TRANSFORMING ENERGY POVERTY POLICIES IN THE EUROPEAN UNION: SECOND ANNUAL REPORT OF THE EUROPEAN UNION ENERGY POVERTY OBSERVATORY

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Executive Summary

Addressing energy poverty has become a central policy priority for the European Union. The EU's recently-adopted *Clean Energy for all Europeans* package features numerous policies measures to monitor and address energy poverty. Their implementation will mean direct improvements to the lives of millions of Europeans, and a significant boost to climate change mitigation policies.

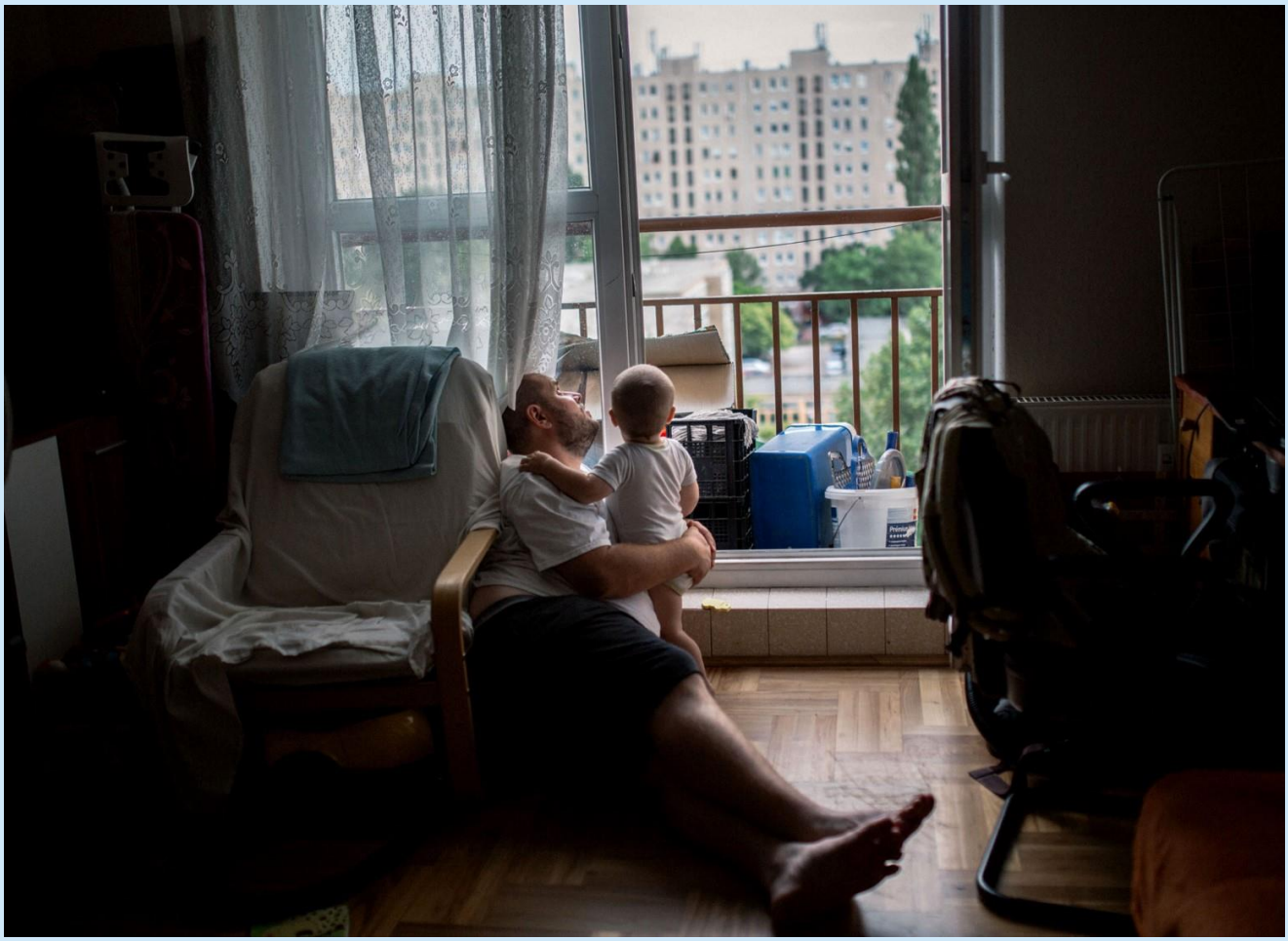
To help Member States in their efforts to combat energy poverty, the European Commission finances the EU Energy Poverty Observatory (EPOV). The central aim of EPOV is to engender transformational change in the availability of information about energy poverty in Europe, and indicative measures to address this challenge.

In this second annual report, we outline measures to tackle energy poverty, both in terms of the new EU legislative requirements mandated by the Clean Energy for all Europeans Package, and national policy approaches towards energy poverty and vulnerable consumers. We find variations in the proposed and current measures taken by Member States, underpinned by a combination of social and energy policies. This includes social tariffs, subsidies for heating and targeted energy efficiency interventions. However, specific energy poverty-focused measures and definitions are often lacking, particularly in the domain of energy efficiency. Thus, significant learning opportunities exist for countries to transfer aspects of different policy frameworks to complement their existing work, or, indeed as part of new action to tackle energy poverty.

In the report, an analysis of National Energy and Climate Plans (NECPs) adopted by Member States points to the pronounced need for developing more tangible ambitions to ensure a socially more fair and integrated energy and climate transition. In particular, the report highlights the significant room for social policy measures to address energy poverty, as well as action in the housing, health and infrastructure sectors. This can go hand in hand with the development of a more comprehensive suite of measures to monitor energy poverty – including a focus on dimensions that have received little attention to date, such as summertime cooling, gender and transport – as well as policies focusing on the comprehensive upgrading of the energy efficiency of the housing stock.

The report also highlights best case examples from Spain, Croatia and Belgium, where grassroots organisations from different sectors have used innovative practices to combat energy poverty within their local communities.

The final part of the report provides further details on the prevalence of energy poverty in the EU using the latest data from the EU Statistics on Income and Living Conditions, and Household Budget Surveys, with a description of the methodology used by EPOV. This part of the report highlights that energy poverty should be measured using multiple indicators in tandem, as it is a complex multi-dimensional issue that manifests in different ways across households and Member States.



3rd District, Budapest, Hungary • Mónika Kovács, Gábor Karácsonyi, and **Gergő Zalán Karácsonyi**

As part of a photo exhibit commissioned by the EPOV consortium, households and businesses in several countries were interviewed about their everyday experiences of energy poverty.

This young family lives in Óbuda, Békásmegyer— Budapest's concrete jungle. Once the temperature starts to rise, buildings become unbearably hot (often exceeding 30ºC internally).

In the mornings, Mónika takes Zalán to play in the park. Back home for a nap, she keeps the lights out to avoid creating extra heat and using electricity.

Once Csonyi returns from work, they stay near the windows. Every waking hour is spent avoiding the sun and searching for a breeze.

1. Introduction

1.1. Energy poverty in the EU

It is now widely acknowledged that energy poverty is a problem across many EU Member States, affecting around 40 million people (EU-SILC 2017). Even though a single definition of energy poverty does not exist, work commissioned by the EC (Pye et al., 2015) has defined energy poverty 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'.

The considerable knowledge base on energy poverty (Bouzarovski 2018) has shown that that living in inadequately heated or cooled homes has detrimental implications on respiratory, circulatory and cardiovascular systems, as well as mental health and well-being. The consequences of energy poverty extend beyond the home to affect macroeconomic development and political processes.

In Europe, energy poverty is predicated upon a combination of low household incomes, high energy prices, and low levels of residential energy efficiency, with the manner in which energy is used in the home also playing a role. As such, energy poverty does not fully overlap with income poverty, although many low-income households are also energy poor.

Europe's energy poverty geographies are highly uneven, with Western and Northern European Member States reporting a lower prevalence of household and housing circumstances linked to the problem. There are also significant divides along urban, rural, socio-demographic, gender and housing lines. All of this points to the need for concerted policy action to address energy poverty, through a combination of measures in the energy, social, housing and health sectors.

1.2. The EU Energy Poverty Observatory (EPOV)

The EU Energy Poverty Observatory (EPOV) is an initiative financed by the EC (contract Number ENER/B3/SER/2015-507/SI2.742529) to help Member States in their efforts to combat energy poverty, and is led by an international consortium of organisations, see Appendix 6.1 for full details of membership and governance.

EPOV exists to improve the measuring, monitoring and sharing of knowledge and best practice on energy poverty. It collects and publishes Europe-wide energy poverty data while serving as the focal point of growing networks of policy-makers, research scientists, advocacy groups and community activists interested in the issue. It aims to improve the state of the art on energy poverty detection, measurement and reporting by creating a public forum for the exchange of knowledge on the issue, and the identification of possible policy solutions.

The Observatory is part of a growing drive to consolidate energy policy at the level of the European Union, reflected in the recent Energy Union and Clean Energy Package proposals. It is thus expected that the EPOV will become a decision-support tool for the significant amount of new European Union-wide energy policy, regulation and legislation that will be developed in the near future.

Nattavaara, Gällivare municipality, Sweden • Dirk Hagenbuch, owner of village store with Eva-Karin Johansson Björk, employee.

A key energy challenge for households and businesses in Sweden's remote northern areas is responding to frequent electricity outages. Some last only a few minutes, others stretch out over several days.

The village store in Nattavaara is such example of a business that struggles with frequent and long-lasting outages:

'At one point we had no electricity for 43 hours. The week after, an outage lasted more than 20 hours. Food and goods worth hundreds of thousands of Swedish crowns went bad'.

The local business association has since invested in an expensive generator that guarantees power supply to several enterprises.

2. Measures to Tackle Energy Poverty

2.1. European legislation: from the Third Energy Package to Clean Energy for all Europeans

The objective of protecting vulnerable customers in the energy sector has been present within EU legislation since 2003 with the introduction of Directives 2003/54/EC and 2003/55/EC, which required Member States to take necessary measures to protect vulnerable customers in the context of open internal electricity and gas markets. Energy poverty as a specific policy issue has been officially present in the legal vocabulary of European institutions for more than a decade. The momentum behind the energy chapter in the Lisbon Treaty provided a driving force in the drafting of the Third Energy Package (TEP) and subsequent adoption in 2009, which brought energy poverty into mainstream EU energy policy, and established it as a European issue (Bouzarovski 2018). In particular, the TEP established the following legal requirement to protect vulnerable consumers in energy markets:

> "*Member States shall take appropriate measures to protect final customers, and shall, in particular, ensure that there are adequate safeguards to protect vulnerable customers. In this context, each Member State shall define the concept of vulnerable customers which may refer to energy poverty and, inter alia, to the prohibition of disconnection of electricity (gas) to such customers in critical times*"
>
> Electricity and Gas Directives (Directive 2009/72/EC; Directive 2009/73/EC)

Aside from the pioneering role of the EC in shaping the EU energy poverty agenda, activities in other institutions – the European Economic and Social Committee and the European Parliament – also played an important role.

More recently, the Clean Energy for all Europeans Package (2018-2019) has allowed for a further integration of energy poverty amelioration efforts into policy stipulations and legal regulation. The Package is made up of eight legislative acts targeting a variety of energy poverty-relevant sectors: energy efficiency, energy performance of buildings, renewable energy, electricity market redesign, governance rules for the Energy Union, energy security and eco-design. Their departure point is a strong declarative commitment to energy efficiency, 'fair treatment' of consumers, and global leadership in energy transitions.

The Clean Energy Package set of directives obliges Member States to acknowledge the prevalence of energy poverty in their Energy and Climate Plans and, if necessary, require them to set up measures to address the phenomenon. Integrated National Energy and Climate Plans (NECPs) are prepared by the Member States following Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action (the "Governance regulation"). The NECPs will enable the European Commission to assess the Member States' and collective efforts made to reach the objectives of the Energy Union Strategy, which ensures Europe's energy supply is safe, viable and accessible to all. The draft NECPs had to be presented to the European Commission on 31 December 2018, while the final version should be ready for 31 December 2019. The first NECPs will cover the period from 2021 to 2030.

In Article 3 and recital 26 of the Governance regulation, Member States are explicitly asked to "*assess the number of households in energy poverty, taking into account the necessary domestic energy services needed to guarantee basic standards of living in the relevant national context, existing social policy and other relevant policies, as well as Commission indicative guidance on relevant indicators, including geographical dispersion, that are based on a common approach for energy poverty*".

