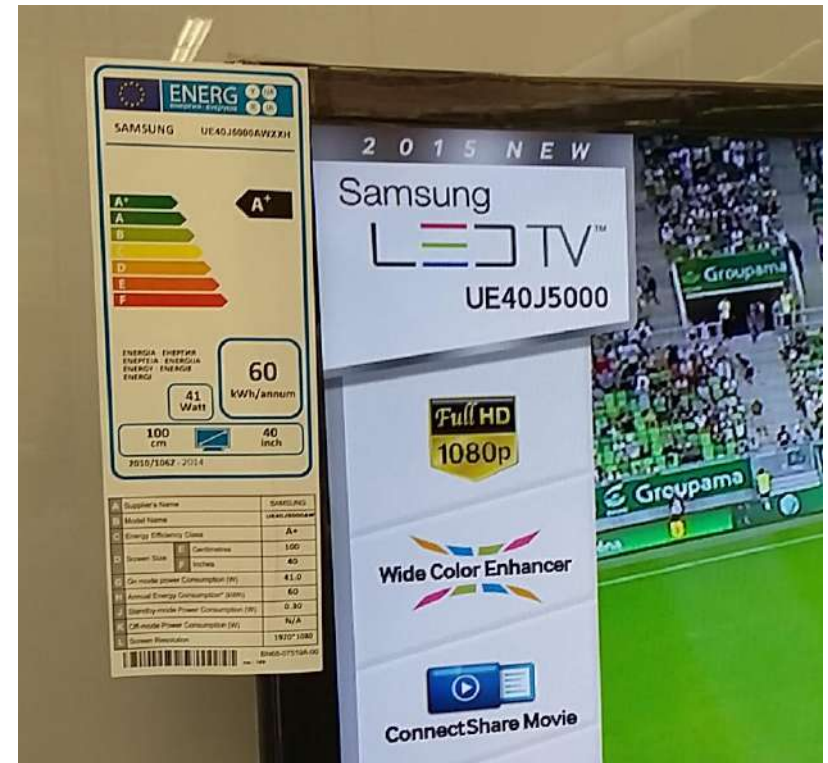
New 2021 energy labels

Source: https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/product-database/qr-code-new-energy-label_en



PART III: Household energy performance

3. Energy efficiency measures and practical tips



PART III: Household energy performance

3. Energy efficiency measures and practical tips

Example: ENERGY RENOVATION of a family house with 100 m²

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- **Water saving devices**



10 m³ potential savings compared to normal tap

PART III: Household energy performance

3. Energy efficiency measures and practical tips

HEATING – practical tips

WOOD HEATING

- When buying a furnace, select one that fits the size of the room.
- Close air intake whenever the furnace is not in use to avoid heat loss through the chimney
- Make sure that there is no exhaust gas leakage into the living space (!)
- Make sure that the wood is dry enough to be used as fuel
- Regularly inspect and clean the chimney
- Don't overfill the furnace with wood
- Consider stovepipe heat reclaim radiators to increase heat transfer to the room

GAS/ CENTRAL HEATING

- Reduce thermostat set points for unused rooms
- Insulate hot water piping, especially if passing through “cold” areas
- Service the system regularly

PART III: Household energy performance

3. Energy efficiency measures and practical tips

HEATING – practical tips

WOOD HEATING

The proper way to light firewood

- use only dry, raw (untreated) firewood (avoid all other flammable substances)
- load firewood in this way (see picture 1)
- light the pile from above

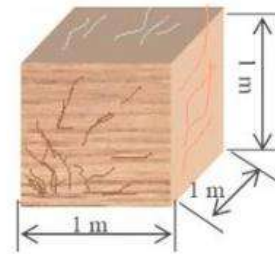


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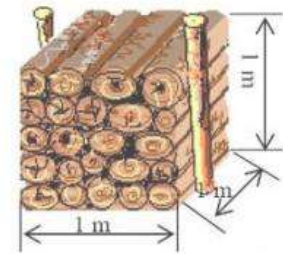
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PART III: Household energy performance

3. Energy efficiency measures and practical tips

ELECTRICITY – practical tips

- Use night/"cheap" electricity tariff for heating – especially for electric thermal storage heaters and electric water heaters
- Use socket timers to heat only rooms that are in use at certain part of the day
- Keep heating elements clean and free of airflow obstruction
- Use insulation + reflective pads between heating element and the wall

PART III: Household energy performance

3. Energy efficiency measures and practical tips

SANITARY HOT WATER – practical tips

- Use night/"cheap" electricity for water heaters
- Limit water heater temperature – around 60C is enough for most household needs
- Avoid excessively low water heater temperatures to prevent the growth of Legionella bacteria
- If the existing water heater is poorly insulated, consider additional insulation
- The size of the water heater should match the needs of the household – water heaters larger than necessary are less efficient
- Take a shower instead of a bath
- Remove lime scale (especially in case of hard water) from electric heating elements to increase efficiency
- Check pipe fittings – faulty water mixers and shower heads cause hot water leakages

PART III: Household energy performance

3. Energy efficiency measures and practical tips

INSULATION and BUILDING ENVELOPE – practical tips

- Use insulation + reflective pads between heating elements and the wall
- Use rubber seals on doors/windows to eliminate unwanted airflow
- Utilize window blinds for passive energy efficiency
- Close blinds during the night to reduce heat loss through the windows
- Open blinds to allow the sun to warm up the rooms
- Look for mold and damp walls to determine cold spots on the walls – consider additional insulation around these spots
- Thick carpets can reduce heat loss through the floors

PART III: Household energy performance

3. Energy efficiency measures and practical tips

HOME APPLIANCES – practical tips

- When buying a new appliance, pay attention to the appliance energy class
- Defrost refrigerators regularly
- Keep refrigerators away from heat sources and leave enough empty space behind them to allow efficient heat rejection
- Check if the refrigerator doors are airtight
- Don't set refrigerator setpoint too low – suggested values are 4C for refrigerators and -18C for freezers
- Use laundry washing machines and dryers during low electricity tariff periods
- Consider using lower water temperature while doing laundry
- Consider natural drying instead of electric dryer
- Induction stoves are more efficient than electric resistance ones
- Keep pot lids on when cooking to reduce required energy
- Shut down electronic devices when not in use; avoid leaving them on or in standby mode

PART III: Household energy performance

3. Energy efficiency measures and practical tips

LIGHTING – practical tips

- Turn off the lights in unoccupied rooms
- Use natural lighting when possible
- Correct light fixture can reduce power required for lighting a room

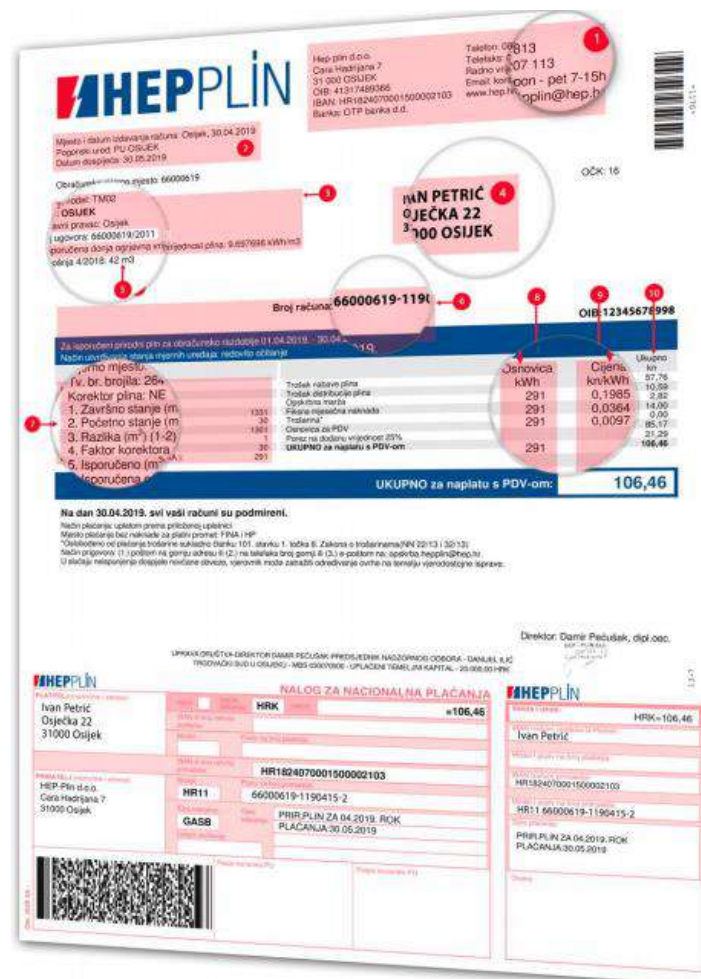
PART III: Household energy performance

4. Understanding energy and electricity utility bills - Gas

1. **Informacije o izdavatelju:** podaci o izdavatelju računa
2. **Informacije o računu:** podaci o mjestu i datumu izdavanja računa, pripadnosti organizacijskoj jedinici unutar HEP-Plin-a d.o.o., datumu dospijanja
3. **Tehnički podaci:** podaci o Tarifnom modelu, MRS-i, obračunskom mjernom mjestu, dobavnom pravcu i isporučenoj donjoj ogrijevnoj vrijednosti sukladno Mrežnim pravilima plinskog distribucijskog sustava (NN [50/18](#))
4. **Podaci o kupcu:** naziv i adresa navedena za dostavu računa
5. **Potrošnja:** podaci o prošlogodišnjoj potrošnji u istom obračunskom razdoblju u m³
6. **Broj računa:** obračunsko mjerno mjesto, podaci o pozivu na broj, obračunsko razdoblje na koje se odnosi
7. **Podaci o potrošnji:** podaci o tvorničkom broju plinomjera, podaci o postojanju korektora plina (DA/NE), razlika početnog i završnog stanja, pretvorba u kWh (umnožak potrošene količine plina (m³) i donje ogrijevne vrijednosti).
8. **Osnovica kWh:** osnovna jedinica mjere obračunskih elemenata. Od 1. siječnja 2012. godine na tržištu prirodnog plina RH primjenjuje se mjerna jedinica kWh (kWh/h).
9. **Cijena kn/kWh:** sukladno Odluci o iznosu tarifnih stavki za javnu uslugu opskrbe plinom za razdoblje od 1. travnja do 31. prosinca 2019. za energetski subjekt HEP-Plin d.o.o. (NN [15/19](#))
10. **Ukupno kn:** umnožak osnovice (kWh) i cijene (kn/kWh), svedeno na dvije decimalne jedinice

- 1 m³ of natural gas: ~9.4kWh
- 1 kWh of natural gas: ~0.04EUR/kWh

- Natural gas is measured in cubic meters (m³)
- However, natural gas can have different energy densities in different locations
- Gas volume is multiplied with lower heating value of gas, specific for different distribution areas
- Resulting energy in kWh is billed according to price per kWh

Source:
https://www.hep.hr/elektra/UserDocsImages/dokumententi/cesta-pitanja/Pojasnenje_racuna_2_2018.pdf



PART III: Household energy performance

4. Understanding energy and electricity utility bills - Electrical

- Electricity price in Croatia:
 - Day: ~0.15EUR/kWh
 - Night: ~0.8EUR/kWh
- Actual electricity readings are taken several times per year, while bills are issued monthly based on assumptions. Consumers are often confused by the balancing accounting.
- Items explained in the bill:
 - customer information
 - billing period
 - measurement units
 - energy consumed, high/low tariff
 - unit prices (energy, grid usage, renewables surcharge, "solidarity surcharge")
 - subtotals per each item
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RAČUN br: 2212345678-180120-3, razdoblje: 13.06.2017. - 28.12.2017.

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POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part IV - Energy communities and innovative financing schemes to tackle energy poverty

Oliver Gajda (EUROCROWD)
26 October 2022



This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 890437

Module – Structure and content

-  Module goals
-  Module content
 -  I – Collective Innovative Actions for Energy Poverty – An Introduction
 -  II – Crowdfunding & Innovative Finance
 -  III – Collective Energy Initiatives
 -  IV – Power Fund Tool
-  Module summary
 -  Key takeaways
 -  Further reading

Goals

- 🌱 Introduce the concept of Collective Innovative Actions for Energy Poverty
- 🌱 Explain what crowdfunding is and how to use it
- 🌱 Introduce the concept of Collective Energy Initiatives and equip participants with the necessary skills to create their own initiatives

I: Collective Innovative Actions for Energy Poverty – An Introduction

What are Collective Innovative Actions for Energy Poverty?

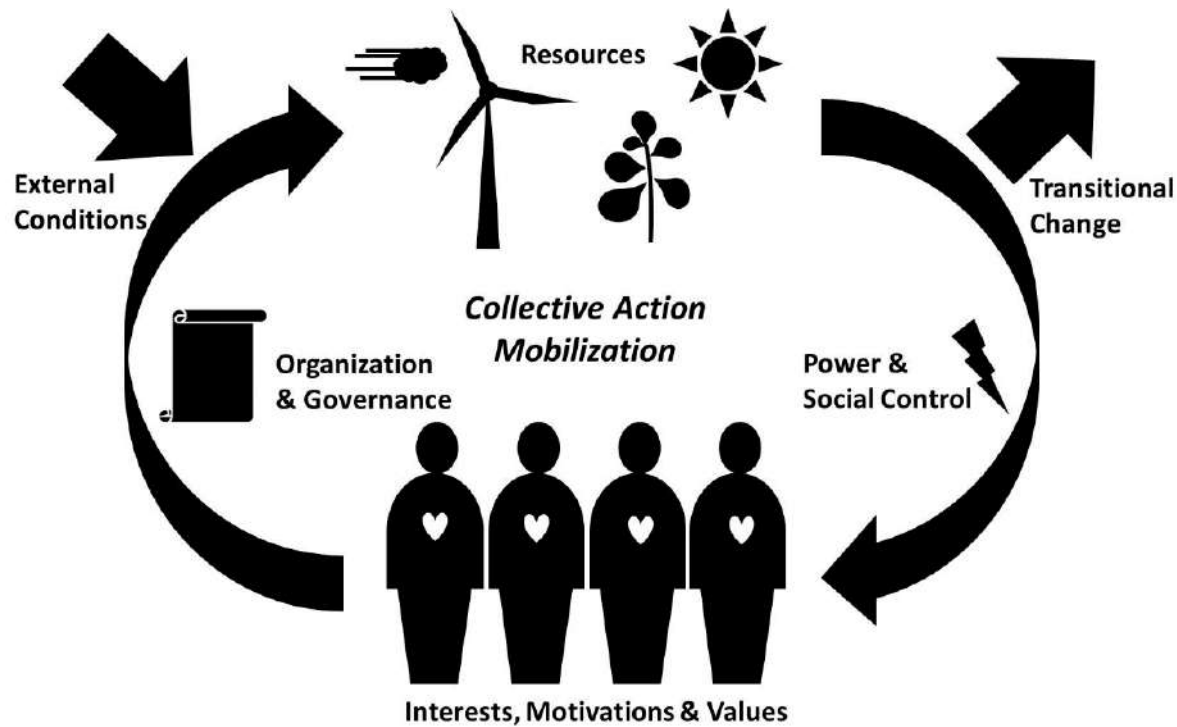
What can they do to alleviate energy poverty?

I: Collective Innovative Actions for Energy Poverty

What are they?

What is a Collective Innovative Action?

Collective Innovative Actions such as energy communities or crowdfunding initiatives are based on a simple yet powerful idea:



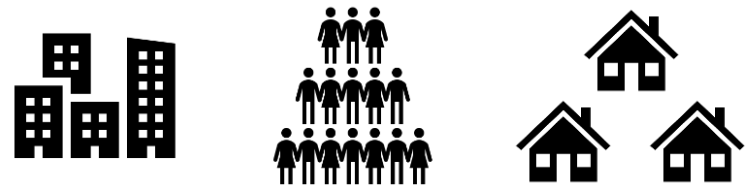
There is strength in numbers!

How can you achieve an ambitious goal without having sufficient resources to do it on your own?

Normally, you might ask your friends and family to help you by either donating some money or giving you a small loan.



