Energy Efficiency Support Schemes for Energy Poor Consumers

The Role of Utilities in the EU's Just Energy Transition

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Abstract

Energy poverty has become a significant concern in policymaking, with energy efficiency measures recognized as key solutions to ensure a just transition. Notably, the 2023 EU Energy Efficiency Directive recast mandates a share of the Member States' obligated energy savings to be made in vulnerable households, which requires the involvement of energy utility companies. While current literature shows that utility companies are uniquely positioned to address energy poverty, there is a significant research gap on their concrete role. This study aims to address this gap by exploring to what extent utilities in the EU27 and UK have set up energy efficiency support schemes targeted to vulnerable consumers. By conducting semi-structured interviews with experts combined with comprehensive desk research, 24 utilities in 11 countries were found to act on energy poverty through supporting energy efficiency measures. Utilities active in France, Ireland and the UK have been identified as frontrunners, supported by their governments that have set sub-targets for vulnerable households within their energy efficiency obligation schemes. Conclusively, our findings show that while certain utilities present best practices, overall utility action on energy poverty is still heavily reliant on government support and struggles to effectively reach vulnerable households.

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List of Abbreviations

Abbreviation	Definition
ECO	Energy Company Obligation
EDF	Électricité de France
EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
EU	European Union
EUR	Euro (currency)
EU27	27 Member States of the European Union
FSL	Fonds de Solidarité pour le Logement
GBP	Great British Pound (currency)
NECP	National Energy and Climate Plan
OPs	Obligated Parties
SEAI	Sustainable Energy Authority of Ireland
TWhc	Terawatt hours cumulative
WHD	Warm Home Discount

1. Introduction

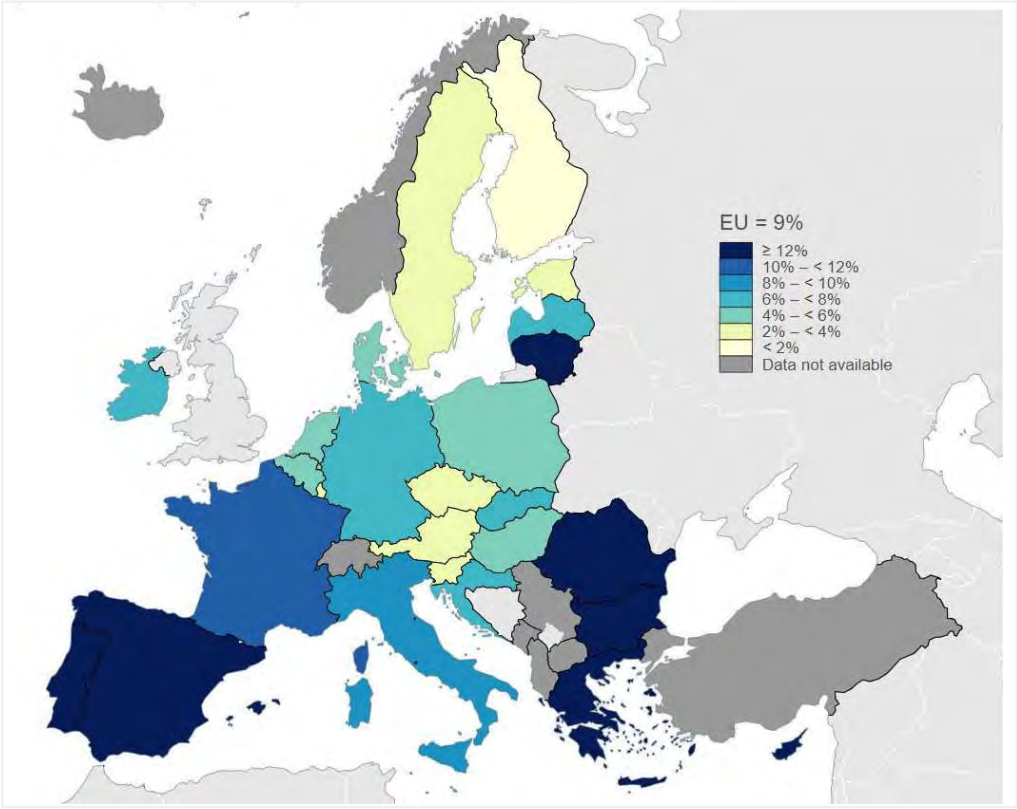
Energy poverty has become a significant concern in policymaking due to the growing emphasis on climate policies, the energy transition, and energy security. Decarbonization efforts, including carbon pricing and fossil fuel subsidies phase-out, are expected to raise energy costs, potentially leading to unintended redistributive consequences that disproportionately affect vulnerable populations if unaddressed (Kelly et al., 2020). In the European Union (EU), where achieving climate neutrality by mid-century is a key objective of the European Green Deal, policymakers are prioritizing a just transition that includes all segments of society.

Energy poverty is closely linked to general income poverty and highlights the disproportionate impact of rising energy prices on low-income households, compelling them to allocate a larger share of their income to energy expenses instead of poverty-alleviating investments. Energy poverty is defined under the 2023 Social Climate Fund regulation and the revised Energy Efficiency Directive (EED) as:

> "*…a household's lack of access to essential energy services that provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances…*" (Directive EU/2023/1791, p. 31)

Typically arising from a combination of factors including "*non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes"*, energy poverty is a multifaceted phenomenon impacting citizens across the EU (Directive EU/2023/1791). Recent events such as the COVID-19 pandemic, surging energy prices and the Russian invasion of Ukraine, have escalated the prevalence of energy poverty in Europe (Agnieszka, 2023). Eurostat data underscores the severity of the situation, with over 9.3 % of the EU population unable to adequately heat their homes in 2022 (see Figure 1), and almost 7 % struggling with utility bills arrears in 2020 (Eurostat, 2024a).

Figure 1 - Share of population that is unable to keep their home adequately warm in 2022 (in %)



Source: Eurostat (2023)

Energy poverty in the EU is identified with a number of different indicators since no single metric can cover all of its dimensions. Each Member State can freely decide how to measure energy poverty but the EU Commission (2023b) provides eleven exemplary indicators that can be used to track the prevalence of energy poverty (see Table 1) which can be further complemented by domestic metrics.