When assessing the number of households in energy poverty, Member States have to define and use a set of measurable criteria, "*which may include low income, high expenditure of disposable income on energy and poor energy efficiency*" (Article 29 of the Directive on the Common rules for the internal market for electricity - "Market Design" Directive). When a State counts a "significant" number of households in energy poverty or applies public interventions in the price setting for vulnerable consumers (Market Design Directive), the NECP shall include a timeframe and a "*national indicative objective*" to reduce the phenomenon (Governance regulation). Any policies and measures addressing energy poverty shall be outlined, "*including social policy measures and other relevant national programmes*".

Member States also have to provide information on the outcome of energy efficiency and energy saving measures designed for vulnerable households, whether affected by energy poverty or living in social housing. Those energy efficiency measures may come under the scope of Member States' energy efficiency obligation schemes, alternative policy measures, or programmes or measures financed under an Energy Efficiency National Fund (Article 7 (11) of the Energy efficiency directive 2018/2002 of 11 December 2018, amending Directive 2012/27/EU).

Member States' improvements will be monitored through the two-yearly progress reports. It will help EPOV to gather data on the number of households affected by energy poverty, and information on available policies and measures (Article 24 of the Governance regulation). Meanwhile, the European Commission will facilitate the sharing of good practices between the Member States and provide guidance on the definition of "*significant number of households in energy poverty*" (Directive on the Common rules for the internal market for electricity).

2.2. Overview of Member State approaches

As detailed in EPOV's first pan-EU report[1], a growing number of Member States have official definitions of energy poverty (or fuel poverty) in place, as well as supporting national policy frameworks to address the issue. These are Cyprus, France, Greece, Ireland, Slovakia, Spain, and the United Kingdom. One contributing factor to the limited number of national definitions of energy poverty may be that Member States are not yet legally required to produce such a definition. However, as noted in section 1 above, Member States are now obliged to acknowledge the prevalence of energy poverty in their NECPs (National Energy and Climate Plans), as part of new requirements stemming from the Clean Energy Package set of directives. This section of the report presents an assessment of the draft NECPs submitted to the European Commission[2], in terms of energy poverty and vulnerability. It should be noted that the positions and assessments expressed in the text that follows are solely those of the EPOV consortium rather than the European Commission.

Our analysis of the draft NECPs shows that, as things stand at present, the European Union would not be able to meet the commitments made in the Paris Agreement on climate change or the objectives of the Energy Union to build a fairer and more inclusive energy transition. Overall, there is a significant amount of inconsistency in how the draft NECPs submitted to the European Commission by the twenty-eight EU Member States address the issue of energy poverty and the current and needed

[1] https://www.energypoverty.eu/publication/addressing-energy-poverty-european-union-state-play-and-action

[2] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union/national-energy-climate-plans

measures to protect vulnerable consumers, whether those measures provide immediate relief or a lasting solution to the problem through targeted energy efficiency programmes.

It is worth noting that most Member States have not taken the opportunity of preparing the NECPs to analyse in detail the **impact of the criteria and measures already in place** and the role of the stakeholders who can influence the lives of people affected by energy poverty. Little attention has been brought to giving details on the bodies in charge of fighting energy poverty and accompanying the most vulnerable consumers and on the barriers preventing consumers from exercising their rights. **Italy** is one of the few Member States to have provided an assessment of existing measures, while acknowledging that the impact of current policies is too weak. According to the NECP, "*about a third of potential beneficiaries have requested access to the existing benefit; the low levels of use can be attributed to different factors, including a lack of awareness of the measure itself and the administrative complexity of the requirements established*".

Most countries do not define energy poverty or provide an extensive analysis of its causes. Robust and comparable data are missing. This prevents a thorough assessment or a comparison work of the measures in place or to initiate. Only one country, **Greece**, gives precise figures and presents a plan to reduce by at least 50 % the relevant energy poverty footprint by 2025, to reduce it by 75% compared to 2016 and to bring it to levels well below the EU average by 2030.

Some countries, such as **Croatia, Ireland, Latvia, Poland, Spain and Portugal** announced a timetable for the implementation of a (more) integrated strategy, arguing that more research on the causes and solutions is needed before making any further political commitment. For instance, **Croatia** announces the creation of an integrated "Programme for Elimination of Energy Poverty" and capacity building, looking at information on funding sources and awareness-raising, measuring and monitoring and increasing energy efficiency for energy-poor households. The **Czech Republic** provides theoretical elements but informs that an unnamed project will be completed by November 2020 should give better insights on energy poverty, a definition and help design the right measures to address the issue. The Czech Republic acknowledges that energy poverty is at the crossroads between social, economic and environmental agendas.

Certain countries consider that energy poverty is not part of energy policies and therefore, do not take specific action nor plan to present a strategy. **Malta, Germany, Denmark, Finland, Sweden** and the **Netherlands** treat energy poverty as a form of income poverty and approach it through general social policies. For instance, **Denmark** says it "*generally addresses energy poverty through social policy, which is not specifically targeted towards energy. There are specific subsidies targeting energy efficiency, particularly in buildings*". Low-income pensioners, however, receive specific financial support for their heating bill.

Energy poverty is mainly addressed through the issue of affordability and energy costs. For instance, **Belgium** focuses on the costs for vulnerable households and the inability to pay the energy bills. Energy efficiency policies differ from region to region, and they mostly aim to "limit consumption" and support the payment of the bills. **Germany** addresses energy poverty as a part of general poverty, although the question of affordability is one of the three critical elements of the energy policy goals stated in the NECP (alongside the reliability of supply and environmental soundness).

Bulgaria focuses on creating the "right conditions for the protection of consumers in the framework of an open market". The main tool in the draft NECP is a heating allowance to help specific categories cope with expenditures. This Member State has been reported to have some of the highest numbers of people affected by energy poverty-relevant conditions[3].

Lithuania and **Hungary** – also affected significantly by energy poverty – consider that the measures already in place (such as price regulation in Hungary), are sufficient to address the phenomenon. In **Estonia**, energy poverty is targeted through the household subsistence funds by the national and local government, within the framework of the Welfare Development plan. In **Cyprus**, according to

[3] https://www.energypoverty.eu/indicators-data

the NECP, the number of beneficiaries who fall within the definition of energy poverty is not "significant" and, therefore, the country does not plan to include a national indicative objective to reduce energy poverty. This is in contrast to an earlier 2017 National Action Plan on Energy Efficiency[4] from Cyprus that noted energy poverty is an important problem that requires action.

Despite the strong wording used in Directive 2018/2002 on **Energy Efficiency** ("Energy efficiency measures must be central to any cost-effective strategy to address energy poverty and consumer vulnerability and are complementary to social security policies at Member State level"), many countries do not implement or plan to target programmes to combat inefficiency and poor housing quality among households affected by energy poverty. The most socially vulnerable and energy-poor families are indeed the ones who could reap the benefits of such measures most quickly, not only at the financial level, as their health, and their wellbeing would improve too. Performing building renovations would also have a substantial impact on their resilience to climate change. As stated by **Poland's** draft NECP, energy efficiency housing upgrading strategies for energy poverty are playing a pivotal role in reducing CO2 emissions and improving air quality.

France presents an inclusive approach focusing on energy efficiency improvements for "modest homeowners" (ANAH) and redistributive policies via the "Chèque énergie". These measures are financed in part by energy saving certificates (EEC) for which energy producers contribute directly. The NECP specifies that more than €2 billion should be invested by energy companies in the fight against energy poverty for the period 2018-2020. The plan for the energy renovation of buildings also foresees that the State will allocate €1.2 billion to the fight against energy poverty. In the social housing sector, the objective is to renovate "thermal sieves" at a rate of 100,000 per year, with the support of Caisse des Dépôts, by multiplying innovative solutions, with a budget of €3 billion as part of the Grand Plan d'Investissement. However, as it is the case for the majority of the plans, the objectives and impacts of those measures are not always consistent and comparable.

In the **UK**, competencies are devolved between England, Wales, Scotland and Northern Ireland, and each administration has a particular strategy and objectives addressing the poor quality of the dwellings, energy efficiency and finance their retrofitting programmes. The most comprehensive applications are in Scotland, although objectives and costs, included energy efficiency objectives targeted at energy poverty are roughly presented but are partially quantified. The UK NECP mentions the Energy Company Obligation (ECO), a £640 million per annum scheme designed to improve the energy performance of homes in England, Scotland and Wales and funded by companies. The UK Government announced that for 2018-2022, the scheme will be focused entirely on low income and vulnerable households.

Ireland already has an integrated strategy turning around energy efficiency pilot projects for the energy-poor, but Ireland's Strategy to Combat Energy Poverty shall be reviewed in 2019. Ireland plans to expand the reach of existing energy efficiency schemes and commit the Government to develop and pilot new measures to find more effective ways to focus energy efficiency efforts on those most at risk of energy poverty.

Romania acknowledges the prevalence of energy poverty and mentions several strategies to tackle it[5]. The NECP underpins the importance of an integrated and comprehensive approach towards energy poverty. Romania is one of the few programmes showing a close link between the renovation schemes with the needs of the people affected by energy poverty ("*public programs for thermal insulation of buildings for communities affected by energy poverty to reduce energy losses and lower heating costs*"). Access to energy (electrification, in particular through local mini-grids), thermal renovation, efficiency and retrofitting programmes and affordability through direct support measures are also crucial aspects of the strategies.

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[4] https://ec.europa.eu/energy/sites/ener/files/documents/cy_neeap_2017_en.pdf

[5] Romania's national action plan for energy poverty, the National Strategy on Social Inclusion and Poverty Reduction for the period 2015-2020 and the Strategic Action Plan for 2015-2020 and the Romania's Energy Strategy 2019-2030, including a 2050 perspective

Slovakia presents a comprehensive series of measures which could impact the level of energy poverty, such as a system to promote the insulation of residential blocks and family homes, the implementation of a uniform new tariff structure, a housing allowance, state employment programmes. Concerns are expressed about the fairness of measures to combat energy poverty, and the sharing of costs among the society as a whole.

Unlike many other EU countries, **Slovenia** focuses on improving energy efficiency and retrofitting the dwellings occupied by the most vulnerable. The NECP lists several projects (mostly EU-funded, in particular, cohesion funds) that have aimed to improve energy efficiency among energy-poor households.

At the level of **consumer empowerment,** the link between decentralised generation, alternative business models, community energy and energy poverty is, overall, addressed in a relatively limited manner. Barriers preventing the take-off of alternative business models and the direct participation in electricity generation among the poorest and most vulnerable have not been addressed by the vast majority of the Member States.

In **Poland**, "*active forms of participation in the electricity market*" are seen as a method of addressing energy poverty. **Spain**, and to a lesser extent **Portugal**, stand out, the latter aiming to build a "*fair, democratic and cohesive transition*". Improving the housing stock and involving the population in the setting up of renewable energy installations are among the priorities of Portuguese policymakers. **Spain's** NECP pays special attention to the right to access energy, the right to auto-consumption and to join an energy community as ways to mitigate energy poverty.

As pointed out in a recent briefing undertaken by the Right to Energy Coalition[6], Member States have paid insufficient attention to the issue of disconnections, in a context where seven million Europeans receive notices each year, putting them at risk of being cut off of basic needs such as heating, lighting or cooling or the dependence to specific life support systems. Other recent pan-EU work on energy poverty has emphasized the need for a stronger emphasis on inadequate summer cooling and transport needs in energy poverty definitions and measurement.

It is worth noting that **Italy** has adopted an approach taking into consideration the requirements to cool in the summer and the reliance on vital devices. **Austria** is one of the few countries mentioning the basic "*mobility requirements*" of the population, saying that "*consumers should be able to manage this now and in future at a socially affordable cost. High energy costs put low-income households in particular at risk of poverty*". **Luxembourg** plans to introduce free public transport by 2020 as a measure that will help household customers.

2.3. Best practice examples

The data repositories and case studies presented on the EPOV portal (www.energypoverty.eu) contain numerous examples of existing energy poverty action at the local and national level. Here, we present the work of three organisations who have achieved transformational change in their local communities.

2.3.1. Alliance against energy poverty (APE), Spain

The Alliance Against Energy Poverty was created in February 2014 by, among others, movements that take direct action to stop evictions and campaign for housing rights, community and neighbourhood associations, the movement against the privatization of water and Engineering Without Borders, to fight against the lack of access to basic services for all. The alliance is a movement led by people affected by energy poverty.