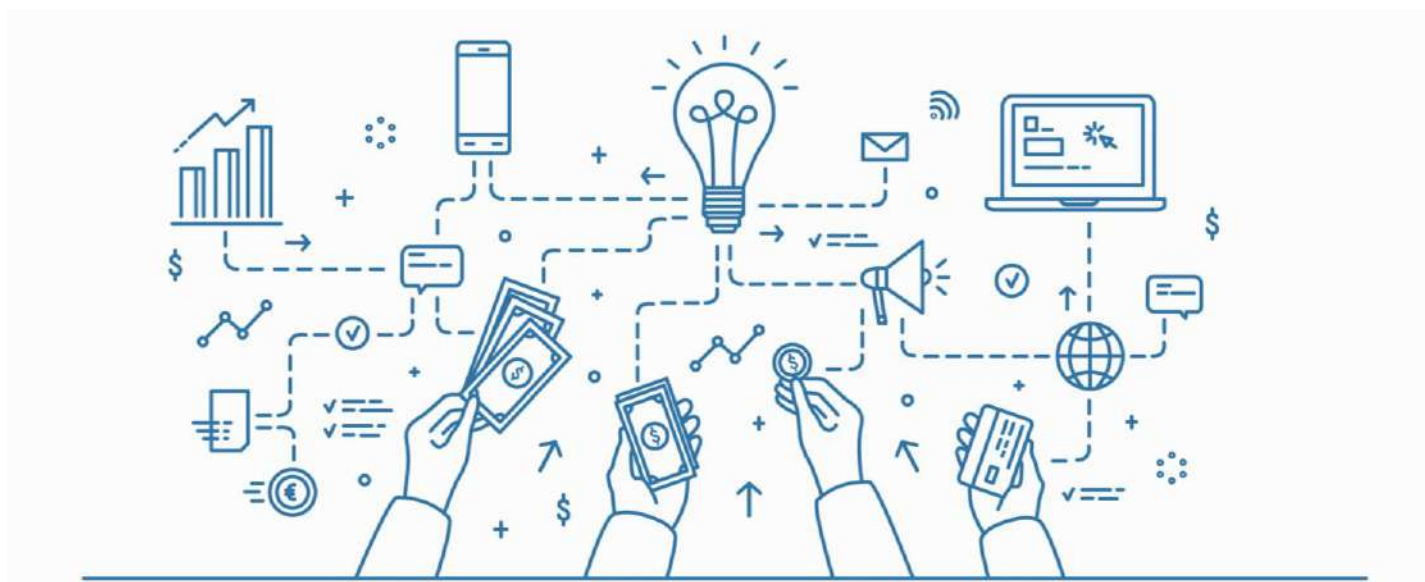
When you expand that idea to an entire neighborhood or region and build an organization around it, it becomes a community.



Collective Energy Initiatives

Collective Energy Initiatives, as the name indicates, are initiatives to bring citizens together and develop joint strategies to:

- gain **access** to affordable energy,
- **tackle a certain issue** such as energy poverty,
 - **empower** citizens in the energy market,
- find a **new electricity source**, for instance, by switching from traditional retailers to renewable energy ones and/or to self-generation.



Community finance

Community finance, or crowdfunding, is the natural extension of cooperative finance initiatives to even **larger communities**, typically via the Internet. It draws support from people across entire countries in order to make **specific projects** feasible and create change at the local level, raise awareness of social challenges or inspire communities to engage with local initiatives.

What can Collective Innovative Actions do to tackle energy poverty?



The **collective approach** fostered by energy communities and/or crowdfunding initiatives is **particularly appropriate** to address the enormous challenges faced by energy poor citizens who wish to:

- take action to **reduce their energy consumption** or
- **improve the energy efficiency** of their households.

1

Community actions allow building/household owners to pay the **large upfront costs** of investments in Renewable Energy Sources (RES) or Energy Efficiency (EE), which traditional financial institutions may not be interested in funding or able to finance.

- When it comes to renewable energy generation, energy communities can support installation services by raising the initial capital required to make a large investment in generation capacity.
- In the case of EE investments, external funding and motivational support can allow property owners to overcome the energy efficiency gap.

2

Community-based RES installations allow **individuals who would not be able to purchase their own generation system**, or do not have a sunlit private roof or area, **to take part in the renewable energy transition.**

Likewise, energy-based communities allow individuals to easily invest in EE improvements, derive income from them, and participate in the energy transition. They also allow individuals already taking part in the energy transition to increase their participation levels under sustainable conditions.

3

Community-based RES installations generally **lower installation costs and increase revenues** by utilizing economies-of-scale and optimal siting of generation capacities.

Similarly, large-scale EE investments can take advantage of bulk purchases and economies-of-scale to **improve the returns on such investments**.

4

Collective innovative actions can also **support off-grid energy poor households**, such as those in rural areas that are not connected to the energy grid, and improve their access to energy by helping them pull together the resources and capital required for capital-intensive off-grid energy projects.

5

At the same time, the community approach allows individuals to **combine their buying power to purchase energy** (not only generate it), obtaining better prices in the wholesale market.

II: Crowdfunding & Innovative Finance

What is community finance?

How does it work?

Setting up a campaign

How can community finance help tackle energy poverty?

?

WHAT

Crowdfunding & Innovative Finance

What is it



Community Finance is the practice of funding a project or venture by raising small amounts of money from a large number of people, typically via the Internet.

Crowdfunding & Innovative Finance

Key elements



Open call to **raise funds** for a specific project

From **anyone with Internet access**
(potentially)

Through an **Internet-based** mechanism
(specialised website)

Foreseeing **tangible or intangible benefits** in
exchange for each economic contribution

Crowdfunding & Innovative Finance

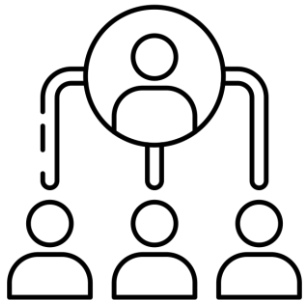
Main actors



Promoter



Platform



Crowd

Crowdfunding & Innovative Finance

Terminology and different Models

Non-financial

Match-funding

Financial



Donation

Philanthropic donation or gift, no return expected

Up to 10.000 €



Reward

Contribution in exchange for a perk or a product pre-order

Up to: 30.000 €



Equity

Investment for an ownership share in the business

Avg: 350.000 €



Lending

Capital repayment most often with interest

500k - 2 million €

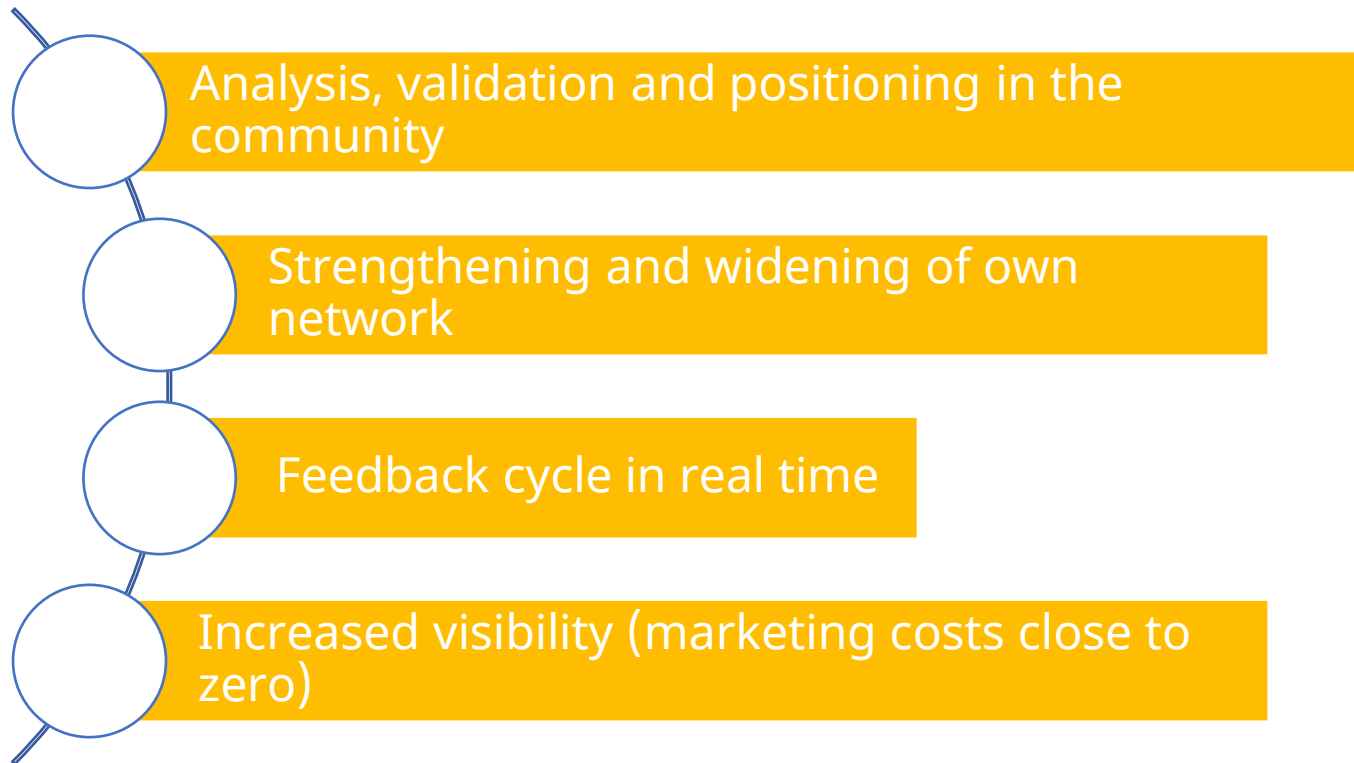
Crowdfunding & Innovative Finance

General benefits



Crowdfunding & Innovative Finance

Specific benefits

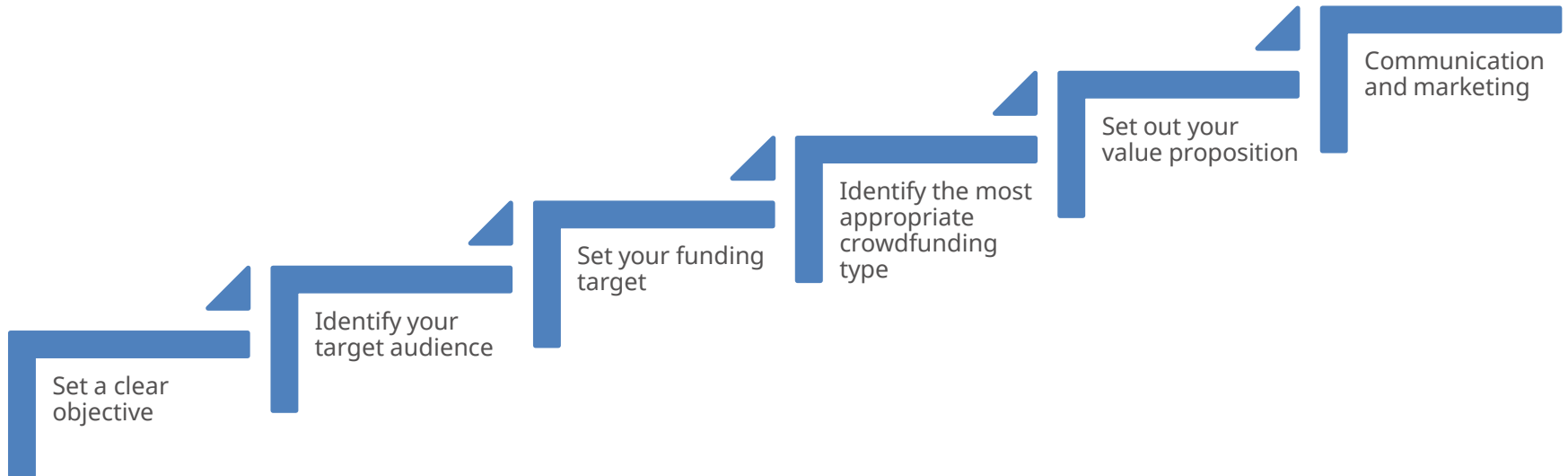




HOW

Crowdfunding & Innovative Finance

The crowdfunding process



Crowdfunding & Innovative Finance

Project idea outline



What is the objective of your project?



What is its target audience?



Why should the community support it?

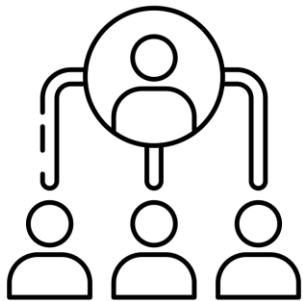


Exercise: answer each question with a concise and clear sentence.



Crowdfunding & Innovative Finance

Potential funders



CROWD

Own Network (friends, family, peers)

People reached through media coverage

Businesses as part of CSR activities

People reached through affiliated communities/networks

Existing crowdfunding networks (i.e. Eurocrowd)

Investors



Crowdfunding & Innovative Finance

Understand your target audience

Friends and
family

Peers

Organisations

- **Who** do you think will be supportive of your work and why? (friends, family, peers, people interested in the research area)
- **How big** are the audience groups?
- **How much money** can the different groups give? Which one should be the focus?
- How can you **reach** them?
- What is the **best style** of communication?
- **Why** would they be **interested** in your project?
- **Who** in your network can help you **reach** your audience?



Exercise: Identify at least two potential funders, as well as organizations and amplifiers relevant to your campaign

Crowdfunding & Innovative Finance

Identify your funding needs

**How much money do you need
to achieve your objective?**



Campaign production costs

rewards, videos, marketing, etc.



Service costs

Crowdfunding platform fees,
transaction fees

Crowdfunding & Innovative Finance

Campaign concept outline

Your objective

What do you need funds for?

Project type

Social cause? Tech? Consumer product?

Project stage

Pre-seed? Seed? Early Stage? Growth?

Type of capital

Equity? Debt? Donation? Commercial?

Funds needed

How much money do you need to achieve your objective?

Target audience

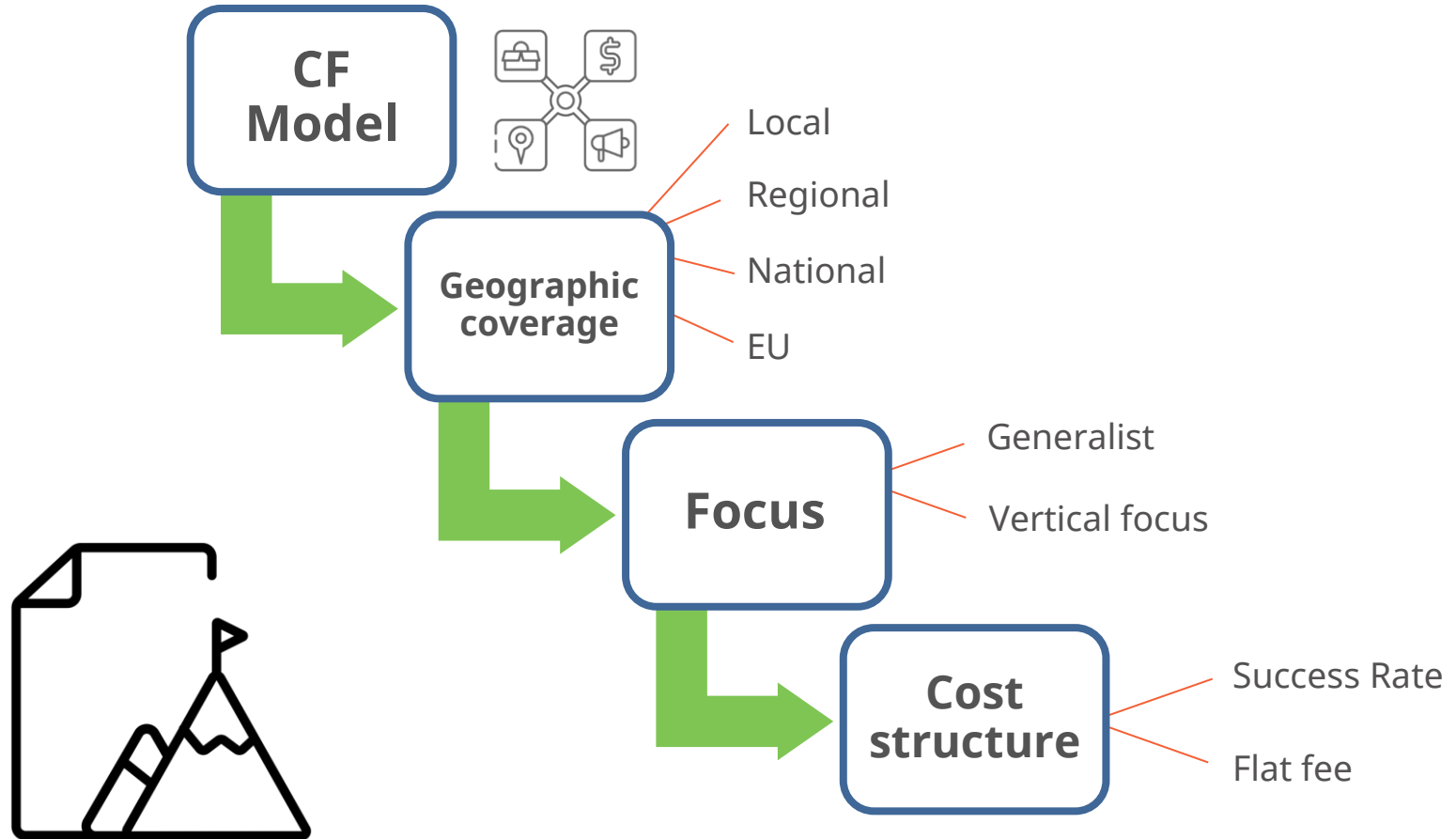
Who is the target audience of your campaign?