Recognizing the urgency to address energy poverty and protect vulnerable consumers, the EU has developed a set of legislative and non-legislative initiatives aimed at fostering a just transition to clean energy. Promoting energy savings and energy efficiency is central to this strategy, with the overarching goals of enhancing energy security, reducing greenhouse gas emissions and ensuring an inclusive transition that "leaves no one behind" (EU Commission, 2023b).

In this regard, the EED stands out as a key policy framework, especially since the 2023 recast, which strengthened Member States' energy saving obligations. Particularly noteworthy within this obligation, enshrined under Article 8, is the inclusion of a subtarget that underscores the importance of a just transition (Agnieszka, 2023). This revised provision indeed mandates that a portion of energy savings must be specifically directed towards individuals affected by energy poverty, thus creating a

crucial tool to ensure that the energy transition remains affordable for all citizens. The directive states that:

> "…*Member States shall implement energy efficiency obligation schemes, alternative policy measures, or a combination of both, or programmes or measures financed under a national energy efficiency fund, as a priority among, but not limited to, people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing*…" (Directive EU/2023/1791, p. 41)

Article 8 of the EED thus mandates Member States to fulfill their energy savings obligations by implementing, among other measures, energy efficiency obligations schemes (EEOS). EEOS entails imposing energy-saving requirements on energy distributors and/or retail energy sales companies across different energy-using sectors, including residential (households), public or commercial. Hence, this provision also underscores the pivotal role of utilities and energy companies in addressing energy poverty (SocialWatt, 2023c).

Notably, leveraging their existing relationships and communication channels with their customers, these entities are uniquely positioned to identify energy-poor households and offer targeted assistance. Since vulnerable households are already well-defined in national legislation across Europe, utilities and energy companies can offer direct assistance to these consumers even in the absence of a national energy poverty definition. Furthermore, addressing energy poverty aligns with utilities' interests as it reduces customer debt and lowers the likelihood of costly disconnections (SocialWatt, 2023c).

Consequently, this paper aims to investigate the role of energy utility companies in alleviating energy poverty by finding out *to what extent utilities in the EU27 and UK have set up energy efficiency support schemes targeted to vulnerable consumers as established under the EED*.

To this end, the paper first provides a literature review before outlining the methodology deployed to address the identified research gap. Thereafter, the analysis is presented with specific emphasis on insights at both country and utility levels. The subsequent section discusses best practices, challenges and limitations in current approaches, before ending with concluding remarks.

2. Literature Review and Research Gap

The implementation of EEOS has driven research on their nature and effectiveness (Rosenow & Bayer, 2017; ENSPOL, 2017; Fawcett et al., 2019). In their study, Rezessy and Bertoldi (2010) analyze the EEOS designs of France, Italy, Denmark and the UK, underlining the central role of subsidy measures and standardized saving factors. The findings suggest that trading white certificates

can be particularly beneficial when the energy-saving targets are set ambitiously relative to the available saving potential within the covered sectors.

Rosenow and Bayer (2017) extend this analysis by demonstrating that EEOS are highly cost-effective in reducing energy consumption and bills substantially, which shield consumers from volatile energy prices. Evidence from countries with long-term EEOS demonstrates decreasing energy consumption over time. In addition, EEOS deliver substantial, measurable savings across energy systems and to society as a whole. Other benefits include health benefits, increased comfort, economic stimulus, employment creation, cost savings in transmission and distribution, avoided costs related to the European Emissions Trading System, and air quality improvements.

A study conducted by ENSPOL (2015) provides a detailed analysis of EEOS across the EU, highlighting both strengths and potential areas for improvement. The study stresses that the EEOS have delivered substantial improvements in energy efficiency within Member States. Placing obligations on energy suppliers in competitive markets has succeeded in meeting targets, with schemes growing in scale and ambition over the years. Yet, as low-cost technological opportunities diminish, the challenge remains for EEOS to support deeper refurbishments and innovations. The ENSPOL study suggests considering expansion beyond the buildings sector into industry and transport, learning from the successes in Denmark and Italy. Furthermore, the study emphasizes the importance of public awareness and the engagement of all potential beneficiaries, especially low-income groups, to ensure that EEOS are effective and inclusive.

However, Fawcett, Rosenow and Bertoldi (2019) point out the future risks of relying only on EEOS, most notably if there is a lack of energy company, public or political support for this policy. For instance, energy companies can have internal reasons for opposing the policy, such as its perceived burden or misalignment with their primary business objectives, which they may present as protecting their customers from rising prices due to unnecessary government policy.

Current literature shows that utilities and energy companies are uniquely positioned to address energy poverty, either through the design of energy efficiency schemes or by partnering in the implementation of schemes aiming to alleviate poverty (SocialWatt, 2023b). However, there is a significant research gap on the concrete role of utilities and their impact on addressing energy poverty. Further studies are required to comprehensively assess how utilities are effectively leveraging EEOS to tackle energy poverty in the EU.

3. Methodology

To address the identified research gap by exploring the extent to which utilities engage in energy efficiency support schemes promoting energy poverty, this study adopted a two-fold data-collecting approach combining desk research and semi-structured interviews. The desk research was conducted to map utility activity directed to vulnerable households within the designated scope of the EU27 and the UK. Moreover, it served the secondary objective of providing an overview of the overarching policy landscape, within this geographical area, related to the EED and energy poverty. Valuable sources that were reviewed include the countries' National Energy and Climate Plans (NECPs) and documents of relevant ministries and governmental agencies in charge of coordinating energy efficiency measures. To systemize the review, it was structured around four guiding questions:

- How does the country define energy poverty?
- Do energy poverty support schemes exist? If yes, what kind of schemes?
- How has the EED, and Article 8 (previously 7) specifically, been transposed?
- How are energy utility companies involved in the implementation of energy efficiency support schemes directed at vulnerable households?

The findings were fed into a high-level table to enable an overview for analysis and country comparisons.