[6] https://righttoenergy.org/2019/05/21/keeping-the-lights-on-which-eu-countries-are-taking-action-on-energy-poverty/

The Alliance against energy poverty works at various levels in order to:

- Support people affected by energy poverty through a collective advisory assembly, where families in similar situations meet every two weeks, give mutual support, and share information about their rights and how to defend them. These assemblies are also formed as spaces for training and the generation of actions and strategies, and contribute to building active citizenship.
- Influence the administration and supply companies in order to guarantee universal access to water and energy. We have worked together with the Catalan Ombudsman and have submitted motions to the municipality, among other actions. The main success achieved is the approval of a popular legislative initiative promoted by citizens (APE was one of the driving organizations), with the support of more than 150,000 signatures, which was unanimously approved by the Parliament of Catalonia in July 2015. This initiative became Law 24/2015, which basically prohibits water, electricity and gas cuts for vulnerable families in Catalonia.

Goals:

- To promote the perspective of rights and gender in the fight against energy poverty
- To ensure that no vulnerable person is cut off by water, light or gas
- To make the administration and supply companies jointly responsible in the fight against energy poverty
- To defend models of management of basic public services with citizen control and participation.

2.3.3. DOOR (Society for Sustainable Development Design), Croatia

DOOR has been working on sustainable energy issues since 2003. The energy poverty related agenda started developing with the CENEP project in 2011, where, for the first time in Croatia, social actors were included in energy efficiency planning. Policy links and gaps between social and energy-related issues were also analysed.

From 2011, DOOR has implemented several pilot and policy related projects[7] while achieving relevant results at the local, national and EU level:

Field visits to energy poor households were carried out in more than 600 households in rural and urban areas of Croatia. During field visits, besides small energy efficiency measures that have already resulted in energy savings, energy audits and health and social consequences of energy poverty were also examined.

In combination with desktop research, DOOR has generated not only scientific results and expert publications, but also policy proposals that were implemented at the regional and national levels. Those measures were developed in a participatory manner. They are based not only on field work and research, but also roundtables, semi-structured interviews, educational activities, awareness raising and high level policy work across several national working groups, the EU level, and trough events in the EU Parliament.

In the local Social Services Action Plan in Sisak Moslavina County, there is a measure related to energy poverty alleviation. In the Fourth Croatian National Energy Efficiency Plan (2017-2019), there are two energy poverty related measures: the Development of the Energy Poverty Alleviation Programme at the national level, for which DOOR has calculated expenses and developed actions; and

[7] Projects: Reduce Energy and Change Habits (REACH, funded from CIP IEE), Trough knowledge to warm home(ESF), Fair (FER) solutions for better community (ESF), other project partially dedicated to energy poverty (SEE SEP), local projects, new H2020 EMPOWERMED

energy – poverty related capacity building for local authorities and energy advisors. Similar measures were transferred into the Croatian Integrated National Climate and Energy Plan 2021-2030.

DOOR is continuing to work on energy poverty issues, now broadening the issue to higher education, including students and social learning, to the public health sector, climate – change related energy poverty (cooling), specific vulnerable groups and even more interdisciplinary policy work.

2.3.4. Papillon Project, Belgium

Energy-poor households often use domestic appliances with a high energy consumption while being outdated, unreliable and expensive to run, and often leading to energy debts in low income households. The Papillon project breaks the spiral by providing an appliance rental model for low income households that do not have the funds to purchase new, high efficiency appliances.

In Flanders, Belgium, one third of households in energy poverty (120.000 families) are using old energy-wasting household appliances. Because of their difficult financial situation, these families lack a budget to buy new energy-efficient ones. Their old devices are electricity intensive, which leads to high energy bills and thus even more financial problems. It is common to find old freezers, for example, consuming 1250 kWh/year vs efficient options which use 250 kWh/year, resulting in electricity bills in the region of €300 per year higher per appliance. Over the lifetime of an appliance, this can result in additional electricity bills of €3,000. For low income households with several appliances, this can result in debt, which is shown to be a contributor to significantly worsening health and social outcomes.

'Samenlevingsopbouw West-Vlaanderen', a community building organisation in West-Flanders, sought a way to break this vicious circle. It worked out a rental model for appliances. Instead of buying a device, people in energy poverty are able to rent it on a 10-year contract, including service and warranty. This way energy-efficient appliances are made feasible for people who cannot buy them. Samenlevingsopbouw partnered with Bosch Belgium for Papillon. Bosch delivers the A++(+) appliances and takes care of the service and warranty. For Bosch Papillon fits into a strategy for a more circular economy, leading to additional benefits for climate.

The pilot started in September 2018 and the first 104 appliances were promptly installed in 63 homes. The appliances are refrigerators, freezers, fridge-freezers, washing machines, dryers and dishwashers. The equipment can be rented for a period of 10 years and this at a small monthly rental price. In the pilot, prices are at around €7. The subtitle to Papillon is '10 years without worries'. The main objective is to reduce overall energy consumption and consequently the energy bill of the families concerned, this with improved comfort.

The main benefits for the users are the fact that there is no upfront investment, just a monthly fee instead. From day one they save considerably on energy and water. They don't have to worry about extra costs for repair and during the first two years they receive empowering guidance from 'Samenlevingsopbouw' to help them with their overall energy situation. Other benefits are the fact there is no transfer of ownership. At all moments Bosch is the owner of the appliances. This has the extra benefit that debt collectors cannot confiscate the appliances. Design for repair and a longer lifetime is also made possible. There is a reduction of resource use and CO2 emissions and Papillon is a way for tenants to lower their energy consumption considerably.

At the moment Samenlevingsopbouw is looking into scaling Papillon up to the Flemish and Belgian level, and there are discussions to experiment with the model in other European countries too.

2.4. Recommendations

With numerous best practice examples to combat energy poverty now evident both nationally and locally across the European Union, the National Energy and Climate Plans could have been an excellent opportunity for the European Member States to take a thorough look at the energy poverty situation on their territory and the measures to be implemented in order to meet the European Union's energy ambitions. However, although social and climate issues have been placed at the heart of the European strategy for an Energy Union, Member States appear reluctant to put the fight against

energy poverty and the resilience of the most fragile elements of our societies at the top of their political agenda. While other analyses show that climate objectives are far from being fulfilled by the draft plans, there is a pronounced need for Member States to show more tangible ambitions so as to ensure a socially more fair and integrated energy and climate transition.

Overall, further development of the NECPs could:

- Define and quantify energy poverty, and the impacts of current and future policies at the national, regional or local scale;
- Provide details, data figures and timelines in relation to the financing and quantification of the impact of energy poverty measures;
- Consider the trade-offs between different types of measures to address energy poverty: e.g. short- vs. long- term, general vs. targeted, national vs. local;
- Develop a more comprehensive suite of measures to address and monitor energy poverty – including a focus on dimensions that have received little attention to date, such as summertime cooling and transport – as well as policies focusing on the comprehensive upgrading of the energy efficiency of the housing stock;
- Consider a more active role for energy-poor households in the energy market – from stakeholder consultation to new forms of autonomous energy production.

On the whole, a significant amount of divergence in energy poverty policies within the NECPs has been observed. There is also a gap between the energy provisions foreseen in the NECPs, on the one hand, and EU-level requirements mandated by the Clean Energy Package as well as the scientific state of the art, on the other. This suggests that significant learning opportunities exist for countries to transfer aspects of different policy frameworks to complement their existing work, or, indeed as part of new action to tackle energy poverty.

Within the context of the 'Clean Energy for all Europeans' package, and in particular the recently adopted Energy Performance in Buildings Directive[8], Energy Efficiency Directive[9] and the Governance Regulation[10], EPOV has developed two specialist resources for policymakers to assist with national and local action plans to alleviate energy poverty:

- **Guidance for Policymakers[11]** – a dedicated webpage that gives a short overview of essential points for policymakers to consider for new policies;
- **Designing effective energy poverty policies in municipalities[12]** – this Guidance document provides information about the design of practical energy poverty policies in municipalities.

[8] Directive (EU) 2018/844 (EPB)

[9] Directive (EU) 2018/2002 (EE)

[10] Regulation (EU) 2018/ 2019

[11] https://www.energypoverty.eu/guidance-policymakers

[12] https://www.energypoverty.eu/publication/eu-energy-poverty-observatory-guidance-designing-effective-energy-poverty-policies

Based on these guidance resources, and the outcomes of specialist events held in recent years, our key policy recommendations are listed below.

Summary of key policy recommendations

Definitions

- The definition of energy poor and/or vulnerable households is essential for targeting policies. These should be tailored to local contexts, in terms of climate, housing quality, and the structure of energy costs;
- Most national-level definitions will translate poorly to targeting criteria 'on the doorstep', thus complementary frameworks should be used;
- Many energy poor households will not self-identify themselves for assistance programmes. Key stakeholders, including EPOV, should be involved to assist with designing non-stigmatising policy frameworks.

Energy efficiency

- Energy inefficiency is a primary driver of energy poverty. Implementing energy efficiency schemes can reduce energy poverty rates, as well as bring about a range of other energy and non-energy benefits;
- There is a need for closer integration with cohesion and regional development instruments, and the integration of energy policy in urban and regional planning. European Structural and Investment Funds can play a pivotal role in alleviating energy poverty;
- It is imperative that any barriers to receiving energy efficiency investment are identified and removed to ensure the most vulnerable households can benefit from interventions. For example, requiring co-contributions or a financial loan will exclude many households.

Other mechanisms

- Measures that are more targeted to a specific vulnerable group, such as social housing or heating oil users, will be generally more effective at tackling energy poverty than non-targeted measures;
- A Europe-wide ban on winter disconnections is an important goal, alongside better mechanisms for collective switching;
- Both social policy and energy policy mechanisms need to be used, especially as energy poverty does not overlap fully with income poverty, and has a number of infrastructural

3. Energy Poverty in the EU – Key Statistics

Access to reliable and comparable statistics on energy poverty is essential for identifying the scale of energy poverty issues in Europe, as well as for monitoring progress in addressing the issue. As such, the indicator dashboard is an integral element of the EPOV web portal, and is important for addressing Task 1 (improving transparency) and Task 2 (disseminating information). This section of the report provides information on the methodological approach taken by the Observatory, as well as a range of headline statistics on the overall rates of energy poverty.

3.1. Methodology

The process of compiling harmonised, authoritative statistics for the measurement and comparison of energy poverty across MS has been done in four consecutive steps, as indicated in the diagram below. It is an iterative process that will be repeated several times across the project duration to allow new data and indicators to feature in the indicator dashboard.

In the first step, a review of available datasets and indicators was undertaken using the following criteria to appraise the indicators:

Quality of the indicator: The ability and accuracy of the indicator to capture energy poverty, its drivers and outcomes. This includes sub-criteria that assess:

- The ability to measure, compare and track energy poverty over time, including seasonal variations;
- The ability to measure, compare and track energy poverty across Member States;
- The ability to measure, compare and track energy poverty across different socio-economic groups;
- Complexity of calculating the indicator.

Quality of datasets: This includes:

- Availability of data;
- Comparability of data across time and across Member States;
- Quality, robustness and completeness of the data.

In performing this task, the consortium has drawn on its extensive research experience and knowledge of the available data sources and indicators in the field, as well as that of the Advisory Board. Particular attention has been paid to the recommendations contained within the European Commission funded report on 'Selecting Indicators to Measure Energy Poverty' (Rademaekers et al., 2016), as well as the earlier review of pan-EU data and indicators conducted by Thomson and Snell (2014).

In the second step, processes to acquire the identified data have been initiated. However, we have experienced some unexpected delays in procuring the full micro datasets for two of the key household surveys, namely the EU Statistics on Income and Living Conditions, and the Household Budget Survey, due to various MS deciding to temporarily withdraw micro data for all scientific uses. This has led to some missing data points for individual countries.

The acquisition of different (micro- and macro-level) datasets formed the third step, and has involved using appropriate data analysis software to examine the completeness and consistency of coding as well as compatibility of datasets with each other. In the final step, a data preparation strategy has

been implemented, providing the basis for the calculation of descriptive statistics (e.g. country means of different energy poverty indicators) to be published on the web portal.

Energy poverty is a multi-dimensional concept that is not easily captured by a single indicator. Our approach to measuring energy poverty has been to use a suite of indicators, which should be **viewed and used in combination**. Each indicator captures a slightly different aspect of the phenomenon. Our intention is that these indicators should be used to give a snapshot of energy poverty issues, which can then be explored in more detail in research and action projects.

Within the EPOV indicator dashboard, we make a distinction between indicators classified as primary, and those classified as secondary:

Primary indicators – those that capture various aspects of energy poverty, and are applied elsewhere in policy and research;

Secondary indicators – the reasons for a secondary classification are twofold. Either the indicator captures facets of energy poverty but perhaps does not meet the quality of indicator criteria listed above, or it is relevant in the context of energy poverty, but is not a direct indicator of energy poverty itself.