TYPE OF CROWDFUNDING



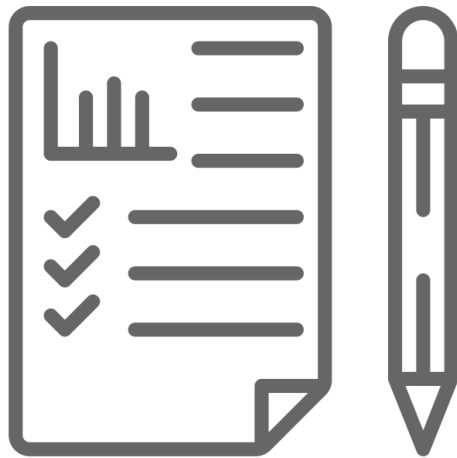
Crowdfunding & Innovative Finance

How to choose your crowdfunding platform



Crowdfunding & Innovative Finance

Due diligence of platforms

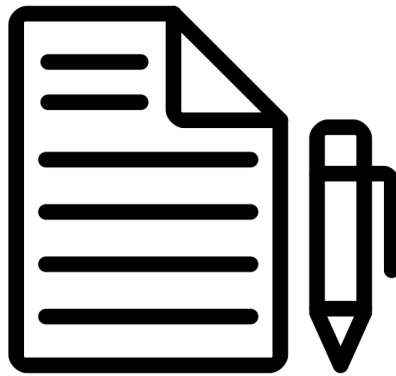


- CF Model
- Geography
- Specialist vs generalist
- Cost structure
- Similar projects



Exercise: Identify the right platform for you + 1 similar project





Setting up a campaign



Crowdfunding & Innovative Finance

Organize your ideas

Telling a compelling story...

What?
Why?
How?
Who?
When?
Where?

Why do you need
their support?
What do you offer
in exchange?
Call to action



Use appropriate language and tone
for your audience



Crowdfunding & Innovative Finance

Tips to take into account

- **Do** use appropriate tone and language for each audience
- **Do** prepare your messages in advance
- **Do** prepare a communication plan
- **Do** keep your social media updated
- **Do** focus on channels where you already have a solid network
- **Do** organize a launch event
- **Don't** be afraid of **asking (for advice, contributions, input, etc)**

Crowdfunding & Innovative Finance

Focus on the typology of crowdfunding that you use

Set the right incentives

Donation	Reward	Equity	Lending
• Appel to intrinsic motivation & philanthropy • Provide updates on the latest developments of projects • Express gratitude to your donours	• Extrinsic + intrinsic motivation • Offer a variety of rewards considering different income and interest levels • Perks' perceived value • Market rate	• Financial return • Intrinsic motivations • Valuation • % offered • Promise & deliver growth	• Financial return • Interest rate



Exercise: Identify the best incentives for your case

Crowdfunding & Innovative Finance

Start your campaign



How Collective Innovative Actions can tackle energy poverty

Case Study 1

CASE STUDY	SOLARISATION OF GREECE: REWARD CROWDFUNDING CAMPAIGN FOR SOLAR PANELS	LOCATION
		GREECE
DESCRIPTION	With energy poverty being one of the most dramatic symptoms of the debt crisis in Greece (6 out of 10 households were struggling to pay their energy bills), investing in the abundant sun, the country's biggest asset, helped put money back in people's pockets by reducing their energy bills, brought them back into the job market by teaching them new skills and giving them opportunities, while contributing to the renewable energy transition.	
SOLUTION	Greenpeace Greece launched a reward-based crowdfunding campaign to finance the installation of solar panels onto the houses of families who lived on the brink of energy poverty in the island of Rhodes.	
IMPACT	35.063€ raised from 1161 backers Lower energy bills for involved households with significant savings Reduced dependency on oil energy production and oil subsidies	

Source: <https://www.indiegogo.com/projects/solarization-of-greece#/updates/all>

How Collective Innovative Actions can tackle energy poverty

Case Study 2

CASE STUDY	Crowdlending campaign for the energy rehabilitation of a homeowner community	LOCATION
		SPAIN
DESCRIPTION	Project to replace community boilers and other energy efficiency measures in the centralized hot water production system of a community of homeowners in Barcelona. The project achieved significant savings in the energy consumption of the centralized Domestic hot water (DHW) production system, as well as a fair distribution of the real consumption of each home.	
SOLUTION	Crowdlending campaign for the realization of a series of energy efficiency proposals: • Replacement of old atmospheric gas boilers with new, more efficient watertight boilers • Replacement of the old circulation pumps • New monitoring and control system • Installation of individual ACS meters in each house	
IMPACT	49,600€ raised from 56 backers Lower energy consumption for involved households with significant savings on the energy bill CO2 emissions reduced by 16 tons/year	

Source: <https://www.ecrowdinvest.com/detalles/comunidad-propietarios-barcelona#description>

How Collective Innovative Actions can tackle energy poverty

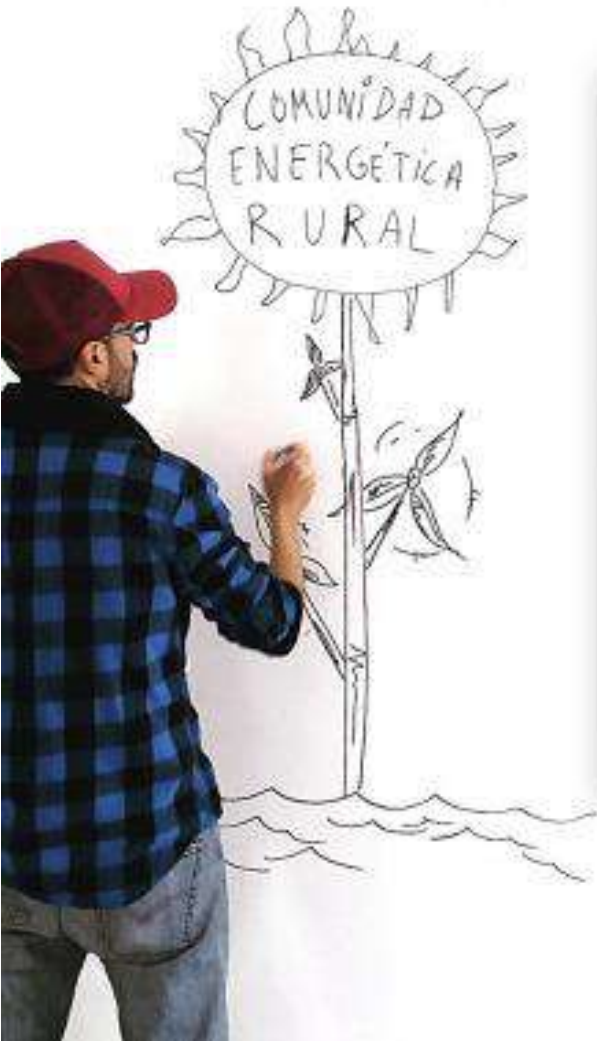
Case Study 3

CASE STUDY	#LaEnergiaDelCole Photovoltaic installation in a rural school committed to sustainability and the right to energy	LOCATION
		SPAIN
DESCRIPTION	Project to replace community boilers and other energy efficiency measures in the centralized hot water production system of a community of homeowners in Barcelona. The project achieved significant savings in the energy consumption of the centralized Domestic hot water (DHW) production system, as well as a fair distribution of the real consumption of each home.	
SOLUTION	Reward CF campaign which the main objective is obtain funding for 42,5 Kwp PHOTOVOLTAIC Installation for collective self-consumption: • Drafting of the technical project, legalization and construction management. • Installation of coplanar structure, with 66 mono-crystalline silicon modules of 340 wp, three-phase inverter of 20KW AC Nom, electrical protections and wiring. • Monitoring system for the intelligent management of the installation and net generation meter.	
IMPACT	29,052€ raised from 202 backers (with 2 matchers, 1000€ each) / 20,000 € “in kind” Reinforce the (rural) Eco-School infrastructure Increase the energy awareness of the community and actively involves them in energy saving actions Dynamization and collective construction of a model of governance, criteria for participation and sharing of collective self-consumption and tackle energy poverty in the community	

Source: <https://en.goteo.org/project/ia-energia-del-cole>

How Collective Innovative Actions can tackle energy poverty

Case Study 3



"If you want to go fast go alone, if you want to go far go together."
- african proverb -

Source: <https://en.goteo.org/project/la-energia-del-cole>

How Collective Innovative Actions can tackle energy poverty

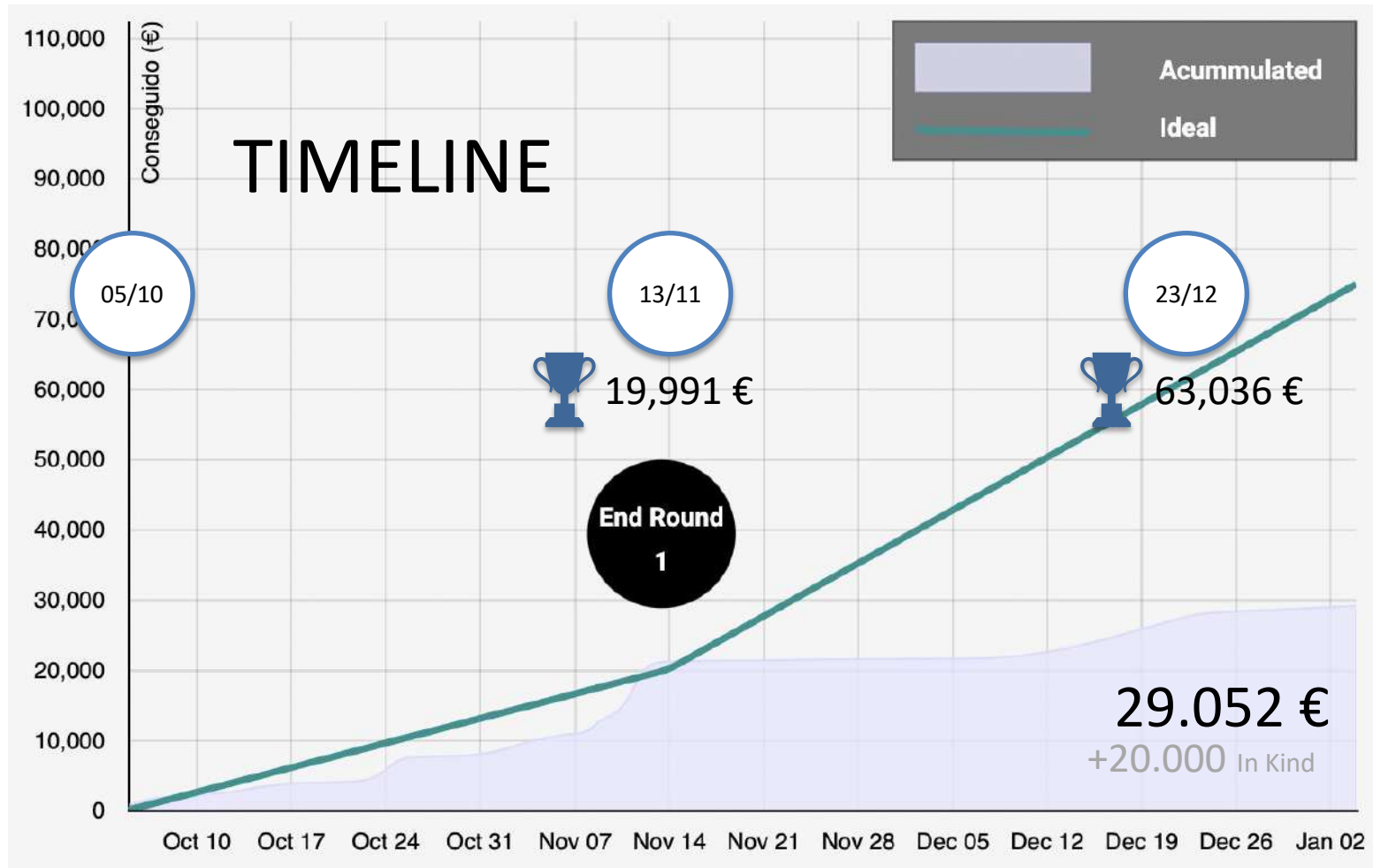
Case Study 3

PREPS



How Collective Innovative Actions can tackle energy poverty

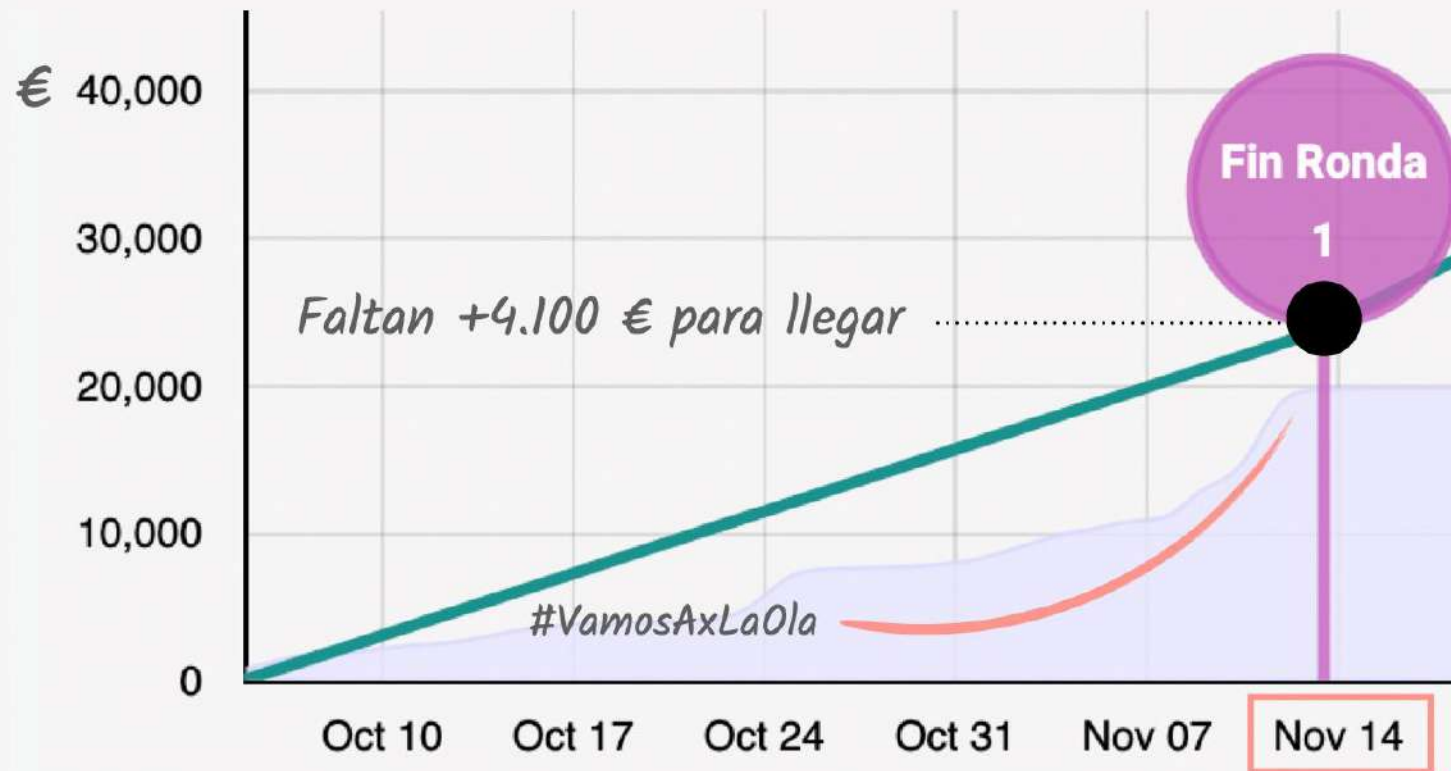
Case Study 3



Source: <https://en.goteo.org/project/la-energia-del-cole>

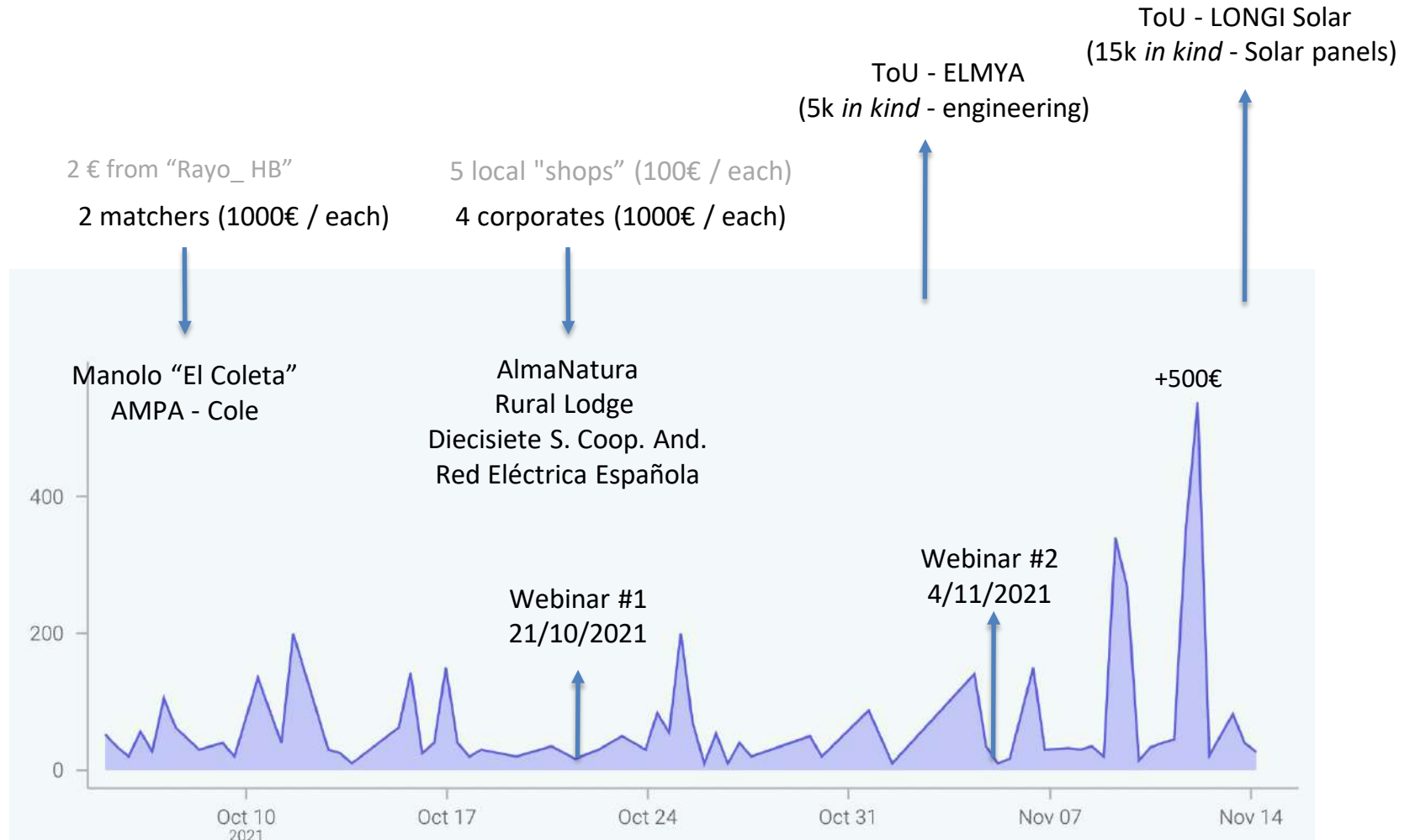
¡Nos faltan 2 días!