Due to limited data availability and the exploratory nature of the research question, semi-structured interviews were carried out with experts in the field to guide and generate qualitative data complementing the desk research (George, 2023). Specifically, the interviews served to both gather an overview of specific themes and to gain deeper insights into best practices and challenges faced by utilities. The study used a snowball sampling selection of interviewees (Bryman, 2018). Initially, the selection was made in accordance with recommendations of the European Climate, Infrastructure and Environment Executive Agency, based on the criteria of experts involved in projects financed by the EU Horizon 2020 funding program and specifically relating to energy poverty in the context of the implementations of EED Article 8 at utility level. Thereafter, experts and utilities recommended by the interviewees were contacted. In light of the limited timeframe of the study, three 45 minute interviews were conducted over three weeks with a total of six experts pertaining to the initial selection criteria. Additionally, more than 15 people, including utilities, were contacted but were not available for an interview.

To explore expert views, an interview guide was constructed using a combination of open-ended, ordinal and direct questions, followed by probing and specifying questions (see Annex A; Bryman,

2018). To obtain an overview of the current state of affairs, the first questions concerned the overall progress on energy poverty in Europe and frontrunners in the field. Thereafter, the interviews shifted focus to the role of utilities and the specific projects of respective experts. The original interview guide was adapted as the interviews proceeded to take into account the interviewees' expertise and lessons learned. While the interview guide was shared with the interviewees beforehand and provided structure, a part of the interviews was allocated to discuss relevant themes or aspects pointed out by the experts. Afterward, the insights were compared with the findings of the desk research.

Regarding limitations, time constraints were one of the main impediments to this study, primarily impacting the extent of the data collection through interviews. Given the very broad geographical scope of this study which aimed to cover 28 countries, a second barrier concerned language. Much of the information concerning national policy and specifically the work of utilities is available only in the domestic language(s). While the research group's combined language skills covered a fair share of the geographical scope and language conversion tools were strategically deployed, the language deficiency impacted the exhaustiveness of the results. Conclusively, it should be noted that this study is of exploratory nature whose results are deemed non-exhaustive.

4. Policy Overview and Categorisation

4.1 Classification of Measures that Address Energy Poverty

Tackling energy poverty with energy efficiency measures occurs in a variety of ways, involving many stakeholders in the process. The different approaches are shaped by national decisions and policies which, depending on the country context, combine several instruments to address the prevalence of energy poverty. Broadly speaking, the measures addressing energy poverty can be divided into two categories: measures that deal with affordability issues and measures that aim to address the root causes of energy poverty (EU Commission, 2023b).

The first category is centered around the affordability of energy. Policies and measures in this category prioritize economic interventions to ensure that vulnerable households can pay their energy bills. For instance, price support measures help to modify the marginal cost of energy consumption, while tax reductions can lower energy bills. Social tariffs are another form of affordability measure that regulates the price for a limited group of consumers with limited financial means. Broader income support schemes, as part of social welfare programs, can also account for energy needs and include direct payments to help people with lower wages to cover living and energy costs. Due to the recent energy crisis in Europe, many countries adopted temporary emergency responses to ease price pressures and support the affordability of energy.

The second set of measures addresses the root causes behind energy poverty with structural measures that combine financial measures, regulation and capacity building on the consumer side. In terms of financial instruments, grant schemes provide households with the financial resources to invest in energy efficiency measures. Vulnerable households are particularly reliant on this option, given the lack of resources for upfront costs. Low-interest loans can complement grants by assisting households in paying the expenses for energy-related investments. Tax policies are used to increase the cost of fossil-fuel based energy and incentivize the adoption of energy-efficient technologies or practices. This can potentially influence the consumers' behavior to a certain extent but without supplementary measures, additional taxes only increase the energy costs for vulnerable households.

Policy-wise, supplier obligations create legally binding responsibilities for energy suppliers to support the implementation of energy transition measures, taking for example the form of energy efficiency improvements or the roll-out of smart meters. New standards specifically target buildings or households' appliances and incentivize or force the adoption of innovations and energy-efficient products. Moreover, extensive information and advisory services raise awareness among consumers about energy use and effective methods to reduce energy consumption. One-stop shops streamline the process of undertaking energy efficiency improvements, while social workers, information campaigns and associations provide advice on energy savings on a local level. Lastly, countries adopt energy efficiency measures that help energy-poor households to save energy. Since the EED requires annual energy savings of Member States, countries can impose legal targets on energy providers to contribute to achieving these goals. Other initiatives related to energy efficiency concern the EU energy labeling and ecodesign legislation that sets minimum standards for transparency regarding the worst-performing products of a market. The renovation strategy of the Commission contributes to renovating energy-inefficient buildings, which are often occupied by energy poor households.

In light of the research question, measures aimed at addressing the root causes of energy poverty are of prime interest to this analysis. These measures are linked to more substantial energy efficiency gains among vulnerable households that can help combat energy poverty, as confirmed by the European Parliament (Widuto, 2023) and the experts interviewed during the research. Moreover, structural measures are identified as key enablers of deeper decarbonisation in the European housing sector (Observatoire de l'Immobilier Durable, 2022).