Data for the primary and secondary indicators is drawn from four main sources:

- Building Stock Observatory (BSO): A European Commission initiative that monitors the energy performance of buildings across Europe[13];
- EU Statistics on Income and Living Conditions (EU-SILC): A widely used pan-EU survey of income distribution and social exclusion[14];
- Household Budget Surveys (HBS): National consumption expenditure surveys that are used to compile weights for Consumer Price Indices[15];
- Eurostat Data Explorer: A publicly accessible online resource with macro data on various topics[16].

A full list of indicators, with descriptions and information about data source and temporal coverage is given in Appendix 6.4.

3.2. Headline statistics

The following section provides a snapshot of energy poverty trends across the EU, based on the four primary indicators listed above plus two secondary indicators concerning summer cooling.

3.2.1. Inability to keep home adequately warm

One of the main energy poverty indicators used to capture self-reported affordability asks whether a household can afford to keep their home adequately warm. Within EU-SILC, the question often has the following wording, although exact wording varies by MS: "Can your household afford to keep its home adequately warm?" This indicator has been widely used in national and comparative analyses of energy poverty across Europe.

[13] https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings/eubuildings

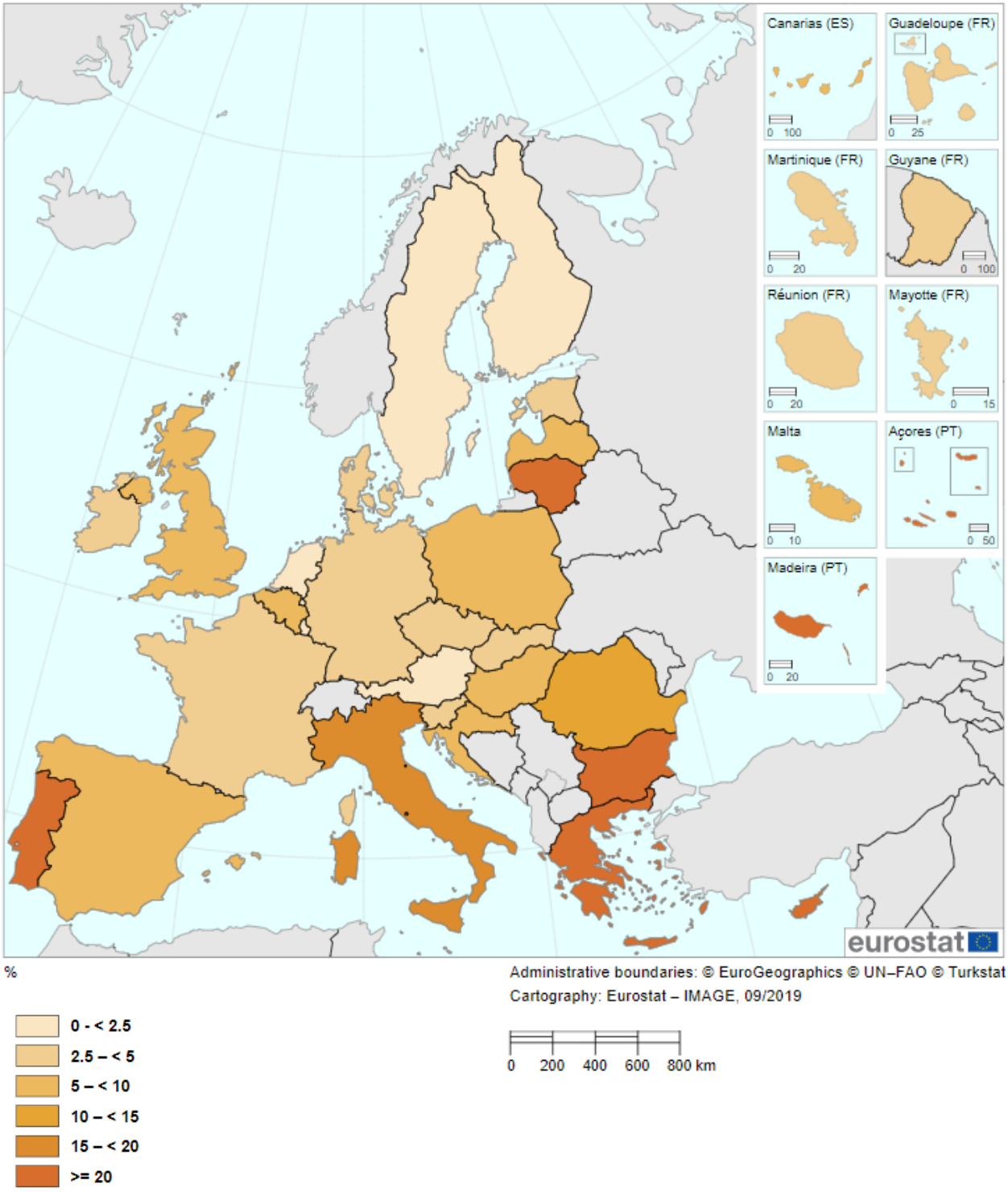
[14] https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions

[15] https://ec.europa.eu/eurostat/web/microdata/household-budget-survey

[16] https://ec.europa.eu/eurostat/data/database

The map in Figure 1 below shows the overall rates of inability to keep warm across the EU in 2017. We find that the highest prevalence occurs within Central and Eastern Europe, as well as parts of Southern Europe.

Figure 1: Map of 'Inability to keep home adequately warm'. Data source: ilc_mdes01, EU-SILC 2017.



Note: United Kingdom: break in series
Eurostat (online data code: ilc_mdes01)

The full set of national and pan-EU means for this indicator between 2010-2017 are provided in Table 1 within Appendix 4. The prevalence of energy poverty, according to this indicator, has remained relatively static for many countries, with the notable exception of Bulgaria, which has seen a year-on-year reduction in households being unable to keep warm, with a reduction of 30 percentage points from 2010-2017[17], although it still has the highest rate of energy poverty in the EU at 36.5% of households. By comparison, the prevalence of this indicator is at its highest rate in 7 years for Luxembourg (1.9%)[18] and Finland (2.0%).

Overall, 7.8% of households in the EU reported an inability to keep warm in 2017, which is the lowest incidence in 8 years. However, this still means at least 39,982,800 people are living in inadequately heated homes[19].

3.2.2. Arrears on utility bills

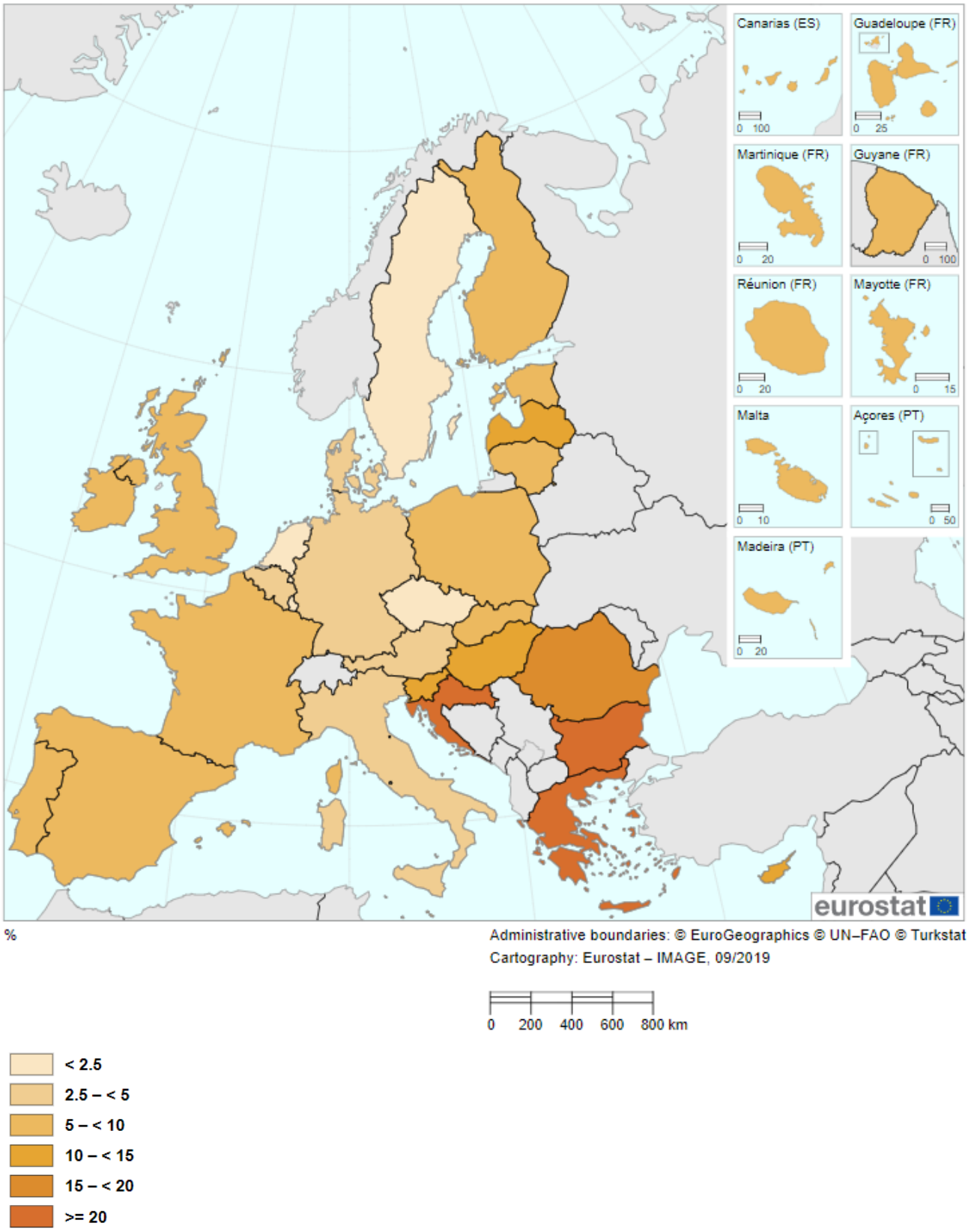
The arrears on utility bills indicator asks: "In the last twelve months, has the household been in arrears, i.e. has been unable to pay on time due to financial difficulties for utility bills (heating, electricity, gas, water, etc.) for the main dwelling?" Whilst this indicator does include some utility expenses beyond energy[20], it is nevertheless an important indicator as households unable to keep up to date with energy bill payments may experience disconnection of supply – as our photo exhibit on page 25 highlights.

The spatial concentration of this indicator for the year 2017 is provided in map form within Figure 2. As before, the rates of utility bill arrears are particularly high within Eastern, Central and Southern Europe.

[17] It should be noted there have been two breaks to the data time series, in 2014 and 2016
[18] This may be explained by a break to the time series in 2016
[19] Based on an estimated EU28 population of 512.6 million inhabitants on 1 January 2018: http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_and_population_change_statistics

[20] It excludes housing-related costs (such as mortgage payments) and telephone bills. It includes water, sewage and rubbish costs, where applicable.

Figure 2: Map of 'Arrears on utility bills'. Data source: ilc_mdes07, EU-SILC 2017



Note: United Kingdom: break in series
Eurostat (online data code: ilc_mdes07)

The majority of countries across the EU reported their lowest rate in 8 years for arrears on utility bills, with 25 countries seeing a reduction from 2010-2017, as seen in Table 2 in Appendix 4. In terms of recent fluctuations, only two countries saw an increase in prevalence from 2016 to 2017, Denmark (+1.0%) and Finland (+0.1%). Greece has the highest overall prevalence of utility bill arrears with 38.5% of households reporting arrears. By comparison, the lowest rate of prevalence is found in Luxembourg, with 1.7% of households experiencing utility bill arrears. In total 7.0% of households in the EU reported having arrears on their utility bills in 2017, which is equivalent to 35,882,000 people.