A por el mínimo  #LaEnergiaDelCole



How Collective Innovative Actions can tackle energy poverty

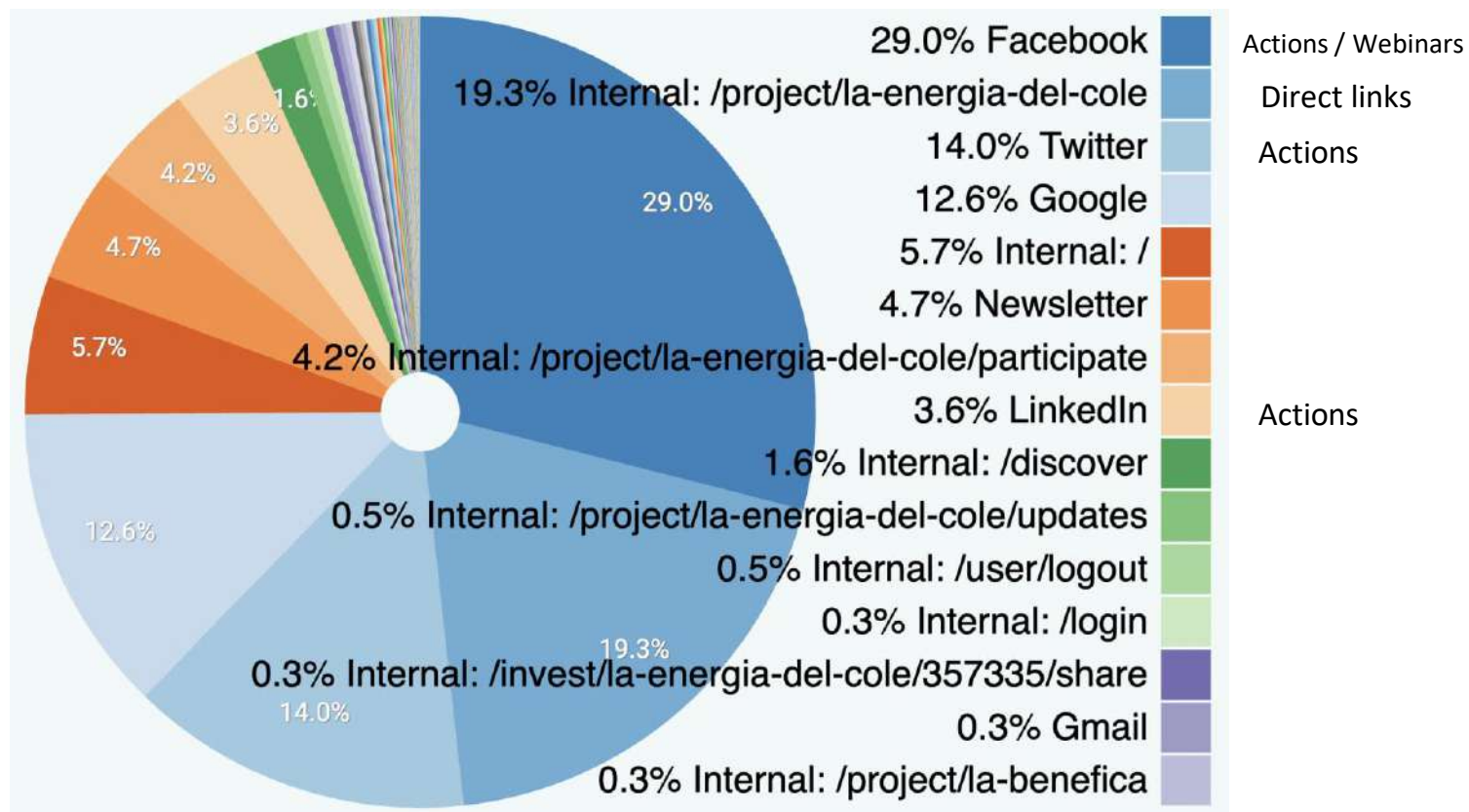
Case Study 3



Source: <https://en.goteo.org/project/la-energia-del-cole>

How Collective Innovative Actions can tackle energy poverty

Case Study 3



Internal information on where the “visits” came from

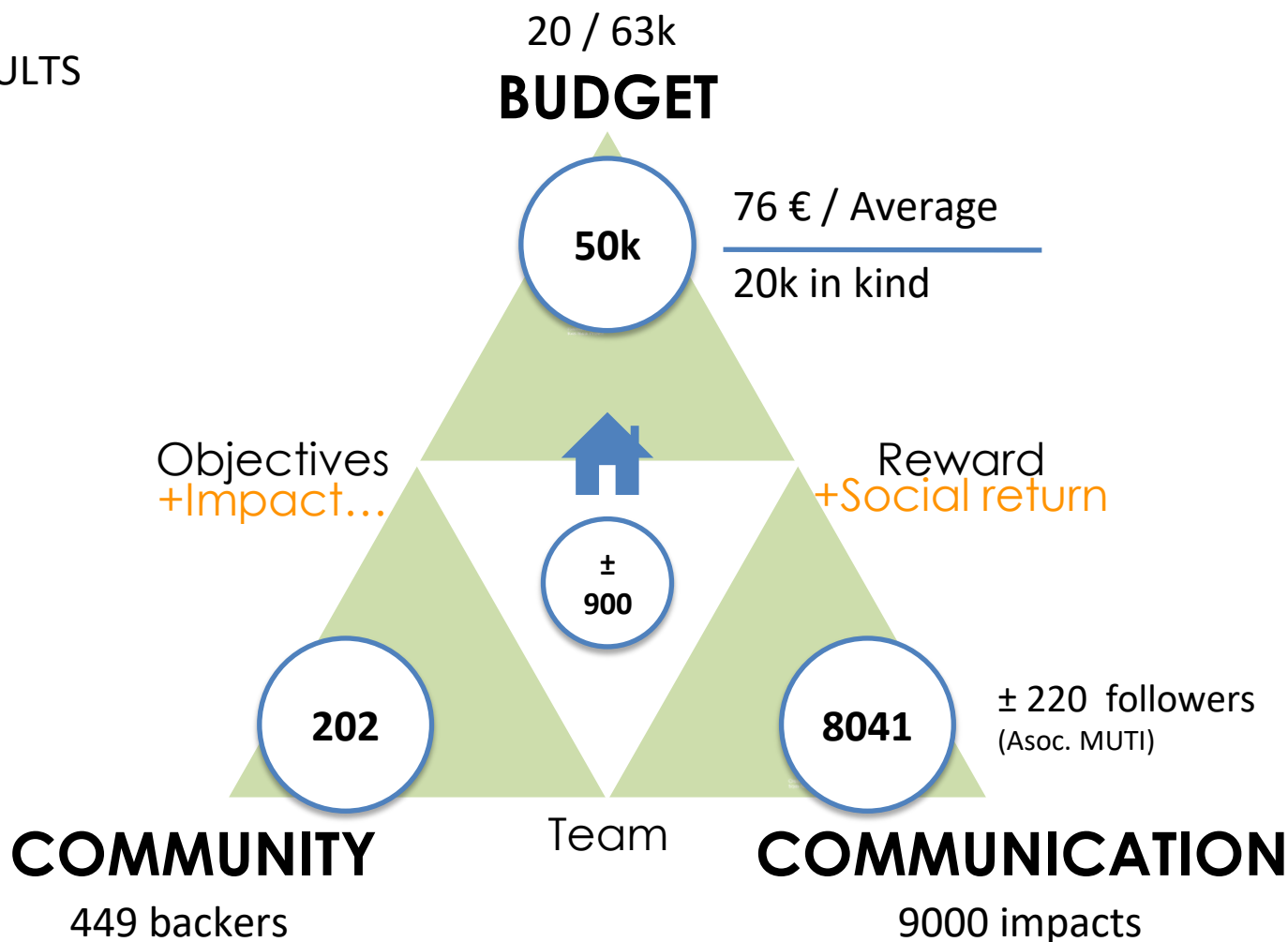
2% conversion

Source: <https://en.goteo.org/project/la-energia-del-cole>

How Collective Innovative Actions can tackle energy poverty

Case Study 3

RESULTS



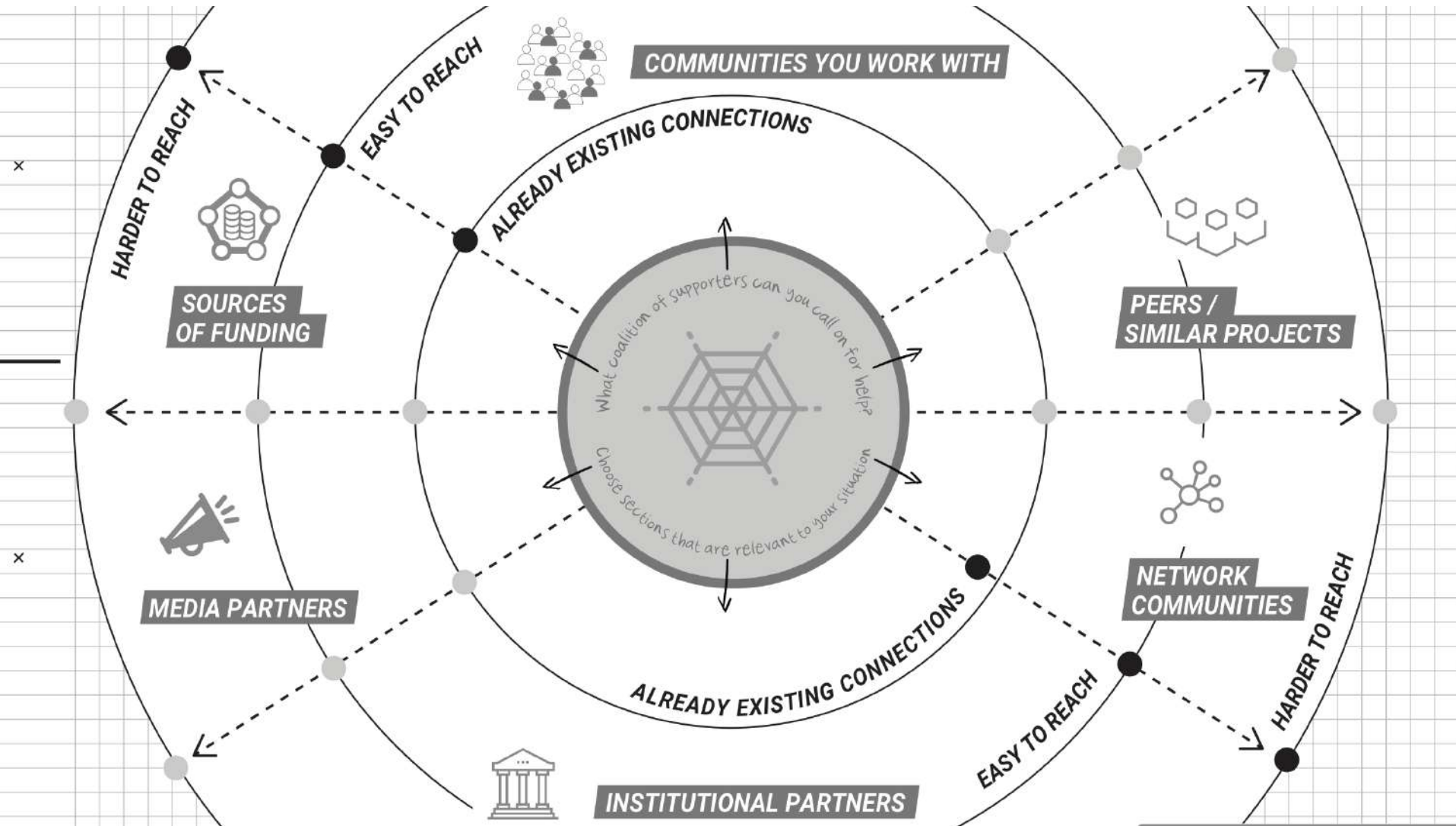


EXERCISE



Crowdfunding & Innovative Finance

Exercise 1: Identify your community network



Crowdfunding & Innovative Finance

Exercise 2: Develop a campaign pitch



Exercise: Based on what you have developed so far, write your crowdfunding pitch, including:

- Who is your target audience? What are you planning to achieve and why?
- Where, when, how (if relevant)?
- How much funding you're looking for?
- Why should people care?
- What are you offering in exchange?
- Call to action



III: Collective Energy Initiatives – An Introduction

Definition

Differences

Energy cooperatives

How can they help fight energy poverty?

How to start

Collective Energy Initiatives

Definition

Energy communities are...

- A way of organising **collective citizen actions** to influence the energy system
- Entities that exercise **energy-related activities** (generation, distribution, supply, aggregation, consumption, sharing, storage of energy, provision of energy-related services, etc.)
- Non-commercial **market actors**, that can facilitate collective switching campaigns, collective investments in solar panels, the ownership of an energy supply company, a distribution network, etc.

Collective Energy Initiatives

Definition

Energy communities are based on...

- Open and voluntary governance
- Ownership and control by citizens, local authorities and small businesses
- Social, environmental or local economic benefits rather than profit-making

Collective Energy Initiatives

Differences

ENERGY COMMUNITIES

Two new definitions at the EU level

Renewable Energy Community (REC)

Citizen Energy Community (CEC)

All forms of renewable energy



Technology-neutral (only electricity)

Proximity of RE projects



No geographic limits

Individuals, local authorities and
micro/small/medium enterprises



Any participant

Autonomous from individual
members
and traditional market actors



Undefined degree of autonomy

Effective control by individuals, local
authorities and micro/small
enterprises



Effective control includes medium-
sized enterprises



Collective Energy Initiatives Differences

Energy Communities can have different legal forms:

Foundations

Partnerships

**Limited liability
companies**

Energy cooperatives

Associations

Trusts

**Non-profit
organisations**

Collective Energy Initiatives

Energy cooperatives

ENERGY COOPERATIVES

A type of social and economic enterprise

A legal form that enables citizens to collectively own and manage energy-related projects and services

- Democratic governance (1 member – 1 vote)
- Citizens can consume and share energy from renewable sources
- People can invest by buying shares or financing projects
- Surpluses are reinvested to support its members and/or the community

Collective Energy Initiatives

Energy cooperatives



Collective Energy Initiatives

How can they help fight energy poverty?

Accessibility

- **Economy**
 - Fair prices
- **Governance**
 - Fair decisions

Sustainability

- **Social**
 - Integration and cohesion
- **Environmental benefits**
 - Less health risks

Solidarity

- **Fair conditions**
 - Well-being rather than profit
- **Support**
 - Knowledge sharing

Local economy

- **From citizens, for citizens**
 - Benefits remain local
- **Financial autonomy**
 - Less external dependence

Collective Energy Initiatives

How can they help fight energy poverty?