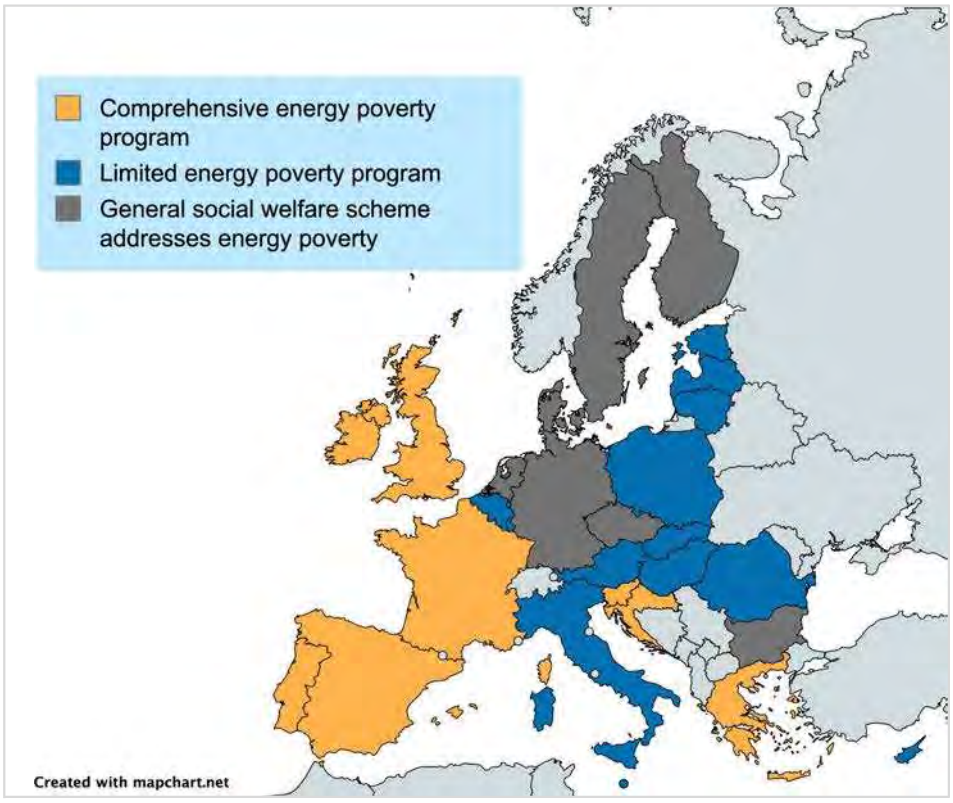
4.2 Overview of Policies and Utility Engagement in the EU27 and UK

To provide a comprehensive overview of efforts addressing energy poverty and the implementation of EEOS within the framework of Article 8 of the EED, an in-depth analysis of national initiatives across all EU27 countries and the UK was conducted. The findings of this analysis are summarized in a

high-level table (see Table 2), structured around two main sections. The first examines each country's overall strategy and initiatives aimed at addressing energy poverty, based on the classification of measures outlined in the previous section. The second section assesses the involvement of energy utility companies in implementing these initiatives, focusing on the implementation through EEOS.

The analysis reveals a significant diversity in approaches to tackling energy poverty, with some countries adopting affordability measures, while others focus more on structural measures aimed at enhancing energy efficiency of buildings and reducing overall energy consumption. A common trend is that recent events, such as the COVID-19 pandemic, surging energy prices and the Russian invasion of Ukraine, have drawn increased attention to the issue. This has led to a widespread adoption of emergency measures, focusing on temporarily increasing energy affordability. Another notable finding is that, despite all experiencing energy poverty to different extents, many of the examined countries still lack a legally binding definition and/or a dedicated national strategy aiming at comprehensively addressing the issue. Based on the findings, the analyzed 28 countries can be classified into three broader categories: those with *comprehensive energy poverty programs (A)*, such as France, Greece, Ireland, Spain and the UK; countries with *limited energy poverty programs (B)*, adopting dedicated measures, but lacking a comprehensive strategy include Austria, Belgium, Italy, Poland and Romania; and countries that incorporate energy poverty into *general social welfare schemes that address energy poverty (C)*, such as Denmark, Finland, Germany, the Netherlands and Sweden (see Figure 2). These trends often reflect the priority attributed to the issue within the national political agendas. For instance, in Northern Europe, energy poverty seems to be generally less of a concern and therefore, it lacks a dedicated national program, whereas several Southern European countries such as Greece, Portugal and Spain, where energy poverty is more widespread, have implemented dedicated strategies to tackle the issue.

Figure 2 - Classification of energy poverty schemes in the EU27 and the UK



Source: Own creation based on findings in Table 2

The involvement of utilities also varies significantly across Europe, with only a minority of countries legally mandating for energy suppliers to implement measures specifically targeting energy-poor and vulnerable households. Notable among these countries are Ireland, the UK and France. As of 2024, 17 countries have an EEOS that is directly reported under Article 8 of the EED (see Table 2). Typically, the implementation of an EEOS is supplemented with alternative measures. However, among the identified schemes, only Ireland, the UK and France have incorporated a ring-fence for addressing energy poverty. Specifically, Ireland mandates 5% of EEOS targets to be achieved in energy-poor homes, whereas in France the corresponding figure stands at 36%. In the UK, since 2018, the entire scheme has been directed towards energy-poor households. Despite the absence of a ring-fence, four countries - Austria, Cyprus, Croatia, and Greece - have provisions for energy-poor households, with actions undertaken in low-income households being eligible for a bonus or uplift factor (ENSMOV, 2022). Specifically, in Greece, until 2017, energy savings initiatives benefiting low-income and vulnerable households were awarded a bonus factor of 1.4, while in Austria and Cyprus, this currently stands at 1.5. In Croatia, uplift factors range from 1.1 to 1.3, depending on whether the actions target special state welfare areas and/or vulnerable customers, although their utilization has been limited so far (SocialWatt, 2023b). The type of implemented EEOS models also vary among the analyzed countries. In most cases, these models specify measures on a case-by-case basis, and there is

considerable variation in sector eligibility criteria across countries. However, overall, they all mainly focus on delivering energy savings through the provision of energy services (like energy audits and inspections), awareness campaigns, and efficiency improvement measures. Details regarding the cases of the frontrunners Ireland, the UK and France will be elaborated on in the next section.