3.2.3. High share of energy expenditure in income (2M)

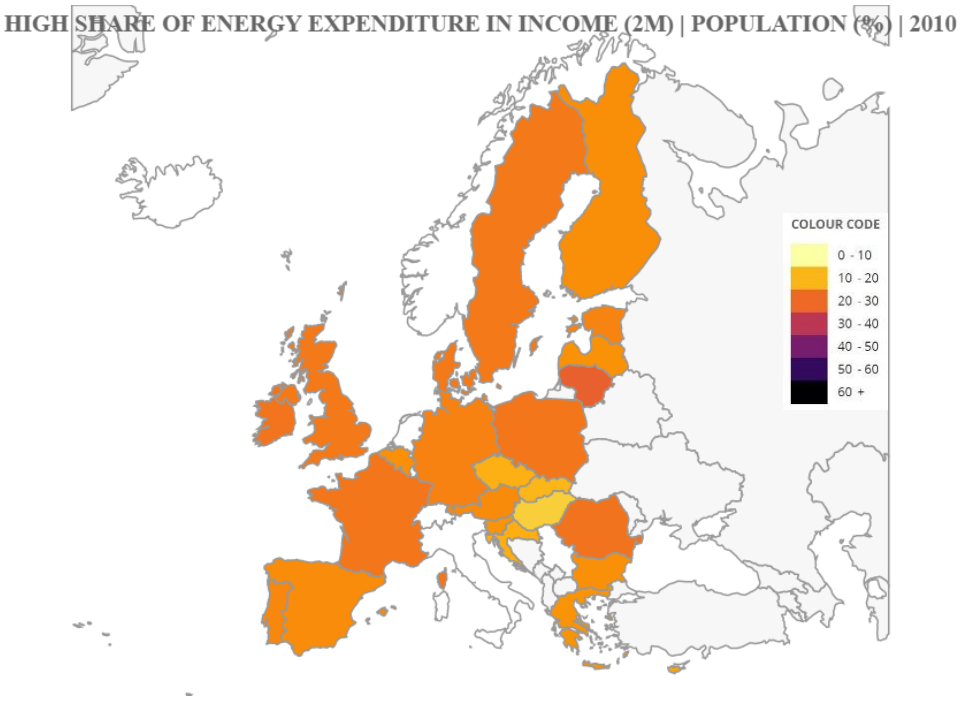
For expenditure-based assessments of energy poverty, the only available option is to use actual expenditure data from HBS. The HBS are conducted in all EU countries and contain data on household expenditure on goods and services, including household energy. However, at present the HBS datasets are not harmonised across the EU and there is significant variation in sampling methods, variable design and how often Member States conduct HBS, ranging from annually to every five years (Eurostat, 2014). At the time of publication, only 2010 HBS data was available in scientific use files (micro data) from Eurostat; the 2015 micro data is not expected for release until early 2020. However, we expect to use this newer 2015 data in our Third Annual Report.

Using HBS data, a 2M indicator has been constructed[21]. As noted earlier, the 2M indicator presents the proportion of population whose share of energy expenditure in income is more than twice the national median share. An important methodological point to consider is that **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.

From the map in Figure 3 and values in Table 3 – Appendix 4, we see that this expenditure indicator has less spatial variance than the two preceding self-reported consensual indicators. In general, the rates of high energy expenditure are slightly higher within parts of Eastern, Northern and Western Europe.

[21] Italy, Luxembourg and the Netherlands are missing data.

Figure 3: Map of 2M indicator. Data source: HBS 2010[22]



3.2.4 Low share of energy expenditure in income (M/2)

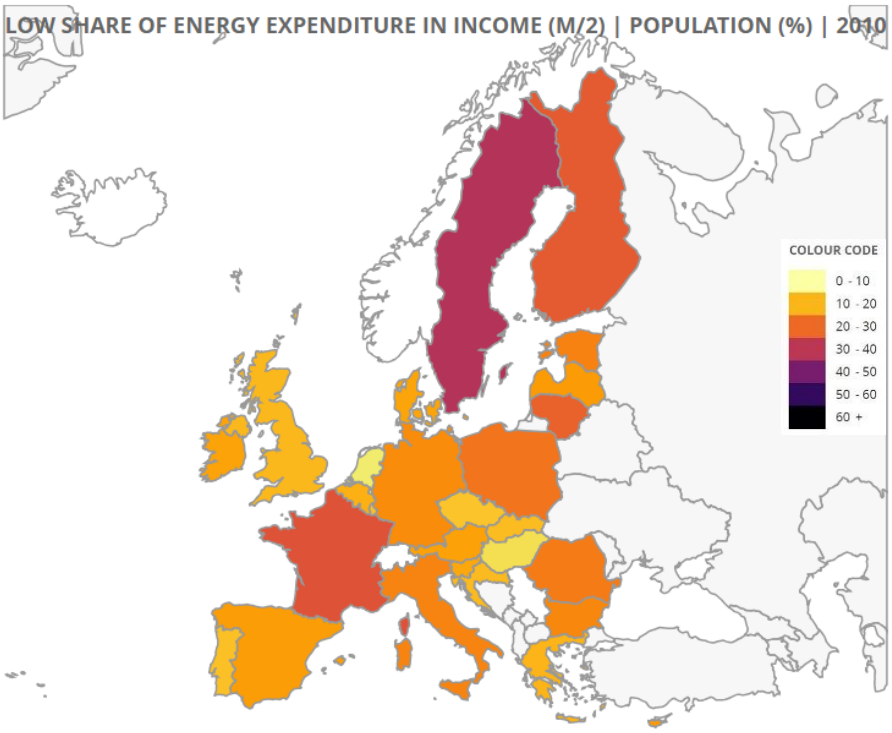
Based on HBS data, the M/2 indicator[23] presents the share of population whose absolute energy expenditure is below half the national median, in other words abnormally low. On the one hand, this could be due to high energy efficiency standards, which would result in a household consuming low amounts of energy. However, it could also be indicative of a household dangerously under-consuming energy and failing to meet their basic needs.

It should be noted that this indicator is influenced by the underlying distribution of absolute energy expenses in the lower half of the population. **If the median is relatively high and the distribution below very unequal, the M/2 indicator is high.**

In Figure 4, the national means for the M/2 indicator are displayed in map form. This indicator displays greater spatial variance than the 2M indicator, with countries within Northern and Western Europe displaying some of the highest rates.

[22] We are aware that 2015 HBS data is in preparation, however, at the time of publication, we could only access scientific use files (micro data) for the 2010 HBS wave. We expect to use the newer 2015 data in our Third Annual Report.
[23] The Netherlands is missing data.

Figure 4: Map of M/2 indicator. Data source: HBS 2010[24]



Taking a closer look at the country means in Table 4 in Appendix 4, we see that Sweden (31.0%), France (23.7%) and Finland (22.3%) have the highest rates of households with abnormally low expenditure. For countries like Sweden, which typically includes heating costs in rent, this may be a product of high variance in energy/income shares. Overall, the EU average is 15.1%.

3.3. Summertime issues

Indoor space cooling difficulties and summertime energy poverty are under-explored aspects of prevailing energy poverty discourses in Europe, which tend to focus more on indoor heating during winter, and overall affordability of energy. As highlighted by our photo exhibition work in Hungary (see page 5), some homes in Europe are reaching dangerously hot temperatures, which is likely to have health and well-being impacts. This has been confirmed by recent research conducted by Thomson et al (2019), in a comparative study of indoor cooling and energy poverty.

On a conceptual level, the EPOV consortium sees an inability to keep adequately cool as a primary indicator of energy poverty. However, on a practical level, the currently available data fails to meet the 'quality of datasets' criteria set out in section 3.1 in full, thus it has been classified as a secondary indicator. More specifically, it fails the test of 'Comparability of data across time', as explained below. Within this section, statistics from the limited number of indicators are presented.

The EU-SILC survey has run a number of ad-hoc modules on special topics, including two on housing conditions. Within the housing condition module for 2007, there were two key indicators of summertime cooling:

- Dwelling comfortably cool during summer time (Yes/No)
- Dwelling equipped with air conditioning facilities (Yes/No)

[24] We are aware that 2015 HBS data is in preparation, however, at the time of publication, we could only access scientific use files (micro data) for the 2010 HBS wave. We expect to use the newer 2015 data in our Third Annual Report.

However, collection of the air conditioning indicator was not repeated after the 2007 module, whilst the comfortably cool indicator was repeated in 2012. However, the comfortably cool indicator has so far not been selected by MS for future data collection exercises, meaning that there will be no further EU-level data relating to summertime energy poverty issues.

In Table 5 in Appendix 4, we find that in 2007 a third or more of households reported they were not comfortably cool during summer in eight Member States. The issue seems to particularly affect Eastern, Central and Southern European countries. Adequate cooling appears to be the dominant issue for many households, rather than warmth. Even within colder countries such as Ireland and the UK, 7.8% and 10.8% of households respectively report inadequate cooling. The EU28 average for the proportion of dwellings not comfortably cool during summer time was 19.2% in 2012. Across most countries (22), there was a reduction in the prevalence of uncomfortable indoor cooling between 2007 to 2012. The exceptions are Finland and Greece, who both saw small increases in prevalence, and Malta whose rates more than doubled. Nearly half of all Bulgarian households reported that their homes were not comfortably cool in summer in 2012.

In terms of air conditioning facilities, as might be expected countries located in Southern Europe have the highest rates of air conditioning units, with 77.1% of homes in Cyprus featuring air conditioning, 55.7% in Malta, and 52.8% in Greece. Considering that a high proportion of Bulgarian households report that their home is uncomfortably hot during summer, only 8.4% of households have an air conditioning unit. Overall, the EU average is 10.8%.

Key information:

- Energy poverty is not easily measured with a single indicator; each indicator captures a different aspect of the phenomenon;
- EPOV recommends using a suite of indicators in combination;
- 40.0 million people were unable to keep their home warm in 2017;
- 35.9 million people had arrears on their utility bills in 2017;
- A large proportion of households have disproportionately high – and low - energy expenditure burdens;
- 19.2% of households reported being uncomfortably hot during summer in 2012;
- For the moment, there are no plans as to whether and when data for summertime cooling will be collected.

3.4. Indicator gaps

Attempts to quantify the prevalence of energy poverty are constrained by the limited availability of appropriate data and indicators. In particular, there is no dedicated survey of energy poverty anywhere in Europe, thus researchers are reliant on data collected for other purposes.

Some of the key aspects of energy poverty that are presently missing or under-explored within national surveys are:

- Electrical safety – the International Federation for the Safety of Electricity Users (Fisuel) has been campaigning on the link between energy poverty and electrical safety, and recently called for new indicators on this topic[25]
- Economic impacts of poor quality energy supply – as the photo on page 7 highlights, power outages can result in significant economic losses.
- Cooling and summertime issues – Collection of the air conditioning indicator was not repeated after the 2007 ad-hoc module, and for the moment there no plans as to whether and when data for the air conditioning and comfortably cool indicators will be collected.
- Health and wellbeing impacts, with greater detail on individual conditions.
- Data on other energy services in the home, such as ICT.
- Developing more regionally specific and targeted settlement-level data.
- Household needs and everyday practices are largely absent from statistical data (Thomson et al. 2017).

In addition to compiling authoritative statistics on energy poverty using existing sources of data, our consortium also seeks to push the state-of-the-art forward by actively engaging with processes to 1) improve the quality of existing data sources, and 2) expand data availability.

[25] https://www.energypoverty.eu/news/addressing-safety-and-energy-poverty-better-protect-vulnerable-consumers

Lens, France • Raymonde (59) and René (62)

Raymonde and René are retired, and live in social housing with their 28-year-old son. Struggling with a few debts, they fell behind on energy bills.

'Gaz de France (GDF) cut off the gas supply about two years ago. Now, we have a single electric heater that we move as needed.

The washing machine broke down three years ago, so I wash our things by hand. The fridge is empty, like a demonstration fridge at the appliance store.

We get used to everything…except the idea of being on the street'.

4. Conclusions

The second of a series of pan-EU reports on energy poverty by the EU Energy Poverty Observatory examined measures to tackle energy poverty, both in terms of new EU legislative requirements within the Clean Energy Package for all Europeans, and national approaches in policy of energy poverty and vulnerable consumers. Overall, the report found that significant progress has already been made at the Member State level; however, significantly more remains to be done to tackle energy poverty via concrete measures and policies. In this regard, it is expected that EPOV will become an important decision-support tool for the new European Union-wide energy policy, regulation and legislation that will be developed in the near future.

The EPOV web portal[26] provides the most comprehensive range of energy poverty resources available anywhere worldwide, including:

Indicator dashboard

- 28 primary and secondary indicators of energy poverty.
    - Publications database
- 550+ scientific articles from 1983-present.
    - Catalogue of policies and measures
- 300 examples of practical policies and schemes.
    - Training resources
- ~55 practical training resources, including videos and toolkits.
    - Members' directory
- 680 members from 60+ countries worldwide.
    - List of relevant organisations
- 90+ organisations active in research, policy, and practice.
    - Guidance for policymakers
- Information on essential points to consider for new policies.
    - News & Events
- Calendar of local and national events
    - 'Perspective' articles and news pieces.
- Discussion forums
    - A place to discuss experiences and new ideas.