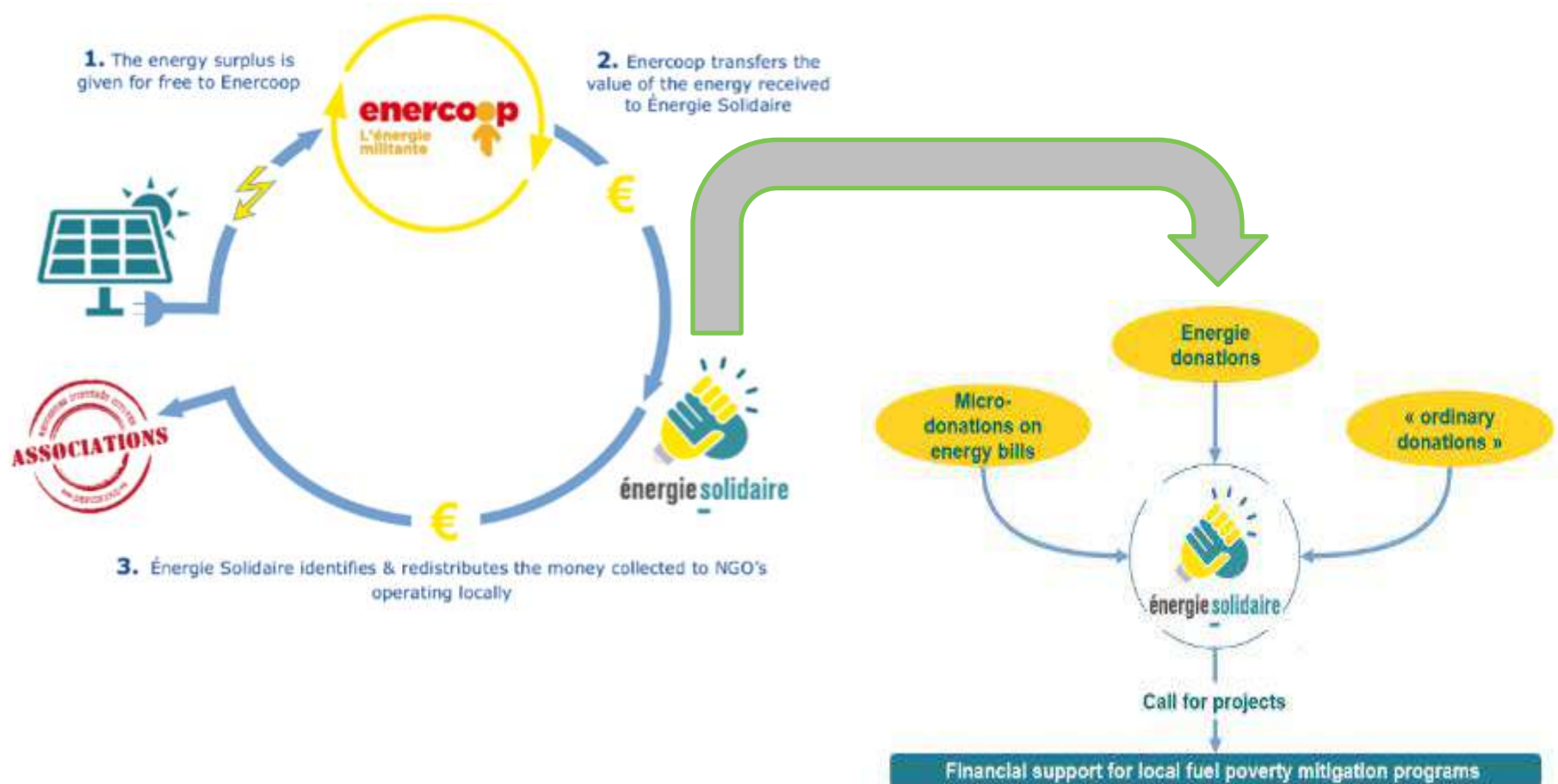
For example:

- **Sharing locally produced energy with vulnerable consumers**
 - More accessible energy prices
- **Collective purchase or ownership of goods and services**
 - Support for making investments with large upfront costs
 - Opportunity to participate in collective energy generation with no or low investments
- **Reinvesting in the community**
 - Round-up or similar mechanisms in energy bills to support vulnerable consumers
 - Accessible loans for investments within the community (e.g. microcredit)
- ...and much more!

Collective Energy Initiatives

How can they help fight energy poverty?

CASE STUDY 1

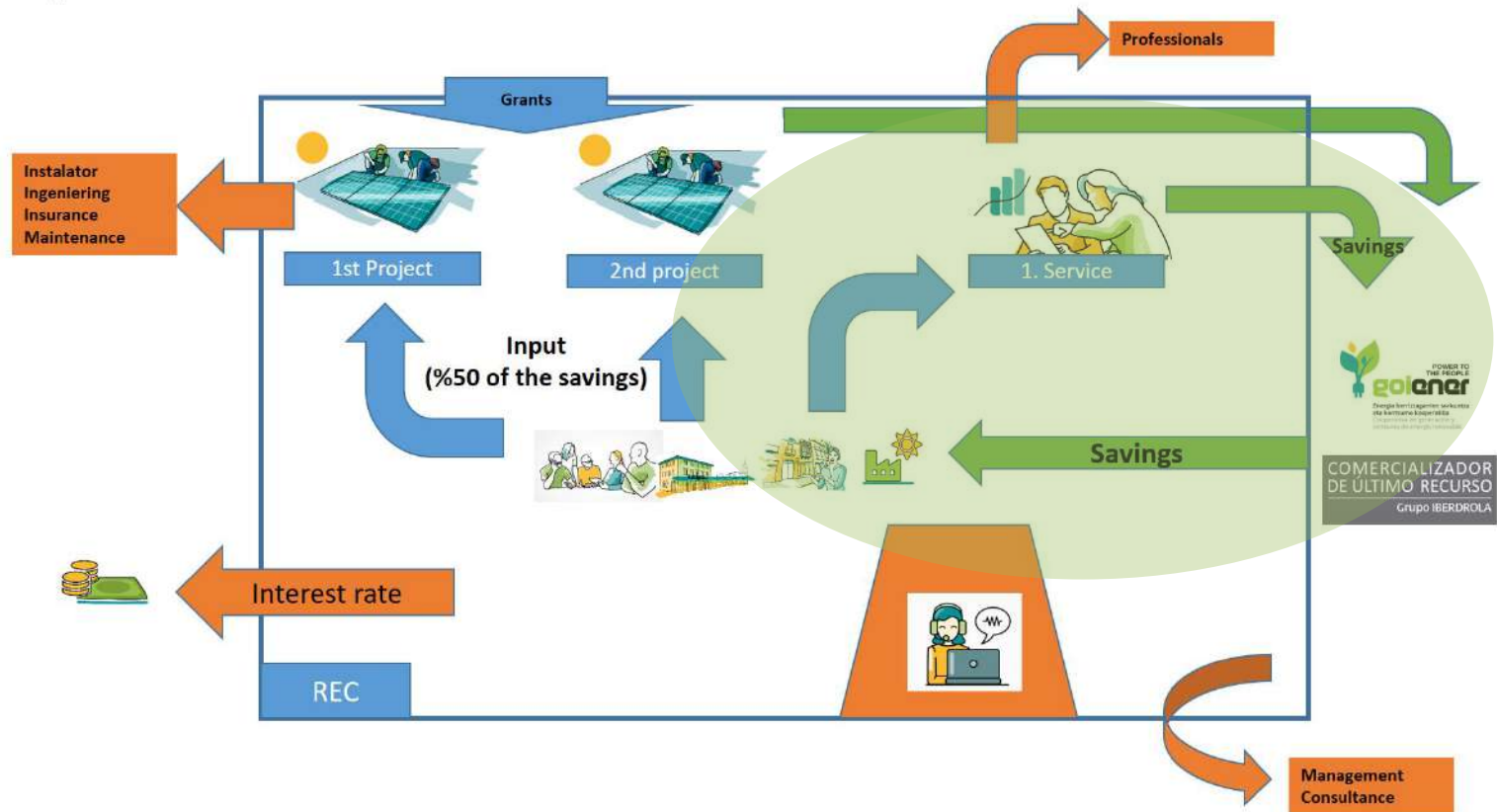


Collective Energy Initiatives

How can they help fight energy poverty?

CASE STUDY 2

Operative scheme of a REC



Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

1. **Get organized** → build up your group of people
2. **Define your goals** → which type of activity will be conducted?
3. **Choose your legal form** → energy cooperative?
4. **Look for support** → what kind of support, and from whom?
5. **Start your activity** → and tell the world about it!

Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

1. Get organized → build up your group

- Gather motivated people → technical skills and knowledge are important, but motivation is key!
- Identify key leaders, or welcome potential ones
- Consider existing groups around you, the community might already be there! (and learn from them)
- Keep your team engaged through regular communication and activities

Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

2. Define your goals → which type of activity will you conduct?

- Ask questions to yourselves
 - Who are you? What do you want to achieve? How are you going to do it?
- Create your own narrative → Storytelling is key
- Define your main activities:
 - Energy efficiency and savings
 - Energy production
 - Energy management (sharing, storing, self-consumption...)
 - Energy supply, distribution, other services...
 - Education
 - Mobility
- Plan your process → Develop your strategy

Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

3. Choose your legal form → energy cooperative?

- You will need a legal framework in order to carry out most of the activities
- **Choose the legal form that best fulfills your needs** → In POWERPOOR, we think that energy cooperatives are the most appropriate ones. Some of their advantages are:
 - Regional networks → Support and visibility
 - Already existing rules/structures → You do not have to start from scratch
 - Other cooperative initiatives → Can be a good inspiration, reference and support
 - Social and economic perspective → A solid legal form to reach your goals
- **Define your structure**
 - Internal rules
 - Who will be the decision-makers?
 - Who will be the investors?

Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

4. Look for support → what kind of support do you need and from whom?

Support from:

Local and regional administrations

Other cooperatives

Companies and professionals

Associations and social movements



Support in/as:

Legal/fiscal procedures, legitimacy...

General/operational support

Service provision, technical support...

A broad reach, social legitimacy

Create a network around you → Reach the wider community

Collective Energy Initiatives

How to start

General guidelines to **CREATE AN ENERGY COMMUNITY**

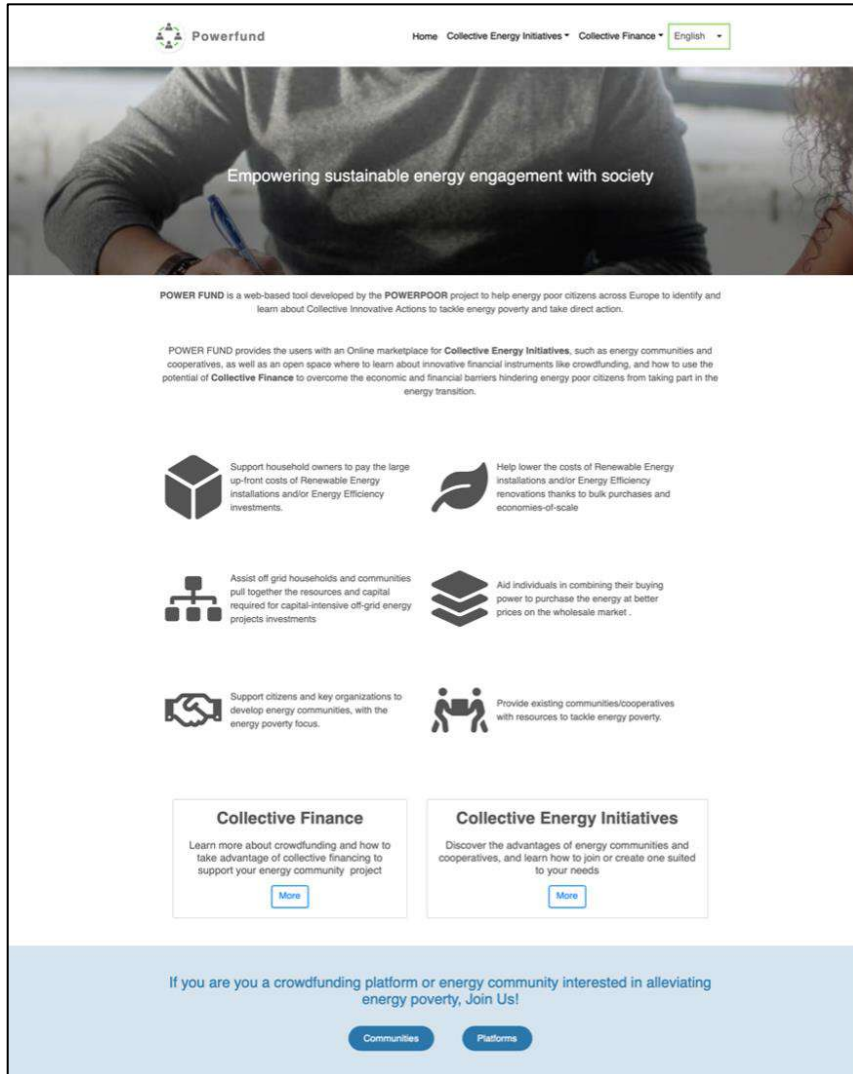
5. **Start your activity** → and tell the world about it!

- **Share your narrative** → Motivate others to join you or to engage in new projects
- Remember: maintaining an energy community is a **continuous process** which requires constant engagement!

IV- POWER FUND

What is it?

How to use it



POWER FUND is a Web based tool to help energy poor citizens identify and learn about collective innovative actions to tackle energy poverty.

To this end POWER-FUND integrates two main sections:

An Online marketplace for Collective Energy Initiatives

A open space on innovative financial instruments and community finance

Online marketplace for **Collective Energy Initiatives**

It provides users, i.e., individuals, including energy poor citizens, local and regional authorities, and communities / cooperatives, with four types of services:

Conceptualising Energy Communities: A brief introduction to Energy Communities, what they are, and what they can do for energy poverty.

Join a community: A list of energy communities / cooperatives per country, with information about their pricing and management policies, the services provided to energy poor citizens, and the process to join and become an active member;

Create a community: Guidelines on how an energy community can be established and operated by energy poor citizens and in close collaboration with local stakeholders, especially for the participating countries.

Operate a community: Tips and tools to help users in managing and operating their energy community, including tools for monitoring data on energy consumption / production, and evaluating the performance of a city/community/buildings, in terms of energy efficiency)

Collective Energy Initiatives, as the name indicates, are initiatives where citizens come together to find new pathways to access energy or to tackle a certain issue such as energy poverty, empowerment of citizens in the energy market or even to find a new source for their electricity like switching from traditional retailers to renewable energy ones and/or to self-generation.

Discover more about the concept of collective energy initiatives and how they are structured.

CONCEPTUALISING ENERGY COMMUNITIES

As an effective way to address energy poverty, Collective Energy Initiatives can provide a variety of services that can help vulnerable citizens to improve their situation. In addition to financial support such as collective purchases or social tariffs, energy communities and cooperatives can empower citizens in many ways, for example by improving the accessibility to energy through shared energy production and management, or by giving voice to vulnerable citizens in the decision-making processes. They can also support citizens by providing relevant knowledge and fair conditions when it comes to the energy use and its purchase, encouraging consumers to take actions in the energy sector with the aim of achieving social, environmental and economic benefits in a local level.

JOIN A COMMUNITY

A list of energy communities / cooperatives per country, with information about their pricing, the services provided and the process to join and become an active member.

MORE

CREATE A COMMUNITY

A step-by-step guide on how an energy community can be established and operates.

MORE

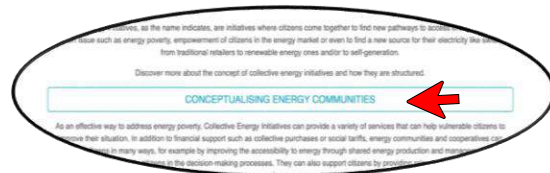
OPERATE A COMMUNITY

A list of various tools to support the day-to-day operation of an energy community, including (real time) monitoring and analysis of the energy use (production and consumption) and voting support.

MORE



Conceptualising Energy Communities



There are two main used type of initiatives where citizens come together to tackle common energy issues: **Energy Communities**, which can be further divided into **Citizens Energy Communities** or **Renewable Energy Communities**, and **Energy Cooperatives**.

ENERGY COMMUNITIES

ENERGY COOPERATIVES

SERVICES

Energy Communities

Energy communities is an emerging concept for which no widely accepted definition exists and which is applied in various ways, such as:



a possible type of organising collective citizen actions in the energy system



entities that can exercise energy-related activities, e.g., generation, distribution, supply, aggregation, consumption, sharing, storage of energy, provision of energy-related services..



non-commercial type of market actors that combine non-commercial economic aims with environmental and social community objectives



collective switching campaigns, collective investments in solar panels, the ownership of an energy supply company, or even a distribution network.

There are **two new official EU level definitions for energy communities**, namely: 'Citizen Energy Community' and 'Renewable Energy Community'.