4.3 Case Studies (Ireland, UK and France)

Ireland, the UK and France are all categorized as countries with comprehensive energy poverty programs (listed as category *A*) in Table 2) and were selected because they showcase exemplary schemes. They are currently the only ones that allocate a portion of the energy savings target specifically to energy-poor or vulnerable households, having anticipated the latest changes in Article 8, paragraph 3 of the revised EED (although not applicable to the UK). Moreover, the frontrunner role of these three countries was also confirmed during the interviews regarding the national transposition of energy poverty-relevant articles of the EED and utility-run schemes.

a) Ireland

Ireland takes a leading role in Europe when it comes to involving energy utility companies in large-scale energy efficiency schemes for addressing energy poverty. The Irish efforts are communicated in a transparent manner and energy poverty is recognized as a serious problem. This is highlighted by the fact that Ireland has already published two national strategies for tackling energy poverty. Ireland involves energy utilities in their EEOS by legally mandating large energy suppliers to assist with the implementation of energy efficiency measures and including a certain sub-target for energy savings among energy poor homes (SocialWatt, 2023b). To be more specific, large energy suppliers are described in this context as "Obligated Parties (OPs)" and include all companies that sell more than 400GWh of energy per year to final customers. Since 2017, in the Irish EEOS, 5% of the targets have to be achieved in energy-poor households. This energy poverty ring-fence is outlined in detail in the Irish energy poverty strategy and since 2014, more than 65 000 houses at the risk of energy poverty have been supported under the EEOS (Government of Ireland, 2022). In the current period of 2022-2030, eligible energy efficiency measures must be directed towards deeper renovation reaching at least a B2 energy rating in favor of stand-alone and shallow measures (SocialWatt, 2023b).

The Sustainable Energy Authority of Ireland (SEAI), orchestrates the national efforts and works together with energy utilities to distribute grants to eligible homeowners. Currently, it manages three grant programs. One of them – the "Fully Funded Energy Upgrades" – provides a free energy upgrade to homeowners who are entitled to receive welfare benefits and own a home with poor energy performance (SEAI, n.d.-b). This program is jointly funded by the Government of Ireland and the EU,

and it normally takes two years of waiting time until the upgrade of the house is completed. In 2022, roughly 4 400 low-income households used this scheme to upgrade their house (O'Sullivan, 2023). On top of that, the OPs in Ireland typically collaborate with one-stop shops and project coordinators to hand out additional financial support to the vulnerable households, complementing the grant scheme.

Electric Ireland, which is Ireland's largest energy supplier, serving roughly 50% of national energy customers, is one OP that collaborates with the SEAI to offer energy efficiency upgrades, including new wall insulations and new heating systems or windows, to energy poor households as part of the "Fully Funded Energy Upgrades" (SEAI, n.d.-a). In this case, Electric Ireland only refers their customers to the SEAI which fully administers the scheme. However, Electric Ireland complements this scheme by crediting parts of energy efficiency investments to all of its customers' (not only energy poor households) energy bills after the upgrades to their homes have been completed (Electric Ireland, 2020). Table 3 shows a detailed overview of the financial support that is offered by Electric Ireland for each designated type of action to homeowners. Once the work is completed, Electric Ireland reviews performed energy upgrades and credits the previously specified amount to the linked Electric Ireland account. More than EUR 3.9 million worth of credits were provided so far to roughly 9 000 customers. Apart from that, Electric Ireland set up its own one-stop shop that is called Electric Ireland Superhomes and offers comprehensive home energy retrofits to improve energy efficiency (Electric Ireland, n.d.-a). In this process, the company implements for example air source heat pumps, ensures high standards of insulation, airtightness and an advanced ventilation for indoor air quality. To finance the services of the one-stop shop, energy poor customers can access grants under the program "One Stop Shop Service" that are administered again by SEAI. Lastly, Electric Ireland offers detailed information and useful links for its customers on energy efficiency with specific energy saving tips that can help to address excessive energy consumption (Electric Ireland, n.d.-b).

b) UK

The UK has been at the forefront of addressing energy poverty, officially defined as "fuel poverty" since as early as 2000. Its commitment is exemplified by the implementation of dedicated national strategies across all UK nations, with the earliest dating back to 2001 (SocialWatt, 2023b). However, what truly distinguishes the UK's approach is its proactive involvement of energy companies in EEOS targeting specific energy poverty objectives, with the earliest initiatives starting in 1994 (Broc et al., 2020).

The Energy Company Obligation (ECO) stands out as a key initiative, requiring obligated energy companies to enhance the energy efficiency of the least efficient housing occupied by low-income and vulnerable households, thereby contributing significantly to the overarching goal of combating fuel

poverty (UK Department for Business, Energy and Industrial Strategy, 2021). When still a member of the EU, the UK directly reported its ECO initiatives under Article 8 of the EED (SocialWatt, 2023b). Since its launch in 2013, the scheme has undergone four iterations and has successfully delivered over 3.2 million measures in over 2.3 million households. What makes this scheme noteworthy is that, while initially allocating around 40% of its resources towards energy-poor households, by 2018, its entire focus became shifted towards combating energy poverty (SocialWatt, 2023b).

The latest version, ECO 4, was adopted in July 2022 and will cover all measures over a period of four years until March 2026 (Ofgem, 2023). ECO 4 imposes an overarching obligation, known as the Home Heating Cost Reduction Obligation, on medium and large energy companies, requiring them to implement measures to enhance the heating capabilities and reduce the energy consumption of low-income, fuel-poor, and vulnerable households. This involves fulfilling two additional sub-obligations, the Solid Wall Minimum Requirement and the EFG minimum, which ensure, respectively, the installation of solid wall insulation in eligible premises and upgrades for homes with lower energy efficiency ratings (Ofgem, 2023). These obligations encompass a wide spectrum of measures, including boiler upgrades, installations of first-time central heating, repairs and heating system controls, as well as various insulation improvements (see Table 4 for a comprehensive overview of all eligible measures).

Complementing the ECO 4, in April 2023 the UK government introduced the Great British Insulation Scheme, designed to operate until March 2026. Previously known as ECO+, this initiative also mandates medium and large energy companies to implement energy efficiency improvements in the least energy-efficient homes in order to reduce their energy consumption (Ofgem, 2023). It requires the delivery of single insulation measures in support of a broader range of households, encompassing not only those with the lowest income but also those living in homes with Energy Performance Certificate ratings of D-G and within Council Tax bands A-D in England and A-E in Scotland and Wales (UK Department for Energy Security & Net Zero, 2022).