This report has also explored the prevalence of energy poverty across the EU using a range of available statistical indicators, finding:

- Energy poverty is not easily measured with a single indicator; each indicator captures a different aspect of the phenomenon;

[26] https://www.energypoverty.eu/

- EPOV recommends using a suite of indicators in combination;
- 40.0 million people were unable to keep their home warm in 2017 (EU-SILC);
- 35.9 million people had arrears on their utility bills in 2017 (EU-SILC);
- A large proportion of households have disproportionately high – and low (i.e. they may be under-consuming) - energy expenditure burdens (HBS);
- 19.2% of households reported being too hot during summer in 2012 (EU-SILC).

From these findings, it is evident that energy poverty is a key societal challenge that should be urgently addressed by Member States. Living in inadequately heated or cooled homes is known to have detrimental impacts on respiratory, circulatory and cardiovascular systems, as well as mental health and well-being. Energy poverty has also been shown to exert wider economic and political impacts, beyond the private domain of the home.

In terms of gaps in data and indicators, some of the key aspects of energy poverty that have been identified as missing or under-explored, continue to be:

- Electrical safety – the International Federation for the Safety of Electricity Users (Fisuel) recently called for new indicators on this topic[27].
- Economic impacts of poor quality energy supply – unreliable energy supplies can result in significant economic losses.
- Health and wellbeing impacts.
- Cooling and summertime issues –collection of the air conditioning indicator was not repeated by Eurostat after the 2007 ad-hoc module, and for the moment there are no plans as to whether and when data for the 'dwelling comfortably cool in summer' indicator will be collected. This means there will be no further EU-level data relating to summertime energy poverty.
- Data on other energy services in the home, such as ICT.
- Developing more regionally specific and targeted settlement-level data.
- Household needs and everyday practices are largely absent.

[27] https://www.energypoverty.eu/news/addressing-safety-and-energy-poverty-better-protect-vulnerable-consumers

Appendix 1: the EU Energy Poverty Observatory

Project consortium and governance

The EPOV project is delivered via a consortium of six key partner organisations, all of whom are recognised as leaders in their respective fields, with a wealth of experience in addressing energy poverty:

University of Manchester (UK)

Ecofys Germany GmbH (Germany)

European Policy Centre (Belgium)

Intrasoft International S.A. (Luxembourg)

National Energy Action (UK)

Wuppertal Institut für Klima, Umwelt, Energie gGmbH (Germany)

The partners are also supported by a range of subcontracted organisations, spanning the French and Greek national energy poverty observatories, and other organisations with expertise in research, policy, and practice on energy poverty. These organisations have provided specialist advice on setting up an Observatory, and will help organise thematic workshops, and to disseminate the outputs of the Observatory to their networks:

- Asociación de Ciencias Ambientales (ACA) (Spain)
- Alphéeis (France)
- Centre for Renewable Energy Sources and Saving (Greece)
- Energy Action Project (France)
- Energy Action Ireland (Ireland)
- Fundación Ecología y Desarrollo (ECODES) (Spain)
- Housing Europe (Belgium)
- University of Birmingham (UK)

The project also builds on and subsumes the EU Fuel Poverty Network (EUFPN). Launched in 2011 by Harriet Thomson, the EUFPN worked to raise awareness of the condition, and to further the dialogue between relevant stakeholders. At the point of closure, its website had received around 27,000 visitors worldwide.

EPOV is governed by three key structures:

- Managing Board (MB): It takes responsibility for day-to-day operational decisions as well as the organisation of its tasks and the production of deliverables. The MB is led by the Project Manager (Dr Harriet Thomson), and contains one representative of each project partner.
- Steering Committee (SC): This body works closely with the MB, and monitors and assures the quality of the decisions and outputs produced by the MB, whilst also offering strategic guidance with regard to the wider context and purpose of the Observatory. Each partner is represented on this committee. The SC is led by the Project Chair (Professor Stefan Bouzarovski).

- Advisory Board (AB): The MB and SC are supported by a multi-stakeholder AB composed of around 70 experts from more than 25 countries. Over the duration of the project, its members will be asked to individually provide feedback and advice on all aspects of the Observatory's work. The AB is convened by Slavica Robic (Society for Sustainable Development Design, Croatia). Our AB is the most comprehensive multi-stakeholder group of energy poverty experts assembled to date, and includes two MEPs who have been actively involved with energy poverty legislation (Theresa Griffin and Tamás Meszerics).

The full list of MB and SC members is detailed in the table below, whilst the AB membership directory can be found in section 5.3.

Body	**Lead**	**Members**
Managing Board	Harriet Thomson (University of Manchester, UK)	Harriet Thomson (UoM) Sam Nierop (Ecofys) Adrian Kentsch (Intrasoft Intl.) Johannes Thema (Wuppertal Inst.) Helen Stockton (NEA) Marco Giuli (EPC)
Steering Committee	Stefan Bouzarovski (University of Manchester, UK)	Stefan Bouzarovski (UoM) Sil Boeve (Ecofys) Yiannos Contrafouris (Intrasoft Intl.) Florin Vondung (Wuppertal Inst.) Peter Smith (NEA) Claire Dhéret (EPC)

Tasks and work packages

The principal mission of EPOV is to engender transformational change in knowledge about the extent of energy poverty in Europe, and to propose innovative policies and practices to combat it. It has three overarching Tasks:

- **Improving transparency:** producing statistics and analysis on the number of households in energy poverty and related indicators;
- **Disseminating information and outreach activities:** disseminating the results of the work of the EU Observatory and serving as a hub for energy poverty;
- **Providing technical assistance:** making a positive impact to those fighting energy poverty.

In order to realise these overarching goals, the activities of EPOV are organized according to eight interlinked work packages (WP):

- **WP1 - Web portal:** development and launch of a specialist web platform;
- **WP2 - Indicator dashboard:** preparation of comparative and robust statistics on energy poverty that are publicly accessible;

- **WP3 - Energy poverty analysis and reports:** production of individual Member State and annual pan-EU energy poverty reports;
- **WP4 - Evidence and best practice:** spans an evidence repository, catalogue of measures, and national case studies;
- **WP5 – Networks:** concentrating on involving existing initiatives and networks, and establishing a new network of stakeholders;
- **WP6 - Communications and training material:** continued engagement with stakeholders, and production of new specialist training material;
- **WP7 - Technical assistance:** provision of specialist policy advice, and collaboration with Covenant of Mayors to implement a practical local-level project;
- **WP8 - Monitoring, quality control and feedback:** project meetings and regular reporting to the Contracting Authority.

Members of the Advisory Board

François Bafoil (FR)

Anna Zsófia Bajomi (IT)

Keith Baker (UK)

Katerina Bezgachina (SK)

Brenda Boardman (UK)

Jean-Sébastien Broc (FR)

Mauro Brolis (IT)

Karl-Michael Brunner (AT)

Raúl Castaño De la Rosa (ES)

Evangelia Chatzikonstantinou (GR)

Paul Deane (IE)

Ute Dubois (FR)

Søren Dyck-Madsen (DK)

Sanja Filipovic (RS)

Jan Frankowski (PL)

Marta Garcia (ES)

João Pedro Gouveia (PT)

Theresa Griffin MEP (UK)

Katrin Großmann (DE)

Rachel Guyet (FR)

Peter Heindl (DE)

Adrian Joyce (BE)

John Kolm-Murray (UK)

Ana Colovic Lesoska (MK)

Grzegorz Libor (PL)

Maciej Lis (PL)

Sylvia Mandl (AT)

Sandrine Meyer (BE)

Lucie Middlesmiss (UK)

Marie Moisan (FR)

Virgil Musatescu (RO)

Tamás Meszerics MEP (HU)

Matthias Naumann (DE)

Besim Nebiu (MK)

Eimantas Neniškis (LT)

Ana Raquel Nunes (UK)

Fülöp Orsolya (HU)

Kimberley O'Sullivan (NZ)

Massimo Palombo (IT)

Teodora Peneva (BG)

Gloria Pignatta (IT)

Brian Restall (MT)

Slavica Robic (HR) – Convenor of Advisory Board

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Tomislav Tkalec (SI)

Angela Tod (UK)

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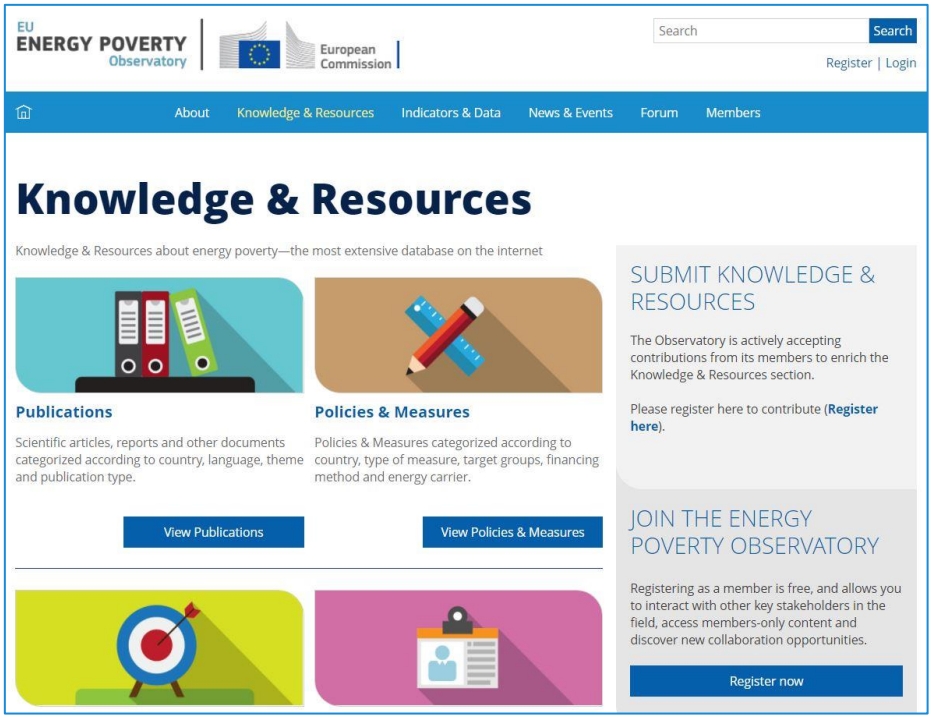
Activities in the reporting period

During the reporting period (1st August 2018 – 31st May 2019), the EPOV consortium has been involved in activities relating to all eight WPs listed above. Our primary focus of activity has been continued development of our specialist web portal, producing tailored outputs for different stakeholders – including case studies and training material, and participating in external events. Further detail on these headline activities is provided below, whilst an outline of proposed future activities follows in section 5.5.

Updating our specialist web portal

For most audiences and users the Observatory portal (www.energypoverty.eu) will be synonymous with the Observatory itself. The web portal is an essential and inseparable element of the task to improve the transparency of energy poverty research, policy and practice across Europe, and is closely linked to the task of disseminating information.

Figure 5: The EPOV web portal (www.energypoverty.eu)



During the reporting period we have continued to add content to the EPOV web portal, via Calls for Evidence and desk-based research. This ensures that we are able to provide the most comprehensive range of energy poverty resources available anywhere worldwide, including:

Indicator dashboard

28 primary and secondary indicators of energy poverty

Publications database

550+ scientific articles from 1983-present.

Catalogue of policies and measures

300 examples of practical policies and schemes.

Training resources

~55 practical training resources, including videos and toolkits.

Members' directory

With 680 members from 60+ countries, this is the largest worldwide stakeholder directory.

List of relevant organisations

90+ organisations active in research, policy, and practice.

Guidance for policymakers

Information on essential points to consider when drafting new policies.

News & Events

A regularly updated calendar of local and national events

'Perspective' articles and news pieces.

Discussion forums

A place to discuss experiences and develop new ideas with others.

Since launching, our portal has received 29,653 unique visitors, generating 161,018 page views. In tandem, we continue to raise visibility of energy poverty across the EU via different tools, such as social media and events, with the attempt to reach out to new stakeholders and increase the number of members.

Social media

Content is posted regularly on @EPOV_EU to around 2,160 followers.

Join the EU Energy Poverty Observatory

www.energypoverty.eu/member/register

Registering as a member is free, and allows you to interact with other key stakeholders in the field, access members-only content, and discover new collaboration opportunities.