Citizen Energy Community (CEC)

"New market actors, new types of membership structure, governance requirements and purpose" (Defined in: Internal Electricity Market Directive (EU) 2019/944 (June 2019))

- Governance:** open and voluntary
- Ownership and control:** citizens, local authorities and small businesses
- Purpose:** social, economic and environmental benefits rather than financial profits
- Geographical scope:** not necessarily the same geographical location
- Technology:** neutral (both renewable and fossil-fuel based)
- Activities:** generation, distribution, supply, consumption, sharing, aggregation and storage of electricity, and also energy-efficiency, EV charging and other energy-related commercial services
- Participants:** anyone (natural persons, local authorities and micro, small medium and large enterprises...)
- Autonomy:** not defined, but decision-making should be limited to those members or shareholders that are not engaged in large-scale commercial activity and for which the energy sector does not constitute a primary area or economic activity
- Effective control:** natural persons, local authorities and micro and small enterprises

Renewable Energy Community (REC)

"A way to expand renewable energy" (Defined in: Renewable Energy Directive (EU) 2018/2001 (December 2018))

- Governance:** open and voluntary
- Ownership and control:** citizens, local authorities and small businesses
- Purpose:** social, economic and environmental benefits rather than financial profits
- Geographical scope:** local communities organised in the proximity of RE projects
- Technology:** all forms of renewable energy in the electricity and heat sectors
- Activities:** generation, distribution, consumption, storage, sale, aggregation, supply and sharing of renewable energy, and also energy-related commercial services
- Participants:** natural persons, local authorities and micro, small and medium enterprises (and must be accessible to consumers in low-income or vulnerable households)
- Autonomy:** should be capable of remaining autonomous from individual members and other traditional market actors that participate in the community as members or shareholders
- Effective control:** natural persons, local authorities and micro, small, and medium-sized enterprises

Join A Community!

JOIN A COMMUNITY

A list of energy communities / cooperatives per country, with information about their pricing, the services provided and the process to join and become an active member.

 [MORE](#)

Coopernico

Foi criada por um grupo de 16 cidadãos vindos de diferentes áreas profissionais e origens culturais, mas que partilhavam uma preocupação comum: o ambiente sustentável!

Desde então, muitos mais cidadãos se juntaram à Coopernico e participam nas nossas atividades e na gestão da cooperativa.

 Website
<https://www.coopernico.org/>

 Email
coopernico@coopernico.org

 Phone
(+351) 213 461 803

 Location
Rua de São Nicolau 73
1100-548 Lisbon
Portugal

 Geographical reach
Country

 Type of initiative
Renewable Energy Cooperative

 Coop
Coopernico

 Services
Energy surplus donations
Grants or other economic support for energy poor citizens
Shared self-consumption that includes energy poor citizens

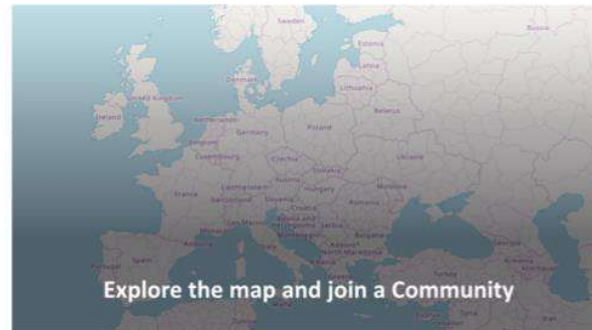
 Additional Services
Collective acquisition of renewable energy installations

 Name Legal Representative
Rita Maroço

 Members
2100

 Membership Fee
60.00

Find energy communities and cooperatives in your country, and discover more about their pricing, management policies, services provided, as well as the process and costs to join and become an active member!



Energy community Luco de Jiloca

 Citizen Energy Community

 27

 Luco de Jiloca
44391 Luco de Jiloca
Spain

[Read More](#)

Attica Energy Community

 Citizen Energy Community

 20

 3rd Septemvriou 144
11251 Athens
Greece

[Read More](#)

Renewable energy community pilot project in Mārupe (Co2mmunity project)

 Renewable Energy Community

 4

 Daugavas iela 29, Marupes novads
Mārupe, LV-2167
Latvia

[Read More](#)

Coopérnico C.R.L.

 Renewable Energy Cooperative

 2150

 Rua de São Nicolau 73
1100-060 Lisboa
Portugal

[Read More](#)

GoiEner

 Renewable Energy Cooperative

 14000

 Mallutz industrialdea 18
20240 Ordizia
Spain

[Read More](#)

Find Your Community....

Filter **Reset** **X**

Initiatives **▼**

Initiative application **▼**

Initiative Services **▼**

Initiative Additional Services **▼**

Coopérnico C.R.L. **X**

Name Legal Representative
Ana Rita Antunes

Email
coopernico@coopernico.org

Phone
[+351213471376](tel:+351213471376)

Coop Name
Coopérnico - Cooperativa de Desenvolvimento Sustentável C.R.L.

Website
<http://www.coopernico.org>

Location
Rua de São Nicolau 73
1100-060 Lisboa
Portugal

Number of Members
2150

Membership Fee
€60.00

Services

.....Or Register one.

If you are you a crowdfunding platform or energy community interested in alleviating energy poverty, Join Us!



Communities

Platforms

Name of the Energy Initiative *		Location
		Country
		- None -
Description *		Phone
Website *		
This must be an external URL such as http://example.com .		
Email *		

Type *	Name Legal Representative
- Select a value -	
Services	Coop Name *
- None - Reduced energy tariffs Micro-donations Energy surplus donations	
Select the first item that you want, press and hold CTRL and select the next item that you want. Be sure to press and hold CTRL while you select the next item that you want to include in the selection.	Number of Members *
Additional Services	Membership Fee * €
- None - Shared self-consumption Retailing Collective acquisition of renewable energy installations	
Select the first item that you want, press and hold CTRL and select the next item that you want. Be sure to press and hold CTRL while you select the next item that you want to include in the selection.	
Geographical Reach	
- None -	
Consent *	
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Create A Community!

CREATE A COMMUNITY

A step-by-step guide on how an energy community can be established and operates.



MORE

Discover step-by-step how to set up and create your own community

STEP 1: Get organized: build up your group!

- Gather people who are motivated: persons with technical skills and knowledge are important, but the key in energy communities is to be formed by people who are motivated and will be engaged in the long term. (Keep in mind: the motivation can come from the interest and knowledge, but it can also come from a necessity)
- Identify key leaders within your group, or welcome potential leaders to your initiative.
- Take into account the existing groups around you that are already creating community in a broad sense, be them energy communities or not. Learn from their successes and mistakes, they may help and boost the energy community.
- Keep your team informed and engaged: maintain the communication, activities, discussions... (this links to the second step!)

STEP 2: Define your goals

STEP 3: Choose your legal form

STEP 4: Look for support

STEP 5: Start with your activity!

Next steps

National Guidelines

Find out how Collective Energy Initiatives are regulated across Europe.



Operating a community can be a complex task. To make it easier, here you find a list of tools and useful links that can help you operate and manage different aspects of your community:



Monitoring and analysing the energy use (consumption and production)



Energy billing



Energy market



Participation and decision making



Pylon

A neutral energy data facilitator for the provision of added-value services to every-day consumers and other stakeholders.

<https://pylon-network.org/>



EnergyID

A public platform where citizens can register and insert and monitor their energy consumption and verify if they are consuming less or more than a similar citizen in their country.

<https://www.energyid.eu>



HomeRule

Compile project's tool to help operate energy communities, with a focus on managing one building/home energy needs.

<https://www.compile-project.eu/products/homerule/>



GridRule

Compile project's tool to coordinate individual community members and optimize the whole community energy needs.

<https://www.compile-project.eu/products/gridrule/>



Demokraian

An online voting platform for horizontal decision-making

<https://www.demokratian.org/>

Operate A Community!

OPERATE A COMMUNITY

A list of various tools to support the day-to-day operation of an energy community, including (real time) monitoring and analysis of the energy use (production and consumption) and voting support.

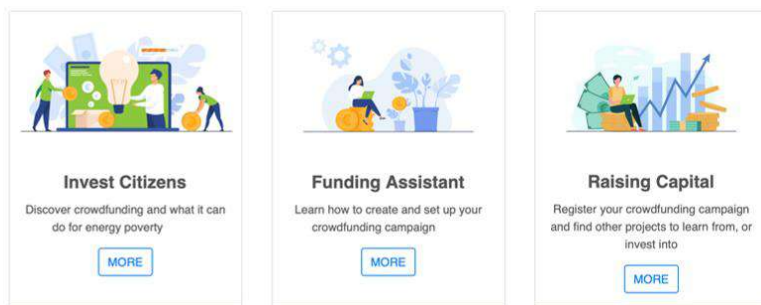
MORE



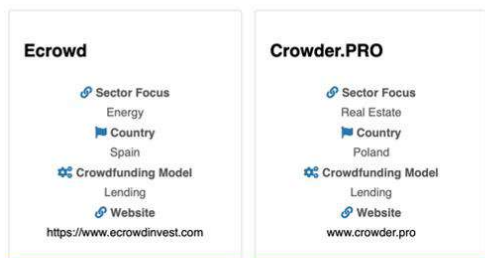
Home

Collective finance, or Crowdfunding, is the natural extension of the cooperative idea to even larger communities with the help of the Internet, drawing support from people across entire countries in order to support specific projects that can create change on a local level, raise awareness of social challenges or inspire communities to participate and engage with local projects and get involved!

Find out here how to use crowdfunding to tackle energy poverty and support your project with collective financing!



Partner Platforms



[View all](#)

Innovative financial instruments and community finance

It will provide the users with detailed information on crowdfunding and how to use it, through three main components:

Invest Citizens: An introduction to crowdfunding providing information on what it is (types of crowdfunding, a brief explanation of how the process works, finding the right crowdfunding platform, namely the differences among platforms according to field of specialization, allocation of funding, costs, etc.) and how to pursue financing opportunities in order to implement sustainable energy interventions, such as energy efficiency measures in their house/ apartment.

Funding Assistant: A detailed guide users on how to create a Crowdfunding campaign, including how to choose your model (objective, funding target, incentives), how to prepare a campaign (target audience, marketing video, social media), how to manage a campaign (monitoring, audience engagement), and how-to follow-Up

Rising Capital: A repository of relevant Investment opportunities (Crowdfunding campaigns) for citizens to examine and/or invest in, with all relevant info such as technology deployed, participation type (reward, lending and equity-based), location, and link to the hosting platform.

Additionally, a list of trusted crowdfunding platform is included for those who wish to begin planning their own campaign.



Register your Crowdfunding Platform

If you are you a crowdfunding platform or energy community interested in alleviating energy poverty, Join Us!

Communities

Platforms



Register here to showcase your Platform on POWER FUND and become part of the POWERPOOR network

Title *

Country *

Description

Email

Phone

Name Legal Representative

Website *

URL *

This must be an external URL such as <http://example.com>.

Link text

Crowdfunding Model *

Sector Focus *

Consent *

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Save

Discover more about crowdfunding and what you can use it for!

What is crowdfunding?



What do you do when you have a big goal and too little money to achieve it on your own?

You may ask your friends and family to help you by either donating a bit of money or giving you a small loan. When you expand that idea to an entire neighborhood, or region and build an organization around it, it becomes a community.

Crowdfunding, in a nutshell, is the natural extension of this idea to even larger communities with the help of the internet.

Or, to put it in a more simplistic way: **Crowdfunding is a way of raising finance by asking a large number of people to contribute to a funding**

goal with a small amount of money!

Through crowdfunding, Communities and individuals can reach out to the crowd to validate ideas, collect money, and engage with both citizens and decision makers. This relatively new funding tool can also improve their visibility and, overall, foster an environment of collective decision-making in order to fund socially relevant projects to the benefit of their members.

Crowdfunding for energy poverty

Crowdfunding's collective financing model is especially appropriate to answer the enormous challenges faced by citizens and households suffering from energy poverty. In this scenario, crowdfunding can provide the necessary funds for community-driven, small-scale renewable and/or energy efficiency projects in a timely manner, with less bureaucracy and regulatory complexity if compared to more traditional financing sources, where bank loans, structured around economies of scale, are effectively crowded out



Building retrofit

Muster the support of the crowd to support energy efficiency renovation of your household / building. Pull your resources together to upgrade your HVAC system, re-coat your building, or improve the insulation of your windows to reduce your heating consumption.



Renewable energy generation

Use crowdfunding community approach to finance the installation of solar panels and start producing your own renewable energy. Collective financing can help realize installations by putting up the initial capital required to make a large investment in electricity generation capacity.



Community Energy projects

If you are part of an off-grid community, crowdfunding can also support you in improving your access to energy by allowing you to pull together the resources and capital required for capital-intensive off-grid energy projects.

Invest Citizens



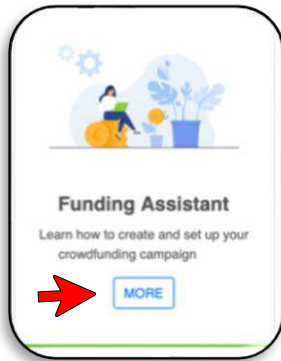
Invest Citizens

Discover crowdfunding and what it can do for energy poverty

[MORE](#)



Funding Assistant



Learn how to set up and create your own crowdfunding campaign!

0. Setting the stage

To successfully prepare a crowdfunding campaign there are a number of steps that must be considered, from setting the objective up to the marketing and communication strategy, each one requiring careful planning and attention to details.



Set your funding target: To set your funding target you have to begin with your financial plan. To define the right amount you would like to raise with your campaign, you have to specify all costs and outlays of the project and account for the platform's fees and other campaign related costs

Identify the fitting type: It is important that your project's characteristics match the crowdfunding type that you will choose. Each type of crowdfunding has its own funding limits, so after setting your financial needs you can move on to identify the types of crowdfunding that best suit your project. Be also aware of the risk regarding crowdfunding campaigns set on all-or-nothing terms. Keeping in mind all these factors, you have to choose the most suitable type of crowdfunding for your project or you can combine various types using the mixed model.

Set out your value proposition: To set out your value proposition you have to find out your target group's preferences and create attractive rewards and perks to capture your funders' attention. It is also important to prepare a convincing story where you explain your backers why you are running the campaign, what's the project about and why and how they should support you. It is also very effective to present yourself, the organization and the current status of the project.

Communication and marketing: Before you launch the campaign, you have to conduct a thorough research to find benchmarks for your project, to try to relate your campaign to relevant news, topics and events and to find the best channels and multipliers for your communication actions. You also have to prepare usable information for your funders and followers not only in a digital way, but as well, depending on the situation, via traditional marketing media that could complement your digital efforts. The more you keep your community informed, the better chances you have to gain support. Finally, focus on your inner circle and existing networks first, then try to reach new communities by leveraging influencers and various communication channels that you will have identified before. Recent research, in fact, shows that the so-called "third circle" may be even more important for the campaign's success, as it enjoys wide following.

Once the groundwork is done, the time has come to put your campaign online. You may set up your own campaign site with DIY ("do it yourself") crowdfunding and payment tools or you can register on an existing platform. The opted-for type of crowdfunding determines which selection of platforms may suit your needs best. Just remember:



1. How to engage your network and go beyond

2. How to create compelling incentives for your backers

3. How to set your crowdfunding campaign's goal





Raising Capital

Find relevant campaigns and projects across Europe to learn from and invest into, or share our own crowdfunding campaign with the POWERPOOR network!

Register your Campaign

Register

Crowdfunding Campaigns



La Energía Del Cole

What if you could support a school that wants to produce its own renewable energy, transform its village and eradicate energy poverty in the community...

Open



Rehabilitación energética de Comunidad de Propietarios - Balmes BCN

Project to replace community boilers and other energy efficiency measures in the centralized hot water production system of a community of owners in...

Closed



Solarization

With energy poverty being one of the most dramatic symptoms of the Greek crisis (6 out of 10 households are struggling to pay their energy bills)...

Closed



Raising Capital

Register your crowdfunding campaign and find other projects to learn from, or invest into

MORE



Solarization

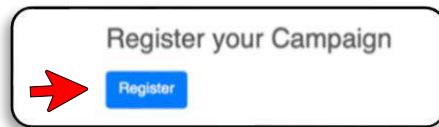


Country
Greece
Funding Model
Reward
Funding Target
€600,000.00
Money Raised
€24,000.00

Energy poverty being one of the most dramatic symptoms of the Greek crisis (6 out of 10 households are struggling to pay their energy bills), investing in the abundant sun, the country's biggest asset, will be key to a Greek solarization of the country will put money back in real people's pockets by reducing their energy bills, it will create jobs, with new skills and opportunities, and it will support a renewable energy revolution that



Register Your Crowdfunding Campaign



Register here to showcase your Project on POWER FUND and become part of the POWERPOOR network

Name of the Crowdfunding Campaign *	Country *
	Afghanistan
Description *	Campaign Link *
	URL *
	This must be an external URL such as http://example.com.
	Link text

Hosting Platform *	Funding Target €
Crowdfunding Model *	Money Raised €
- Select a value -	
Image *	Status
Scogli file nessun file selezionato	Open
One file only. 6 MB limit. Allowed types: png gif jpg jpeg.	
Consent *	
☒ I understand that the information above will be published (after aproval) on www.powerfund.eu at the discretion of the Powerfund project team. You can request to correct , remove or block incorrect data by sending an email to info@powerfund.eu .	