As of the 2023 legislation[1], large and medium-sized energy suppliers have a legal obligation to engage in both ECO 4 and the Great British Insulation Scheme provided that they meet defined threshold criteria, assessed based on customer numbers and supply volumes (Ofgem, 2023). Among the obligated parties under both schemes is British Gas, the largest energy supplier in the UK. Through these schemes, British Gas offers eligible vulnerable consumers a range of cost-free home improvements designed, not only to reduce their energy bills, but also to lower carbon emissions.

[1] The Electricity and Gas (Energy Company Obligation) Order 2023 No. 873.

These improvements encompass loft and wall insulation, installations of air-source heat pumps, as well as complimentary home consultations for solar panel installations (British Gas, n.d.). Notably, utilities such as British Gas will be instrumental in insulating more than the 300 000 homes foressen annually under the Great British Insulation Scheme set up by the government (Centrica Plc, 2024).

Another relevant initiative implemented by the UK within the framework of Article 8 of the EED, is the Warm Home Discount (WHD), running since 2011 and prolonged until March 2026. This scheme mandates energy suppliers serving more than 1 000 consumers to assist low-income, fuel-poor households, or those vulnerable to cold-related illness, by offering an annual discount on customer bills, typically amounting to GBP 150 (SocialWatt, 2023b). Support is frequently extended through supplementary 'Industry Initiatives', which may include various activities, such as free energy advice and assisting with the resolution of energy debts. While structured similarly, the WHD is divided into a scheme for England and Wales, and one for Scotland. For Northern Ireland, a parallel scheme known as Affordable Warmth is in place (Ofgem, 2024).

c) France

Since the introduction of "Grenelle 2" law in 2010 to combat energy poverty, the French government has implemented around 50 measures to address this issue (Legros & Martin, 2022). The French EEOS has been in place since 2006, with growing obligations in each new period. In 2016, the EEOS was modified with the introduction of an additional obligation dedicated to low-income households (Osso et al., 2020). From 2018 to 2021, the total obligation was 1 200 terawatt-hours cumulative (TWhc), including 400 TWhC of low-income certificates. Under this framework, companies must finance renovation works to decrease the energy consumption of buildings occupied and owned by households that have an income below a threshold, depending on the number of the household. For households classified as "very low-income households", the amount of certificate that the company gets is doubled. This definition of "low-income households" encompasses around 40% of French households, reflecting the broad scope of the initiative.

Launched in 2020, MaPrimeRénov is an example of the French government's efforts to tackle energy poverty through energy efficiency measures. This grant can be used by all homeowners to partially cover the cost of installing energy efficient improvements in their homes. Compared to the former tax credit, MaPrimRénov is simpler, more efficient and it has a progressive element, where assistance is granted on a means-tested basis, meaning that the income of applicants must be in the very modest, modest or intermediate brackets (IEA, 2023b). Utilities involved in the scheme can obtain energy savings certificates for carrying out thermal renovations in eligible households.

The most prevalent providers across France Électricité de France (EDF) and Engie are financial contributors to the MaPrimeRénov Programme, which has renovated more than 240 000 homes since its inception (EDF, 2023). The two utilities supplement grants for home renovations given by French National Housing Agency (ANAH) to low-income and very low-income households and, in return, benefit from the allocation of energy-saving certificates.

Both utilities also have other measures in place to combat energy poverty in France. For example, EDF has been a key partner in the Fondation Abbé Pierre's "Toits d'abord" program. This partnership helps to effectively combat energy poverty by creating and rehabilitating so-called social housing at very moderate rents for people in most precarious economic situations. Within the last decade this program produced 6 200 energy-efficient homes for more than 13 000 of the most disadvantaged households throughout France (Fondation Abbé Pierre, 2023). In addition, EDF provides direct assistance via over 300 EDF experts working in "solidarity teams" with social workers to provide most vulnerable customers with the best possible support through financial aid, debt repayment, training and awareness-raising initiatives on energy savings and bill explanation (EDF,2023).

Since 2010 ENGIE has contributed EUR 6 million annually to the Fonds de Solidarité pour le Logement (FSL), providing financial assistance to help households access or remain in housing (ENGIE, 2024b). This aid applies to both public and private rental accommodation. The conditions for granting these subsidies, as well as the operating procedures of the fund, are determined by each Département. FSL grants can be used for anything linked to a household's well-being, thus also for paying electricity bills or renovation. Other support initiatives include financing partnerships with social mediation associations to support its most vulnerable customers. A total of 200 mediation associations, trained and supported by ENGIE, are there to inform and guide customers with payment difficulties on how to control energy costs, the safety of their installation and energy efficiency measures (ibid.). Through an annual budget of around EUR 1 million, roughly 30 000 ENGIE customers are supported each year.

4.4 Insights from Interviews with Experts

The previous sections integrate key points derived from discussions with experts in the field of energy poverty and reflect their main inputs. Overall, the perspectives of the experts corroborate the findings of the desk research. For example, the three broad country categories were mirrored in the interviews. One expert stated that some countries *"don't necessarily differentiate it [energy poverty], like* [...] *Scandinavian countries,* [...] *they do have such strong social welfare measures already in place".* The experts furthermore emphasized the importance of governmental action such as national energy poverty strategies, legal definition, ring-fencing and eligibility criteria related to deep renovations, as

is reflected in the frontrunner case studies. Regarding ring-fencing, another expert stated that *"it really does change the landscape"*. Furthermore, encouraging comprehensive retrofitting is important since, as emphasized by a third expert, *"... if you really want to get a major impact, you need deeper renovation"*.

Moreover, there are some additional findings that merit attention. Experts were asked if energy efficiency schemes targeting energy poverty reduction in Europe are moving in the right direction at the right pace. Almost unanimously, all interviewees agreed that energy efficiency schemes targeting energy poverty in Europe are moving in the right direction, particularly since the last revision of the EED in 2023. However, opinions were more nuanced when assessing the pace at which countries are promoting more schemes aiming to alleviate energy poverty, with many interviewees neither agreeing nor disagreeing on this matter.