Outputs tailored to stakeholder needs

To assist different stakeholders with addressing energy poverty, EPOV regularly produces specialist outputs that are tailored to the needs of particular stakeholders. Following an emphasis on producing

guidance for policymakers in the last reporting period[28], in this round we have produced three new outputs:

2 x case studies, which showcase successfully implemented energy poverty measures in different Member States, and highlight best practices that can be used as models for energy poverty action:

- The first case study explores the 'Jessica II Fund for Multi-apartment Building Modernisation', for large-scale renovation in Lithuania.
- The second case study looks at the 'Energy Advice Points' project run by Ecoserveis in Barcelona, Spain.

1 x 'how to guide', which is a guidance document for individuals or organisations across the EU to use to help them to produce their own MS specific Energy Poverty Action Guides.

The output was created based on an analysis of the responses gathered through a Call for Evidence consultation during spring 2018.

It is aimed at Elected Officials, local government officials and advice workers.

Participation in external events

The consortium members have been an active participant in numerous external events, including:

- Energy Poverty Workshop, Municipality of Arnhem, September 2018 (Netherlands)
- Expert Workshop on Energy Poverty and Social Isolation, hosted by White Rose Brussels in the European Parliament, October 2018 (Belgium)
- 2nd Catalan Congress on Energy Poverty, November 2018 (Spain).
- Expert Conference on Energy Poverty, organized by the North Rhine-Westphalia Ministry of Economy, December 2018 (Germany)
- 2nd ENGAGER energy poverty conference, January 2019 (Romania)
- Forum for Air Quality Modelling in Europe, Joint Research Centre, February 2019 (Poland)
- 4th Plenary Meeting Concerted Action for the Energy Efficiency Directive, March 2019 (Finland)
- Working Group meeting on Energy Poverty, North Rhine-Westphalia Ministry of Economy, April 2019 (Germany)
- Energy Poverty Workshop at the BEACON conference, May 2019 (Germany).

Future activities

Over the next few months, the consortium will be involved with a number of new activities, as well as the completion of several outputs. A full list of key upcoming activities is provided below, categorised according to the tasks and WPs in section 5.2.

Task	WP	Activity	Timeline
2	1	Portal updates and evolution – we are continually evaluating the user experience and making modifications to improve the service offered. If you have any feedback on the web portal (or any other	Continuous

[28] See https://www.energypoverty.eu/guidance-policymakers and https://www.energypoverty.eu/publication/eu-energy-poverty-observatory-guidance-designing-effective-energy-poverty-policies

		aspects of the Observatory), please write to us on contact@energypoverty.eu or find us on Twitter @EPOV_EU.	
1	2	Annual update to the indicator dashboard, including adding the 2015 Household Budget Survey data when it becomes available from Eurostat in late 2019.	Late-2019
2	4	New national case studies in 2019 from the Center For Renewable Energy Sources (Greece) and Alpheeis (France).	Throughout 2019
2	3	Individual Member State reports, which will focus on providing a comprehensive snapshot of policy, practice and research activities to fight energy poverty in a given country.	Mid-June 2019
2	3	3rd Annual pan-EU report on energy poverty.	January/February 2020
2	4	Incorporation of outputs from recently funded European projects, as well as forthcoming projects from the latest Horizon 2020 call 'Mitigating household energy poverty'.	Continuous
2	5	Closer collaboration with the networks of the COST Action 'European Energy Poverty: Agenda Co-Creation and Knowledge Innovation'.	Continuous

Appendix 2: Review of Draft National Energy and Climate Plans

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
AT	no	yes	yes	yes	yes	no	Austria has an integrated approach, focusing on affordability, housing and climate change: "Efforts must be made to ensure that all sections of the population can meet their basic energy and mobility requirements. Consumers should be able to manage this now and in future at a socially affordable cost. High energy costs put low-income households in particular at risk of poverty".
BE	no	yes	yes	yes	partially	no	Belgium focuses on the costs for vulnerable households and the inability to pay the energy bills. Energy efficiency policies differ from region to region and they mostly aim to "limit consumption" and support the payment of the bills.
BG	no	no	no	no	no	no	The primary tool is a heating allowance to help specific categories cope with expenditures. Bulgaria focuses on creating the right conditions for the protection of consumers in the framework of an open market. Targeted energy efficiency programmes are not considered.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
HR	Expected	no	no	yes	no	no	Croatia announces the creation of a "Programme for Elimination of Energy Poverty" and capacity building, under the 4th National Energy Efficiency Action Plan. It focuses on information on funding sources and awareness-raising; measuring and monitoring; increasing energy efficiency for energy-poor households.
CY	no	no	yes	no	no	no	Cyprus considers that the number of beneficiaries who fall within the definition of energy poverty is not significant. The categories of vulnerable consumers who can benefit from a special tariff are quite precise: "the number of vulnerable consumers who fall within the definition of energy poverty and have applied and benefited so far (September 2018) from the above measures is 12,888 representing 1.5% of the total population."
CZ	Expected 2020	no	no	no	no	no	The Czech Republic considers that energy poverty is at the crossroad between social, economic and environmental agendas. The NECP provides theoretical elements. A specific project to be completed by November 2020 should give better insights, a definition and provide measures to implement.
DK	no	no	no	yes	no	no	Energy poverty is not addressed in the NECP, as Denmark loos at energy poverty through social policy. Low-income pensioners receive specific financial support for their heating bill.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
EE	no	no	no	no	partially	no	Energy poverty is addressed through the household subsistence funds by the national and local government, in the framework of the Welfare Development plan. Estonia provides renovation grants, but they are not quantified nor linked with any specific energy efficiency objective.
FI	no	no	no	no	no	no	Finland considers that energy poverty is sufficiently addressed through the general social policy.
FR	partial	no	partial	yes	yes	no	France has an inclusive approach focusing on energy efficiency improvements for "modest homeowners" and redistributive policies via the Chèque énergie.
DE	no	no	no	no	no	no	Germany looks at energy poverty as a part of general poverty, although the question of affordability is one of the three critical elements of the energy policy goals (with the reliability of supply and environmental soundness).
GR	yes	no but indicators are presented	yes	yes	yes	yes	Greece presents a very comprehensive understanding of energy poverty, integrated into strategic policy plans and linked with energy efficiency programmes and taking into consideration the potential role of energy communities. Greece aims to reduce by at least 50 % the relevant energy poverty footprint by 2025, to reduce it by 75% compared to 2016 and to bring it to levels well below the EU average, by 2030.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
HU	no	no	no	yes	no	no	Hungary does not define specific objectives: the regulation of prices is sufficient to guarantee affordable energy prices for all consumers and that no additional policies are needed.
IE	yes - updated 2019	yes	yes	yes	yes	no	Ireland already has an integrated strategy turning around energy efficiency pilot projects for energy-poor. Ireland's Strategy to Combat Energy Poverty will be reviewed in 2019. Ireland plans to expand the reach of existing energy efficiency schemes and commit the Government to develop and pilot new measures to find more effective ways to focus energy efficiency efforts on those most at risk of energy poverty.
IT	no	yes	yes	yes	no	no	Italy has a comprehensive approach looking at consumer protection and taking into consideration the needs to cool in the summer and the dependence on vital devices. Current policies mostly focus on measures to cover energy expenditures, and, although mentioning energy efficiency, the objectives are superficially addressed.
LV	Expected 2021	yes	no	no	no	no	Latvia acknowledges the need to look at energy poverty. A strategic plan should be launched in 2021, following two years of assessment of definitions and data analysis. No new specific policy measure was announced, although existing policies are likely to be assessed before the upcoming 2021 strategy.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
LT	no	no	no	no	no	no	Lithuania sees energy poverty only as part of poverty in general among social policies. Lithuania acknowledges an increase in Energy poverty (+1.8 point since 2008) but does not envisage a specific strategy or measures apart from the existing ones. Lithuania recognises the need to study the phenomenon better and evaluate the impact of existing policies.
LU	no	yes	no	yes	yes	no	Luxembourg calls for progress at EU level on a common definition of energy poverty. It highlights targeted financial measures to help pay the bills and a project on energy efficiency through the replacement of old appliances. Luxembourg presents its free public transport scheme as a way to help household consumers.
MT	no	yes	yes	yes	no	no	Energy poverty is considered to be one of the expressions of poverty. Malta focuses on the inability to keep the home adequately warm in the winter. In 2017, 20,488 individuals received the energy benefit.
NL	no	partially	no	no	yes	no	The Netherlands consider that energy poverty is a form of poverty and general social policies are sufficient to address the phenomenon. The only criteria taken into account is the "low income" and not the quality of the building nor the prices of energy.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
PL	Coming	partially	no	no	yes	no	An upcoming report on energy poverty should have an impact on Poland's integrated strategy to address energy poverty, including on energy efficiency and pollution. Energy efficiency renovation strategies for energy poverty are playing a pivotal role in reducing CO2 emissions and air quality. In Poland, "active forms of participation in the electricity market" are perceived as a way to address energy poverty, although the NECP does not provide further details.
PT	Coming 2021	no	partially	yes	yes	no	Portugal focuses on building a fair, democratic and cohesive transition, and resorbing energy poverty is one of the aspects. Improving the housing stocks and involving the population in the setting up of renewable energy installations are among the priorities. Portugal aims to have a comprehensive analysis of energy poverty by 2021, including a definition and assessment.
RO	partially	yes	yes	yes	yes	no	Romania acknowledges the prevalence of energy poverty and mentions several strategies to tackle it. It underpins the importance of an integrated and comprehensive approach towards energy poverty, but it does not provide details. Romania displays one of the only programmes linking the renovation schemes closely with the needs of the people affected by energy poverty. Access to energy (electrification, in particular through local mini-grids), thermal renovation, efficiency and retrofitting programmes and affordability through direct support measures are critical aspects of the strategies.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
SK	no	no	no	yes	no	no	Slovakia's NECP implies a comprehensive series of measures which could impact the level of energy poverty, but it is unclear if those measures are dedicated explicitly to energy-poor households or are for everyone. The NECP mentions a system to promote the insulation of residential blocks and family homes, the implementation of a stable new tariff structure, a housing allowance, state employment programmes. Slovakia expresses concerns about the fairness of measures made to address energy poverty and the sharing of costs among the whole society
SL	no	no	no	no	no	no	Slovenia recognises it has not started to design particular objectives to mitigate energy poverty. Unlike many other EU countries, Slovenia focuses on improving energy efficiency and retrofitting the dwellings occupied by the most vulnerable. The NECP lists several projects (mostly EU-funded, in particular, cohesion funds) that have aimed at improving energy efficiency among energy-poor households, but the results have not been assessed.
ES	yes	yes	no	no	yes	no	Spain has adopted an integrated and comprehensive national strategy against Energy poverty ("Estrategia Nacional Contra la Pobreza Energética"), entered into force in April 2019. Spain aims to tackle all the dimensions of energy poverty in an integrated manner. The NECP pays special attention to the right to access energy and the right to auto-consumption and be part of an energy community, as a way to mitigate energy poverty.

	Is a strategy presented ?	Is energy poverty defined?	Is energy poverty quantified?	Are policies described?	Are energy efficiency policies targeted at energy poor and vulnerable consumers presented?	Are objectives robustly quantified ?	Summary
SE	no	no	no	no	no	no	Sweden does not define energy poverty. The country considers that energy poverty is part of general social policies, and therefore no quantification or objectives are presented. However, the NECP claims that particular attention is paid to vulnerable consumers by the Swedish Energy Markets Inspectorate.
UK	existing	no	no	yes	yes	no	In the UK, competencies are devolved and fuel poverty is handled by the 4 governments (England, Wales, Scotland and Northern Ireland). Each government has a particular strategy and objectives addressing the poor quality of the dwellings, energy efficiency and finance their retrofitting programmes. The most comprehensive programme is in Scotland. The NECP mentions the Energy Company Obligation (ECO), a £640 million per annum scheme designed to improve the energy performance of homes in England, Scotland and Wales and funded by companies. The UK Government announced that for 2018-2022 the scheme will be focused entirely on low income and vulnerable households.