Save





Check it for yourself!

<http://powerfund.powerpoor.epu.ntua.gr>

Module Summary

Key Takeaways

References and Further Reading



Module Key Takeaways

- Citizen participation is the backbone of collective energy innovative actions
- Both Crowdfunding and Collective Energy Initiatives are powerful tools to improve energy-related conditions and accessibility
- They can be a good alternative to individual or traditional financing methods, and provide many benefits besides purely financial resources

References and further reading

- POWERPOOR Online Library: <http://powerpoor.eu/library>
- Powerfund Tool: <https://www.powerfund.eu/>
- Energy Poverty Observatory: <https://www.energypoverty.eu>
- Successful Crowdfunding in 15 Steps by ECN:
https://www.youtube.com/playlist?list=PLKS4qNWhGkZEqKKDIGtNlg26aWonGC_MK
- “Community Energy: A practical guide to reclaiming power” by Friends of the Earth Europe, REScoop and Energy Cities. October 2020. Available here:
<https://www.rescoop.eu/toolbox/community-energy-a-practical-guide-to-reclaiming-power>

Thank you for your attention!

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Thank you for your attention!

Name of Presenter(s)

Name of Organisation, Country

e-mail -





POWERPOOR

Empowering Energy Poor Citizens through Energy Cooperative Initiatives

Part V - The role of local authorities in tackling energy poverty

Alis Daniela Torres & Arthur Hinsch. ICLEI Europe

26.10.2022



This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 890437

Module Content

-  Module introduction
-  PART I - Energy poverty in cities' sustainable energy and climate action planning processes
-  PART II – Energy Poverty Guidebook, Social Innovation Tools and Energy Poverty Alleviation Offices in Cities
-  Module summary (key takeaways and further reading)

Module Goals

-  To understand the importance of energy poverty actions as key inputs to local sustainable energy and climate action planning processes on a local level
-  To identify key climate and social innovation tools and methods to mainstream energy poverty in cities planning, including energy poverty alleviation offices.

PART I: Energy poverty in cities' sustainable energy and climate action planning processes

Energy poverty challenges and opportunities for cities

The EU Covenant of Mayors, SECAPs and the new energy poverty pillar

Mainstreaming energy poverty in cities' SECAP

Energy Poverty Challenges at the City-level



Districts with restricted access to modern sources of energy (heating and cooling)

- Poor housing conditions
- Centralized energy services
- Non-energy efficient building stock



Citizens unable to pay energy bills (particularly in winter)

- Vulnerable citizens: elderly and children
- Increasing energy costs



Restricted local energy sourcing

- Imported electricity (regional/national)
- Multilevel governance challenges
- Restricted renewable energy funding



Limited citizen engagement in energy communities initiatives

- Lack of incentives to new projects
- Knowledge gaps

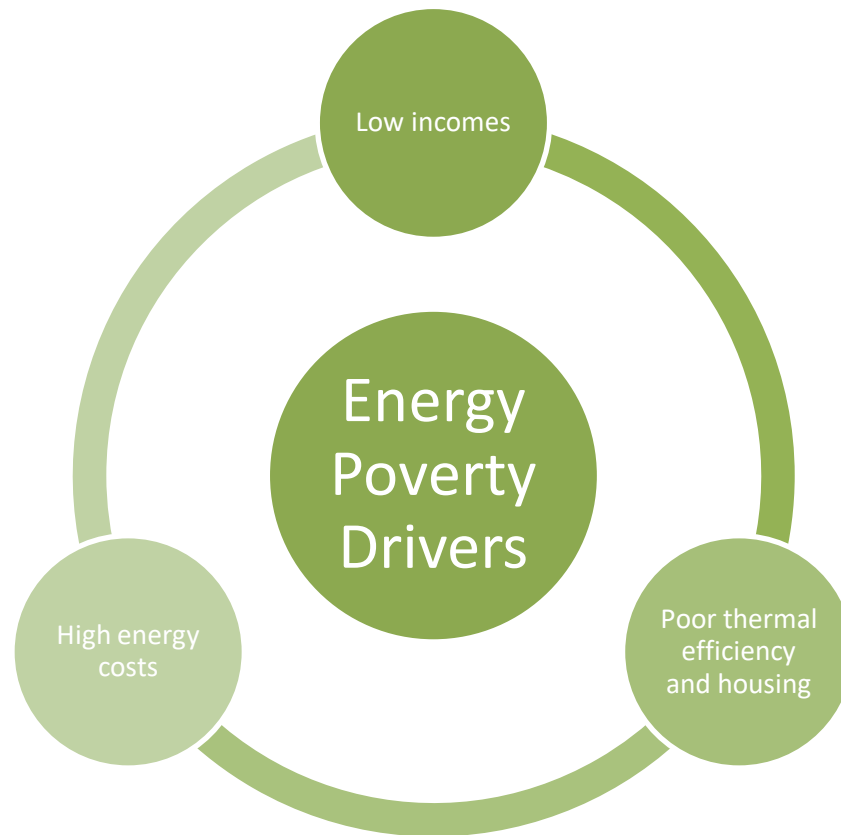
Overall impact on citizens' quality of life: health impacts, people pushed further into poverty, increased stress levels, etc.

(1) EU Energy Poverty Observatory and Global Covenant of Mayors. Factsheet 2018.

(2) EU Report. 2015. Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures Policy Report

Challenges related to energy poverty in cities

Main drivers of energy poverty



These interrelations can be identified mainly in cities and urban settings

Energy Poverty Opportunities for Cities

Aligning energy poverty policies with local sustainability context



Contribution to local and national **energy and GHG emissions reduction** targets



Citizen engagement

- Energy cooperatives
- Community projects



Foster district energy developments

- Green & clean technologies
- Decentralized projects
- Public-private partnerships



Innovative energy finance

- Community finance
- Crowdfunding
- Mobile payments



Adoption of new technologies

- Smart Metering / Smart Grids
- Building Energy Efficiency
- ICTs for energy poverty awareness creation

(1) EU Report. 2015. *Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures Policy Report*

(2) UNEP, ICLEI, INHABITAT. 2015. *Unlocking district energy*.

Energy Poverty at the local level

“Local interventions, **if well planned**, can offer long-term solutions for households dealing with energy poverty.”⁽¹⁾

(1) Pye et al., 2015; Bouzarovski, 2018

(2) .Day, G.Walker, N.Simcock, *Conceptualising energy use and energy poverty using a capabilities framework*, Energy Policy 93 (2016)

Energy Poverty at the local level

Challenges

Municipalities are the first who must cope with energy poverty impacts. However, this is not an easy task, as energy poverty:

- may affect people in various ways,
- is difficult to be measured, and
- needs customised actions relevant to local context.

Sustainable energy and climate action plans (SECAP) must integrate the energy poverty component into the rest of their mitigation and adaptation actions.

Tackling energy poverty in SECAPs

The EU Covenant of Mayors

As part of the *European Covenant of Mayors* movement, cities and towns are *taking climate and energy action* to secure a better future for their citizens.



Tackling energy poverty in SECAPs

The EU Covenant of Mayors – an ever-growing community

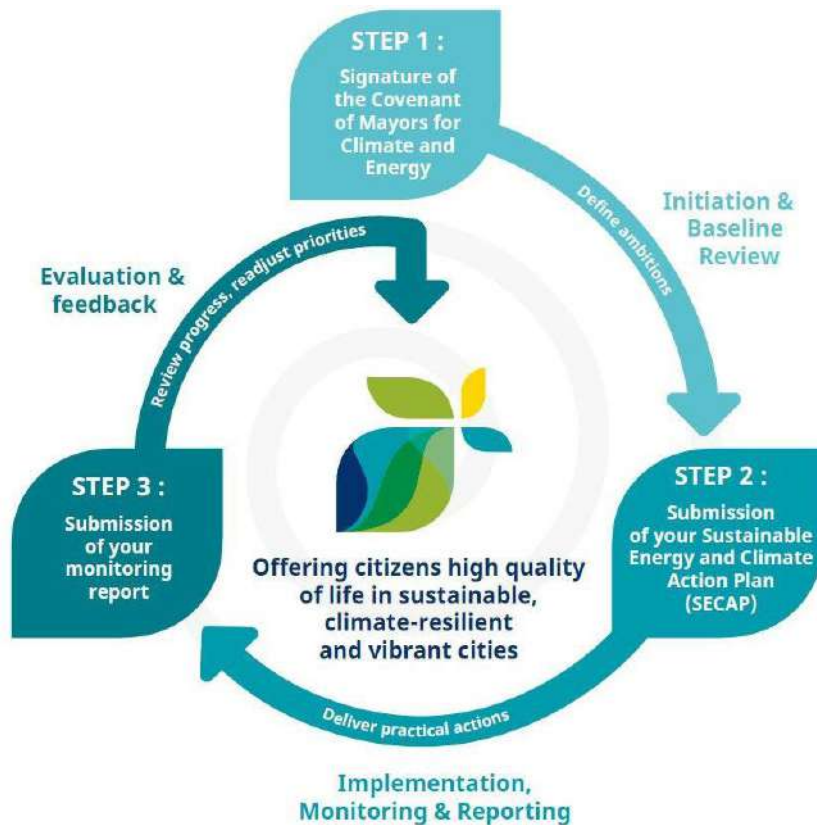


Source. EU Covenant of Mayors. December . 2021



Tackling energy poverty in SECAPs

The Covenant of Mayors' step-by-step guide



The CoM. is working **framework** to incorporate energy poverty into SECAPs is being developed

In collaboration with the EU Energy Poverty Advisory Hub, CoM supports local and regional authorities across Europe in alleviating energy poverty by:

- **sharing knowledge** and **resources** to build local capacities.
- **building a set of indicators** to assess energy poverty on a local

level

Tackling energy poverty in SECAPs

Energy Poverty in the SECAP

1. *Assessing energy poverty* - Is my municipality affected by energy poverty?
2. *Identifying vulnerable groups* - Who are the most vulnerable groups?
3. **Designing actions** - How can I design effective energy poverty actions?

Including energy poverty in Sustainable Energy and Climate Action Plans (SECAPs)



1. Design a strategy to tackle the issue and mainstream energy poverty into mitigation and adaptation measures
2. Indicate the vulnerable groups targeted in the actions
3. **Define indicators** to monitor and report quantitative data on energy poverty

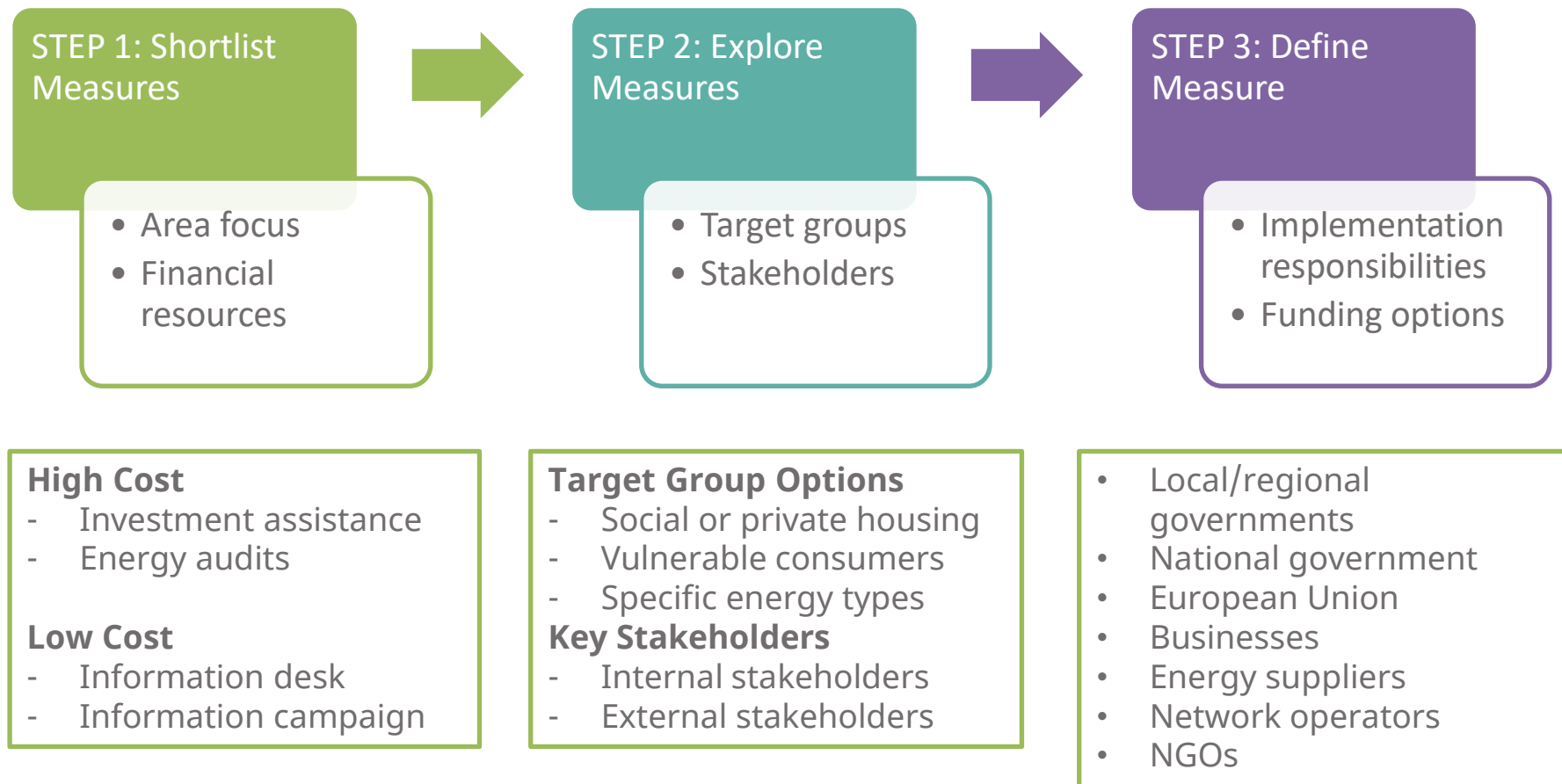
Reporting energy poverty in the frame of the Sustainable Energy and Climate Action Plan (SECAP)



Source. EU Covenant of Mayors. MRE Task Group. 2021

Tackling energy poverty in SECAPs

Designing Energy Poverty Policies in Cities



Source: EPOV. 2019. *Designing effective energy poverty policies in municipalities.*

Tackling energy poverty in SECAPs

Integration of Energy Poverty in the SECAP template

The integration of Energy Poverty in the SECAP template is defined in 4 elements:

Reduction goal

Assessment tool

List of indicators

Actions

A political commitment built on the CoM EU commitment text...

Energy Poverty		
Goal	Target year	Base year
Tackle energy poverty to ensure a just transition by [select target year]	[Drop-Down]	[Drop-Down]

...supported by the possibility to choose **monitoring indicators** for quantitative targets

Source. EU Covenant of Mayors. 2021

Integration of Energy Poverty in the SECAP template

List of indicators (a flexible approach!)

➤ A list of **54 indicators** divided in six categories:

- Climate (4 indicators)
- Socio economic (19 indicators)
- Facilities/housing (20 indicators)
- Mobility (5 indicators)
- Policy and Regulatory Framework (5 indicators)
- Participation/awareness raising (1 indicator)

These indicators offer options to define, quantify and work with energy poverty topics at the local level, thanks to the variety and diversity of the indicators, municipalities can choose the most tailored indicators to their context and possibilities

Source. Draft indicators. EU Covenant of Mayors.. 2021

Integration of Energy Poverty in the SECAP template

List of indicators (a flexible approach!)

ANNEX - Indicators for Energy Poverty

ⓘ This annex serves as a source of inspiration only. None of these indicators are compulsory, but rather illustrative examples.