Many experts highlighted significant differences between countries and the challenges associated with comparably assessing policy performance in this area. These largely stem from the lack of a unified definition of energy poverty and little homogeneity in the indicators used across countries, as was concurrently highlighted by the desk research. Additionally, the varying degrees to which energy poverty is already addressed through general social welfare systems contribute to this complexity. Experts noted that countries are still in the process of implementing the latest recast of the directive, suggesting that changes in policy and approach are likely to occur in response to this framework. Said movements have been identified through the desk research, including in general social welfare category countries such as Denmark and Sweden, who have both indicated the possibility of establishing a definition of energy poverty (Energimyndigheten, 2023; Energistyrelsen, 2023a).

Regarding the involvement of utilities, experts pointed out that, while there is an interest for utilities to address energy poverty due to the energy crisis that has been increasing the risk of their customers defaulting on energy bills, the main drivers pushing utilities to adopt schemes targeting vulnerable households for achieving energy savings are still policies and regulations rather than market forces. They acknowledged the important role of utilities, especially major players in the market and those companies still, at least partially, state-owned in addressing energy poverty as they supply a large segment of the population. This is demonstrated by the three case studies since these three front-runner countries present strong legal provisions for utilities to act on energy poverty and utilities often are publicly or partly publicly owned.

For existing utility schemes highlighted during the interviews, experts emphasized that the most impactful schemes are generally those accessible to all types of households, with only a few

specifically targeted at vulnerable or energy-poor customers. They noted that schemes targeting these specific socio-economic groups face a range of barriers that utilities need to address effectively.

When asked about how easy it is for vulnerable households to access the support that is offered the experts responded that there are challenges related to accessibility. They explained that the procedures to apply for support in energy efficiency schemes can be lengthy and technical, requiring a lot of knowledge and information that affected households might not have. Additionally, there are still significant cost-related, social and cultural barriers that are not adequately addressed by some utility schemes in place, such as the requirement for co-financing by the beneficiary or the need for an energy audit and other more invasive investigations into the economic situation of the applying household.

5. Policy Analysis and Status of the Implementation and Impact of EEOS

5.1 Slow Progress of Utilities

As presented in preceding sections, policy approaches aimed at addressing energy poverty differ significantly between analyzed countries, exhibiting varying degrees of engagement of utilities. Many EU countries have yet to legally define energy poverty, and employ diverse measures to comply with Article 8 of the EED. A lof of them either rely solely on EEOS, with distinct definitions of obligated parties and scheme eligibility criteria, alternative measures, or both to achieve energy savings in vulnerable households. These diverging national policy approaches and the subsequent lack of standardization make comparing countries and identifying specific utility schemes challenging.

Due to this, the authors leaned heavily on expert interviews and supplemented utility scheme data with verifiable information from desk research. Overall, more information on utilities was available in countries with EEOS in place, compared to those using alternative measures only. The findings highlight 24 utility schemes designed to address energy poverty through energy efficiency measures.

Based on insights from expert interviews, utilities lack clear economic incentives to invest in more expensive and structural energy efficiency measures, i.e. deep renovation, for vulnerable households. This challenge is compounded by political strategies that prioritize immediate cash assistance, especially during crises, that provide temporary relief to households to ensure social coherence and acceptability. However, subsidizing the cost of energy often results in artificially low prices, reduced competition, limited consumer choices, and diminished incentives for consumers to adopt structural

energy efficiency measures, which could negatively impact energy security and decarbonization efforts.

Given that affordability measures alone do not effectively address the root causes of energy poverty and may conflict with broader climate and energy policies, schemes that invest in long-term structural improvements to achieve deeper decarbonization and reduce inequalities are essential. These prioritize reducing household energy consumption by enhancing the energy efficiency of buildings and appliances, promoting behavioral changes, and supporting the adoption of renewable energy sources.

5.2 The Role of National Policies

Most of the utility schemes involving structural investments in energy efficiency for energy-poor homes identified in this research were either initiated as part of EU-funded projects and/or continue to receive substantial government support. Notably, there is a strong link between the extent of policy encouragement to prioritize energy efficiency in energy-poor homes and the prevalence of relevant utility schemes.

Best practices of structural energy efficiency measures through utility schemes were identified in countries with national policies that clearly mandate utilities to achieve a certain share of energy savings in vulnerable household groups. Some countries even tie eligibility for energy savings certificates to structural measures, such as more costly energy renovations, as exemplified in Ireland.

The highlighted case studies predominantly involve state-owned utilities or companies with continued state involvement or a legacy status in their markets. For instance, EDF in France is a 100% state-owned utility that was renationalized in 2023 (De Beaupuy, 2023), and the French government owns 23.64% of Engie's shares (Engie, 2024). Electric Ireland is majority-owned by the Irish Government, holding 96.9% of shares (ESB, n.d.), and British Gas, now a subsidiary of Centrica, has a longstanding history as a public utility company in the UK (Centrica, 2024).

The findings reveal that most schemes in the EU27 and UK are not entirely self-run by utilities and often rely on significant government support for implementation. Another key consideration is the scale of these schemes; data on the reach of the schemes is often limited, making it challenging to precisely assess the impact in terms of achieved energy savings and assistance to vulnerable households. However, data from identified best practice examples offer indicative insights into the scale and impact of schemes across the EU27 and the UK.

For instance, in the Electric Ireland case, which involved significant structural assistance, 9 000 vulnerable households were assisted through the scheme. Considering that the Economic and Social

Research Institute estimates that 29% (or roughly 520 000) of Irish households were energy-poor in 2022 (Government of Ireland, 2022), the proportion of households in need reached is lower than 2%.

In the UK, there have been positive outcomes in terms of the scale of the ECO scheme, although the specific contributions of individual obligated parties are not known. Between 2013 and 2021, measures were installed in 2.4 million households under the ECO schemes, reaching around 40% of all 6 million households currently considered energy-poor (National Energy Action, n.d.). The more recently government-created Great British Insulation Scheme, aiming to carry out installations in 300 000 homes annually, would help around 15% of all current energy-poor households until 2026. Regrettably, data on the impact expected by particular utilities under this scheme, especially key players like British Gas, are not available.