Appendix 3: Summary of EPOV Indicators

Indicator name	Data source	Data year(s)	Primary/Secondary	Description
Inability to keep home adequately warm	EU-SILC	2004-2016	Primary	Based on the question "Can your household afford to keep its home adequately warm?" This indicator encompasses the prevailing qualitative definition of energy poverty and captures self-reported thermal discomfort issues. We note that the wording of this question varies by MS. It is a recommended indicator by Rademaekers et al. (2016).
Arrears on utility bills	EU-SILC	2004-2016	Primary	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?" This indicator captures potential financial difficulties, and is an important indicator as households unable to keep up to date with energy bill payments may experience disconnection of supply. Note, however, that for some MS it might cover all utility bills, including those beyond energy. In addition, arrears are not possible for some energy carriers, such as heating oil and wood pellets.
High share of energy expenditure in income (2M)	HBS	2010	Primary	The 2M indicator presents the proportion of population whose share of energy expenditure in income is more than twice the national median share. This suggests the prioritisation of energy costs over other household costs. The 2M threshold was established on

				the basis that this represents disproportionately high expenditure. It is a recommended indicator by Rademaekers et al. (2016).
Low share of energy expenditure in income (M/2)	HBS	2010	Primary	The M/2 indicator presents the share of population whose absolute energy expenditure is below half the national median, in other words abnormally low. M/2 is a relatively new indicator that has been used in Belgium to complement other expenditure and self-reported indicators. In Belgium, the M/2 indicator is called Hidden energy poverty (HEP), and refers to the proportion of households which have a low energy expenditure due to the fact that they restrict their energy spending below what is necessary to meet their needs. It is a recommended indicator by Rademaekers et al. (2016). –
Fuel oil prices	BSO	2004-2015	Secondary	Average household prices per kWh generated from fuel oil.
Biomass prices	BSO	2004-2016	Secondary	Average household prices per kWh generated from biomass.
Coal prices	BSO	2004-2016	Secondary	Average household prices per kWh generated from coal.
Electricity prices	Eurostat: nrg_pc_204	2007-2016	Secondary	Electricity prices for household consumers, band DC 2500-5000 kWh/yr consumption, all taxes and levies included.
Gas prices	Eurostat: nrg_pc_202	2007-2016	Secondary	Natural gas prices for household consumers, band 20-200GJ consumption, all taxes and levies included.
Presence of leaks, damp, rot	EU-SILC	2004-2016*	Secondary	Share of population with leaks, damp or rot in their dwelling, which can be seen as an indirect proxy of housing quality and living conditions. *However, from 2020, this indicator will no longer be

				collected annually; rather it will take place every 3 years.
Dwelling comfortably cool during summer time	EU-SILC ad-hoc modules	2007 and 2012**	Secondary	Share of population, based on question "Is the cooling system efficient enough to keep the dwelling cool?" and/or "Is the dwelling sufficiently insulated against the warm?" **For the moment there no plans as to whether and when data for this indicator will be collected.
Dwelling comfortably warm during winter time	EU-SILC ad-hoc modules	2007 and 2012**	Secondary	Share of population, based on question "Is the heating system efficient enough to keep the dwelling warm?" and "Is the dwelling sufficiently insulated against the cold?" **For the moment there no plans as to whether and when data for this indicator will be collected
Equipped with air conditioning	EU-SILC ad-hoc module	2007***	Secondary	Share of population living in a dwelling equipped with air conditioning facilities. ***Collection of this indicator has not occurred since the 2007 ad-hoc module.
Equipped with heating	EU-SILC ad-hoc modules	2007 and 2012**	Secondary	Share of population living in a dwelling equipped with heating facilities. **From 2020, this indicator will no longer be collected.
Number of rooms per person by tenure status and dwelling type	Eurostat: ilc_lvho03	2004-2016	Secondary	Average number of rooms per person by tenure status and dwelling type.
Dwellings in densely populated areas	BSO	2004-2014	Secondary	Share of dwellings located in densely populated areas (at least 500 inhabitants/km2).

Dwellings in intermediately populated areas	BSO	2004-2014	Secondary	Share of dwellings located in intermediately populated areas (between 100 and 499 inhabitants/km2).
Risk of poverty or social exclusion	Eurostat: ilc_peps01	2004-2016	Secondary	People at risk of poverty or social exclusion (% of population).
Energy expenditure for electricity, gas and other fuels as a share of income, split by income decile	Eurostat: hbs_str_t223	2005, 2010 and 2015	Secondary	Consumption expenditure for electricity, gas and other fuels as a share of income, by income decile.
Excess winter mortality	BSO	2005-2014	Secondary	Share of excess winter mortality.

Appendix 4: Energy Poverty in the EU – Data Tables

Table 1: Country means (%) for 'Inability to keep home adequately warm'. Data source: ilc_mdes01, EU-SILC 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
EU average	9.5	9.8	10.8	10.8	10.3	9.4	8.7	7.8
Belgium	5.6	7.1	6.6	5.8	5.4	5.2	4.8	5.7
Bulgaria	66.5	46.3	46.5	44.9	40.5	39.2	39.2	36.5
Czech Republic	5.2	6.4	6.7	6.2	6.1	5.0	3.8	3.1
Denmark	1.9	2.3	2.5	3.8	2.9	3.6	2.7	2.7
Germany	5.0	5.2	4.7	5.3	4.9	4.1	3.7	3.3
Estonia	3.1	3.0	4.2	2.9	1.7	2.0	2.7	2.9
Ireland	6.8	6.8	8.4	10.0	8.9	9.0	5.8	4.4
Greece	15.4	18.6	26.1	29.5	32.9	29.2	29.1	25.7
Spain	7.5	6.5	9.1	8.0	11.1	10.6	10.1	8.0
France	5.7	6.0	6.0	6.6	5.9	5.5	5.0	4.9
Croatia	8.3	9.8	10.2	9.9	9.7	9.9	9.3	7.4
Italy	11.6	17.8	21.3	18.8	18.0	17.0	16.1	15.2
Cyprus	27.3	26.6	30.7	30.5	27.5	28.3	24.3	22.9
Latvia	19.1	22.5	19.9	21.1	16.8	14.5	10.6	9.7
Lithuania	25.2	36.2	34.1	29.2	26.5	31.1	29.3	28.9
Luxembourg	0.5	0.9	0.6	1.6	0.6	0.9	1.7	1.9
Hungary	10.7	12.2	15.0	14.6	11.6	9.6	9.2	6.8
Malta	14.3	17.6	22.1	23.4	22.1	13.9	6.8	6.3
Netherlands	2.3	1.6	2.2	2.9	2.6	2.9	2.6	2.4
Austria	3.8	2.7	3.2	2.7	3.2	2.6	2.7	2.4
Poland	14.8	13.6	13.2	11.4	9.0	7.5	7.1	6.0
Portugal	30.1	26.8	27.0	27.9	28.3	23.8	22.5	20.4
Romania	20.1	15.6	15.0	14.7	12.9	13.1	13.8	11.3
Slovenia	4.7	5.4	6.1	4.9	5.6	5.6	4.8	3.9
Slovakia	4.4	4.3	5.5	5.4	6.1	5.8	5.1	4.3
Finland	1.4	1.8	1.5	1.2	1.5	1.7	1.7	2.0
Sweden	2.1	1.9	1.7	0.9	1.1	1.2	2.6	2.1

United Kingdom	6.1	6.5	8.1	10.6	9.4	7.8	6.1	5.9

Table 2: Country means (%) for 'Arrears on utility bills'. Data source: ilc_mdes07, EU-SILC 2010-2017

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
EU average	9.1	9.0	9.9	10.2	9.9	9.1	8.1	7.0
Belgium	5.8	6.0	6.1	5.0	5.8	5.1	5.0	4.0
Bulgaria	31.6	28.6	28.4	34.0	32.9	31.4	31.7	31.1
Czech Republic	4.2	4.3	4.1	4.0	4.7	3.0	3.0	2.1
Denmark	3.2	3.4	3.5	3.6	4.6	3.4	2.5	3.5
Germany	3.5	3.9	3.4	3.6	4.2	4.0	3.0	2.8
Estonia	11.0	11.8	10.9	10.4	10.0	7.9	7.9	6.3
Ireland	12.6	14.8	17.6	17.9	18.2	15.1	12.1	9.9
Greece	18.8	23.3	31.8	35.2	37.3	42.0	42.2	38.5
Spain	7.5	5.7	7.5	8.3	9.2	8.8	7.8	7.4
France	7.1	7.1	6.7	6.2	6.3	5.9	6.1	6.1
Croatia	28.0	27.5	28.9	30.4	29.1	28.7	25.3	21.0
Italy	11.2	12.0	11.7	11.9	12.2	12.6	8.9	4.8
Cyprus	16.3	16.9	18.4	21.9	20.5	20.1	15.4	13.7
Latvia	22.5	23.4	22.4	20.7	19.6	16.7	13.2	11.9
Lithuania	10.9	11.8	12.6	13.2	10.4	8.4	9.7	7.9
Luxembourg	2.1	2.2	2.2	3.1	3.2	2.4	4.0	1.7
Hungary	22.1	22.7	24.4	25.0	22.3	19.4	16.2	13.9
Malta	6.8	8.6	10.1	11.4	14.8	10.2	9.0	5.6
Netherlands	2.1	2.4	2.3	2.4	3.0	2.7	2.0	2.1
Austria	4.4	4.0	3.8	4.6	3.5	3.5	4.2	3.6
Poland	13.9	12.9	14.1	14.0	14.4	9.2	9.5	8.5
Portugal	6.4	6.7	6.3	8.2	8.5	7.8	7.3	5.6
Romania	26.5	27.3	29.7	29.7	21.5	17.4	18.0	15.9
Slovenia	18.0	17.3	19.3	19.7	20.3	17.5	15.9	14.3
Slovakia	9.6	6.4	5.8	5.9	6.1	5.7	5.7	5.5
Finland	6.9	7.8	7.9	8.4	7.9	7.5	7.7	7.8
Sweden	5.2	4.6	4.3	4.7	3.6	3.2	2.6	2.2
United Kingdom	5.6	5.0	8.9	8.7	7.2	7.0	5.7	5.0

Table 3: Country means (%) for 2M indicator. Data source: HBS 2010[29]

	2010
EU average	16.3
Austria	15.3
Belgium	14.7
Bulgaria	14.7
Cyprus	11.9
Czech Republic	10.7
Germany	16.6
Denmark	17.7
Estonia	16.2
Greece	14.2
Spain	15.2
Finland	14.8
France	18.1
Croatia	10.9
Hungary	6.9
Ireland	18.4
Lithuania	21.4
Latvia	14.5
Malta	17.3
Poland	18.1
Portugal	15.7
Romania	18.6
Sweden	17.7
Slovenia	14.1
Slovakia	10.0
United Kingdom	17.8

[29] We are aware that 2015 HBS data is in preparation, however, at the time of publication, we could only access scientific use files (micro data) for the 2010 HBS wave. We expect to use the newer 2015 data in our Third Annual Report.

Table 4: Country means (%) for M/2 indicator. Data source: HBS 2010[30]

	2010
EU average	15.1
Austria	12.5
Belgium	10.5
Bulgaria	15.9
Cyprus	13.2
Czech Republic	8.4
Germany	15.1
Denmark	12.0
Estonia	16.5
Greece	10.3
Spain	13.0
Finland	22.3
France	23.7
Croatia	9.6
Hungary	5.0
Ireland	12.3
Italy	16.3
Lithuania	21.2
Luxembourg	8.5
Latvia	13.2
Malta	15.6
Poland	18.5
Portugal	8.8
Romania	17.5
Sweden	31.0
Slovenia	11.5
Slovakia	9.2
United Kingdom	9.8

[30] We are aware that 2015 HBS data is in preparation, however, at the time of publication, we could only access scientific use files (micro data) for the 2010 HBS wave. We expect to use the newer 2015 data in our Third Annual Report.

Table 5: Country means (%) for air conditioning and comfortably cool indicators. Data source: EU-SILC ad-hoc modules 2007 and 2012

	Dwelling equipped with air conditioning facilities	**Dwelling not comfortably cool during summer time**	
	2007	2007	2012
EU average	10.8	25.8	19.2
Austria	1.5	18.1	15.0
Belgium	3.1	14.3	12.7
Bulgaria	8.4	-	49.5
Croatia	-	-	24.2
Cyprus	77.1	40.9	29.6
Czech Republic	0.9	39.1	21.8
Denmark	5.7	17.7	11.6
Estonia	1.9	23.3	23.3
Finland	19.2	20.3	25.2
France	5.2	29	18.9
Germany	1.8	22.7	13.6
Greece	52.8	29.4	34.0
Hungary	4.5	28.5	25.8
Ireland	0.4	7.8	4.0
Italy	25.1	33.4	26.3
Latvia	1.8	39.4	29.9
Lithuania	2.1	33.1	24.6
Luxembourg	5.2	17.9	10.2
Malta	55.7	16.0	35.4
Netherlands	6.4	18.2	17.7
Poland	0.9	41.2	25.3
Portugal	7.2	42.4	35.7
Romania	5.3	-	22.6
Slovakia	1.0	37.5	21.0
Slovenia	12.0	21	17.3
Spain	38.2	25.9	25.6
Sweden	15.2	11.1	7.6
United Kingdom	1.9	10.8	3.3

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