Area	Priority level	Related indicators	Unit	Description
Climate	Monitoring indicator	Frequency of heat waves	Average per monthly/year	Frequency of heat waves per month in a year
	Monitoring indicator	Frequency of cold waves	Average per monthly/year	Frequency of cold waves per month in a year
	Monitoring indicator	Number of heating degree days per year	Number of HDD and CDD /year	Heating degree day is a measurement designed to quantify the demand for energy needed to heat a building, it is based on the outside temperature where heating is needed
	Monitoring indicator	Number of cooling degree days per year	Number of HDD and CDD /year	Cooling degree day is a measurement designed to quantify the demand for energy needed to cool a building, it is based on the outside temperature where cooling is needed
Socio-economic	Monitoring indicator	Percentage of population or households spending up to XX % their income on energy services	[%]	Share of population / households spending more than a specific percentage of their incomes on energy services putting them in an situation of energy poverty
	Monitoring indicator	Vulnerable households	[%]	The here provided description is only an example, municipalities can write here their own description of vulnerable households / population. Households with lonely parents, parents with more than 3 childrens, families with low incomes, households receiving social support, families with low level of education, households out total number of households
	Monitoring indicator	Arrears on utility bills	[%]	Share of (sub-) population having arrears on utility bills, based on question "In the last twelve months, has the household been in arrears, i.e. has been unable to pay on time due to financial difficulties for utility bills (heating, electricity, gas, water, etc.) for the main dwelling?"
	Related indicator	Average price of electricity	[€]	Average price in [€] of the consumed electricity kwh in the municipal households
	Related indicator	Average price of gas	[€]	Average price in [€] of the consumed gas kwh in the municipal households
	Related indicator	Energy related expenditure / local GDP	[%]	Relationship between the yearly energy cost the households and the local GDP, percentual average of the local GDP destined to the energy
	Monitoring indicator	High share of energy expenditure in income (2M)	[%]	The 2M indicator presents the proportion of households whose share of energy expenditure in income is more than twice the national median share. Note: where income distributions are more equal, variance in energy expenditure translates to higher 2M shares. High variance in energy/income shares can occur due to structural differences in energy expenditure between household groups, as well as in situations where energy is often, but not exclusively, included in rent.
	Related indicator	Citizens under poverty threshold / number of citizens	[%]	Percentage of the local population suffering from poverty, persons and families under the limit of incomes considering the family size
	Related indicator	At-risk-of-poverty rate	[%]	People at risk of poverty or social exclusion (% of population). The at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers.

Source. Draft indicators. EU Covenant of Mayors. 2021

Integration of Energy Poverty in the SECAP template

Assessment and monitoring tool

Using the **monitoring indicators** municipalities can track the development of specific energy poverty related aspects

The **monitoring indicators** can be used as local targets to monitor the reduction of energy poverty at the local level

A **flexible approach**: municipalities can decide with which indicators to work

Energy Poverty Assessment									
Macro-areas	Elements	Used indicator(s)	Unit	Households / Persons	Base Year	Current level	Use for monitoring	Target level	
Climate	Heat and cold	Frequency of heat waves	Days per year		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Frequency of cold waves	Days per year		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Number of heating degree days per year	HDD + CDD / year		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Number of cooling degree days per year	HDD + CDD / year		[Drop-down]	[Drop-down]	☐	[Drop-down]	
Macro-areas	Elements	Used indicator(s)	Unit	Households / Persons	Base Year	Current level	Use for monitoring	Target level change	
Facilities	Housing	F+G+H band (EPC) dwelling/total number of dwelling	[%]		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Energy consumption (electricity + heating) per capita / national energy consumption (electricity + heating) per capita	[%]		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Share of buildings renovated per year	[%]		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Share of households or persons with presence of leak, damp, rot in their dwelling / total households or persons	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Percentage of households or persons within the municipality experiencing heating discomfort / total households or population	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Percentage of households or persons within the municipality experiencing cooling discomfort / total households or population	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
	Public transport	Households or persons connected to the electricity and gas grid / total households or persons	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Population or households not having access to essential services within 1 h by walking, cycling or public transport / total population or households	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
Socio-economic		Persons or households living more than one km from nearest public transport station / number of persons or households	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Percentage of population or households spending up to XX % their income on energy services	[%]	NE	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Vulnerable households or persons / total households or persons	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Arrears on utility bills / total population or households	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Inability to keep home adequately warm	[%]	[Drop-down]	[Drop-down]	[Drop-down]	☐	[Drop-down]	
Framework elements		High share of energy expenditure in income (2M)	[%]		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Existence of energy poverty strategy / specific measures related energy poverty	Yes / No		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Existing rent regulation	Yes / No		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Awareness-raising campaigns targeting targeting vulnerable households	Yes / No		[Drop-down]	[Drop-down]	☐	[Drop-down]	
		Engagement and cooperation with stakeholders	Yes / No		[Drop-down]	[Drop-down]	☐	[Drop-down]	

Source. Draft indicators. EU Covenant of Mayors. 2021

Tackling energy poverty in SECAPs

Energy Poverty Actions

Cities develop different types of energy poverty actions, for example:

- ✓ **Training and educational activities**

Awareness-raising campaigns, workshops for students, establishment of energy poverty municipal offices, and more

- ✓ **Energy efficiency measures**

Classification of domestic energy efficiency measures, collective renovations (blocks, neighbourhoods)

- ✓ **Use of renewables**

Net-metering projects, RES energy communities, energy contracts

Source: Energy Poverty actions proposed in C-TRACK 50 SECAPs, including Greek cities

Tackling energy poverty in SECAPs

Still, there is a lot more to do

An integrated approach based on qualitative and quantitative information could be developed by:

1. Assessing the municipality's vulnerability to energy poverty;
2. Identifying the specific households suffering from energy poverty;
3. Choosing and customising tools that are tailored to the local context to tackle the issue

*The **POWERPOOR** toolkit and overall methodology can be used effectively to achieve these goals*

Tackling energy poverty in SECAPs

Still, there is a lot more to do

*The **POWERPOOR Energy Poverty Guidebook for Energy Planning (D5.2)** to support local authorities on alleviating energy poverty.*

- Guidelines to identify vulnerable communities / citizens
- Guidelines to develop **integrated and innovative energy poverty** alleviation actions
- Strategies to include this actions in the SECAPs and other urban sustainability planning frameworks.

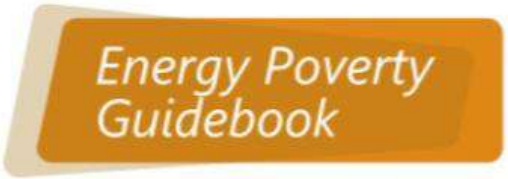
PART II: Climate and Social Innovation Tools.

Energy Poverty Guidebook

How can social and climate systems innovation
alleviate energy poverty?

Concrete Examples

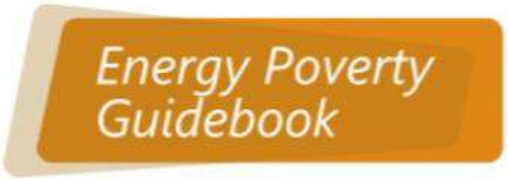
The POWERPOOR Energy Poverty Guidebook for Energy Planning

A graphic of a book cover with the title "Energy Poverty Guidebook" in white text on an orange background.

Energy Poverty Guidebook

The POWERPOOR Energy Poverty Guidebook for Energy Planning has been developed to enable municipalities to be part of a sustainable future and play their role in the just energy transition by following the POWERPOOR approach of tackling energy poverty through joint energy initiatives and leveraging innovative financing schemes.

The POWERPOOR Energy Poverty Guidebook for Energy Planning

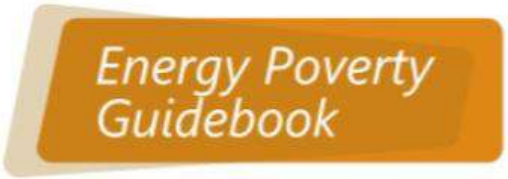


Energy Poverty Guidebook

The Guidebook includes:

- ✓ Energy poverty mitigation through joint energy initiatives
 - The POWERPOOR approach
 - The role municipalities can play
- ✓ Preparing the bottom-up approach
- ✓ Energy poor citizens support programmes
- ✓ TARGETing the problem
- ✓ ACTIONs to tackle energy poverty
- ✓ FUNDing joint energy initiatives to tackle energy poverty

The POWERPOOR Energy Poverty Guidebook for Energy Planning



*Energy Poverty
Guidebook*

The POWERPOOR Energy Poverty Guidebook for Energy Planning is available:

- ✓ On the POWERPOOR website → <https://powerpoor.eu/toolkit>
- ✓ In the stand-alone POWERPOOR Toolkit page → <http://powerpoor.epu.ntua.gr/powerpoor-toolkit/>

Energy Poverty Alleviation Offices

- One-stop-shop for citizens and directly support them
- Energy Mentors can come from different fields
- Different formats possible e.g. the Office can work directly within existing structures, also cross-departmental

The main objective of the Energy Poverty Alleviation Office is to be a one stop shop of information for citizens and directly support them to actively participate in planned activities, get familiar with the problem of energy poverty, propose to them behavioural measures and no regret low-cost energy efficiency measures, and guide them in participating in or setting up an energy community or familiarize them with leveraging innovative financing schemes to achieve energy efficiency goals.



Barcelona Energy Advice Points

- Avoiding the loss of access to basic supply
- Telephone service
- Optimisation of energy supply bills
- Application to social discount
- Job replacement programme



Stromspar-Check (Energy Savings Check)

- Run by Caritas and the Association of German Energy Agencies
- Sends “energy savings supporters” to households
- The supporters are themselves long-term unemployed and have received training
- Supported by about 120 German municipalities. Integrated into overall planning



Climate System Innovation

The concept

“Climate system innovation can be defined as a *combination of technological and non-technological innovations* that, if enacted together, maintain or improve the delivery of desired societal functions, with an absolute reduction in their environmental impacts”

“Problems are no longer simple or isolated. Instead, they can affect a myriad of stakeholders with different perceptions and interests, they are *cross-sectoral, long-term, and interconnected with the ecosystem and societal structures*”

Source: [Climate KIC, 2017](#) *Climate Innovation Insights*

Climate Systems Innovation

Examples and concept application areas



Sustainable cities approaches:
viewing cities as integrated socio-technical systems to improve local systems (i.e energy)



The circular economy: relying on diverse business models, collaborations and coordinated action



Sustainable mobility systems:
focusing on delivering mobility functions by combining and optimising access to various mobility services, notably in urban areas



Can we apply this concept to improve energy poverty alleviation measures?

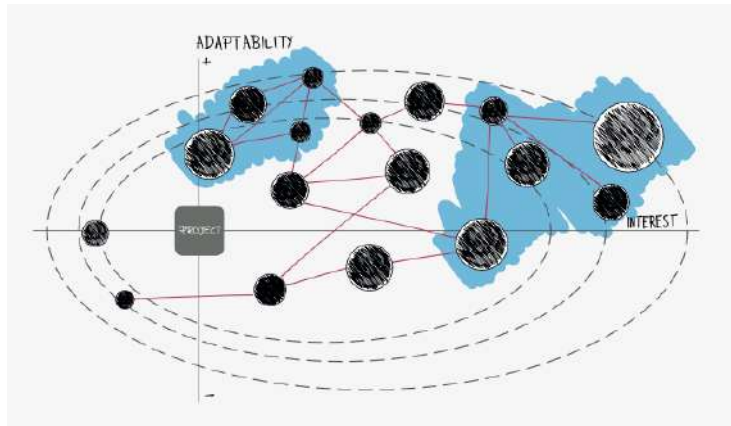


Social Innovation Concept

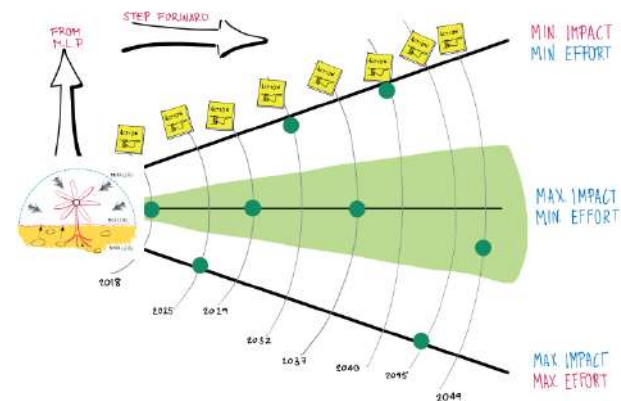
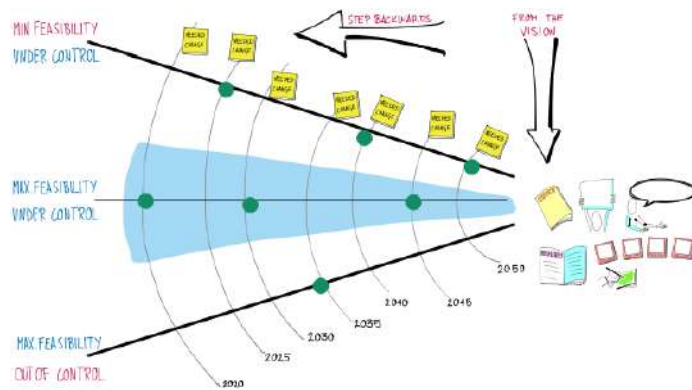
Applied to energy transitions

*“Social innovation in energy transition is a process of **change in social relationships**, interactions, configurations, and/or the sharing of knowledge leading to, or based on, new environmentally sustainable ways of producing, managing, and consuming energy that **meet social challenges/problems**”.*

Co-Creating Energy Poverty Alleviation Actions



Stakeholder Universe and Future Radar



Source: Climate KIC 2017, PROSEU 2021, POWERPOOR 2022



Municipality of Magliano Alpi, Italy

- Located within a micro-area of eight apartment blocks and a public school in Porto (multiple departments involved)
- Electricity will be generated from PV panel installed on the roofs and consumed within the community, with any excess being sold to the grid
- Ambition is to involve 118 families as well as young consumers who will receive rebates on their energy bills
- Within first five years, electricity will be distributed free-of-charge to the members of the community. After that at a lower rate than from traditional suppliers
- The local authority is closely involved as they own and manage a large number of buildings



What can municipalities do to accelerate RECs?

- Many things! E.g:
- They can make **public space available** and offer energy communities opportunities to participate in **public tenders**
- They can raise **awareness** and **share municipal staff and resources** e.g. join the board of the community
- They can set **concrete targets** for the promotion of energy communities and make them a firm part of their climate & energy plans
- They can **bring together different stakeholders** and **promote innovation** through co-creation and citizen engagement
- They can improve the **flexibility** and **resilience** of local grids
- They can **become part of energy communities** themselves
- They can **profit financially** from engaging with RECs e.g. through the generation of stable business tax revenues and access to renewable energy sources

→ They can save costs and can **protect vulnerable households**



Image source: [PROSEU 2021](#) / Design Doppel

Municipality of Magliano Alpi, Italy

- Making the city hall, the library, the gymnasium and the municipal schools self-sufficient
- A reduction of energy cost for participants
- Municipality provided for smart metering and data management systems that allocate and control electricity flows between production and consumption points
- Municipality is a member of the REC and surrounding municipalities committed to adopt comparable models
- Benefits hugely from new Italian funding support for building renovation and community energy (100.000 Euro for every municipality under 5.000 inhabitants to spend on it). → “Magliano & Friends” to test sustainable business models



Copyright © 2021 CER Magliano Alpi, Comunità Energetica Rinnovabile Energy City Hall

Municipality of Magliano Alpi, Italy

Municipality of Marupe and Riga Planning Region, Latvia committed to smart solutions

- PV panels installed on multi-apartment buildings and row-house buildings. Residents of the buildings benefits through rebates on their energy bills
- Tripartite agreement and ownership will come to homeowners association after 5 years.

→ Homeowners associations act as energy communities

Municipality of Tartu, Estonia includes SECAP objective is 150 GWh of electricity consumption annually, 15 GWh need to come from apartment association's rooftops

- Awareness raising and capacity building
- Working with homeowners associations
- Improve energy efficiency



Adapted from TREA 2021



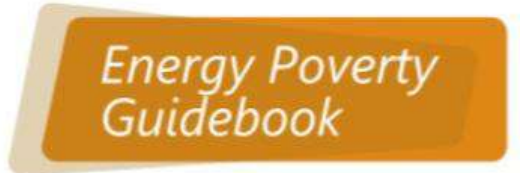
Module 4 Key Takeaways

- ✓ Energy poverty actions are and will be key in achieving the goals of cities SECAPs. It is important that local governments **define and support actions** that reduce energy poverty alleviation in their territory.
- ✓ The integration of climate and social innovation tools to design and evaluate energy poverty actions is key to advance in the inclusion of energy poverty in cities sustainable energy planning processes. Due to the nature of energy poverty actions, **innovative approaches** are required to accelerate the adoption of actions
- ✓ The **POWERPOOR approach** including the POWERPOOR Toolkit and Guidebook is aimed at giving support to this process.

Further Reading

The POWERPOOR Energy Poverty Guidebook for Energy Planning is available:

- ✓ On the POWERPOOR website → <https://powerpoor.eu/toolkit>
- ✓ In the stand-alone POWERPOOR Toolkit page → <http://powerpoor.epu.ntua.gr/powerpoor-toolkit/>



Energy Poverty
Guidebook

- EU Covenant of Mayors. <https://www.eumayors.eu/support/energy-poverty.html>
- EPOV. 2019. Designing effective energy poverty policies in municipalities. https://www.energypoverty.eu/sites/default/files/downloads/publications/18-07/guidance_-_energy_poverty_policies_in_cities.pdf
- STEP IN project Interim Report – Urban Labs. https://www.step-in-project.eu/wp-content/uploads/D2.2_Urban-LL-Interim-Report_final.pdf
- Climate KIC. Climate Innovation tools.