In contrast, the "Toits d'abord" program which is supported by EDF in France, assisted 13 000 households living under the poverty threshold between 2012 and 2022. However, when considering the approximately 440 000 households in energy poverty in France in 2021 (Ministry of Ecological Transition and Territorial Cohesion, 2023), this scheme aided only around 3% of those in need over the decade, highlighting the overall limited reach and effectiveness of utilities in addressing the problem. This highlights, as pointed out by one of the experts, the challenging trade-off between effectiveness and scale often experienced when establishing energy efficient support schemes to vulnerable households.

5.3 Challenges to Engage Utilities

Based on these observations, schemes focused on structural measures for energy efficiency still rely on government support and often struggle to reach many vulnerable or energy-poor households. Experts emphasized that effectiveness could be impaired by the obstacles for utilities in identifying energy-poor households. To address this, Electric Ireland has partnered with local authorities to leverage more detailed data for better identification. Yet, utilities generally lack the capacity to account for different intersectional aspects of energy poverty, such as gender, geographic location, and high-poverty levels. High-poverty households may need to increase energy consumption to achieve a decent living standard, while rural households often face challenges accessing support. In the UK, a specific sub-target for rural households has been established to address this issue. To ensure a comprehensive response to energy poverty, utilities must involve vulnerable groups and social welfare organizations in scheme design and implementation.

It is also important to consider the overall energy performance of housing and the structure of home tenure in different countries, which can impact the effectiveness of energy renovations, especially

when split incentives exist between owners and tenants. For example, in Ireland, around half of the population living below 60% of the median equivalised income in 2022 owned their dwellings, compared to only 28% in France and similarly low rates in Austria, Germany, Denmark, Sweden, Finland, the Netherlands, and Belgium (Eurostat, 2024b). In these countries with higher rates of home renting, utilities face challenges in developing and implementing schemes to support energy renovations because they require involvement from owners who may not directly benefit from the improvements made to their real estate.

5.4 Economic Considerations

Given the challenges of investing in dispersed, small-scale households with higher risk profiles, it is understandable why targeted utility schemes are less prevalent in Europe. This underscores the critical role of governments in derisking such investments, especially in countries where a significant portion of the population struggles to keep their homes adequately warm, lives in lower-quality dwellings, yet exhibits high rates of homeownership among lower-income quintiles, such as Bulgaria, Cyprus, Greece, Lithuania, Portugal, Romania, and Spain.

From the utility perspective, engaging in schemes for vulnerable households is also driven by the costs associated with supporting this segment of their customer base. For instance, in countries like France and Ireland, where utilities are more involved, over 20% of the population living in relative poverty had utility bill arrears in 2020 (Eurostat, 2024a). This figure rises to more than 50% in Greece, while it is significantly lower in countries like Austria and the Netherlands (less than 6%). In these cases, besides moral or legal obligations, there is a clear demand-side push for utilities serving vulnerable households to engage in schemes that prevent revenue losses.

However, utilities must realize that this economic calculus could be a double-edged sword. While it might appear economically sound to ignore less affluent customers, failing to support energy efficiency for vulnerable and energy-poor households exacerbates social and climate inequality. This approach contradicts a just transition and neglects the growing threats of climate change that could worsen existing inequalities. Ultimately, neglecting energy poverty issues could also harm the economic outlook for utilities in the long run, as growing cooling needs in hotter summers due to climate change, are likely to increase the risk of energy poverty. Estimates suggest that in the future, Greece, Italy, Portugal, and Spain alone could account for around two-thirds of the average annual energy use for cooling in residential buildings in the EU (Jakubcionis & Carlsson, 2017).

Against this backdrop, governments, utilities, and other relevant stakeholders such as social welfare institutions and NGOs need to increase collaboration to future-proof the European approach to

understanding and tackling energy poverty within a changing climate. They should seek to establish a stable and somewhat standardized framework for addressing this issue, minimizing policy risk for obligated parties and thereby, enabling more effective and long-term investments from utilities into structural measures that help the most vulnerable households.

6. Conclusion

The role of utilities in addressing energy poverty remains largely unexplored in academic research and their potential for developing effective solutions untapped in practice. Examples of utility-run energy efficiency schemes targeting vulnerable or energy-poor consumers are sparse across the EU27 and UK. The most advanced schemes that are implemented by utility companies to address energy poverty can be found in Ireland, the UK and France. Many initiatives from energy utilities focus on advisory or information-based schemes that do not sufficiently address the root causes of energy poverty. This is likely due to the challenge of achieving a return on investment on more costly structural measures such as energy renovations through dispersed and small-scale household-level projects.

This study shows that the extent to which utilities have set up energy efficiency support schemes targeted to vulnerable consumers, as established under the EED, across the EU27 and UK remains at an early stage and can still be enhanced in the future. It was found that 17 countries have set up an EEOS but only 3 countries (France, Ireland and UK) have designated targets for vulnerable households in their EEOS while 4 countries incorporated uplift factors to incentive savings among the vulnerable. Furthermore, in total 24 utilities in 11 countries were identified to carry out some kind of energy efficiency schemes with the objective to alleviate energy poverty. The level at which energy poverty is integrated into national policies on energy efficiency seems to be correlated with the extent to which utilities implement larger-scale, impactful schemes to reduce energy poverty. Currently, most extensive and impactful schemes are predominantly set up, coordinated, and managed by government agencies and/or heavily supported by social welfare associations. Utilities are generally more passive in addressing energy poverty, mostly responding only to their energy savings obligations within a provided framework for regular compliance.

When utilities run their own schemes for alleviating energy poverty, the communication around the existence, implementation, monitoring, and evaluation of these schemes is lacking. Additionally, the criteria used to determine which schemes are eligible to contribute towards achieving energy savings obligations are not standardized, making comparisons between countries and utilities challenging. This highlights the need for improved collaboration and transparency between stakeholders to effectively address energy poverty through utility-led initiatives. Finally, this research demonstrates

that even within countries, inconsistent policies and regulatory uncertainty related to the energy transition, energy security, and energy poverty pose challenges for utilities, making it difficult to justify long-term investments in projects with planning horizons that extend beyond typical legislative cycles.

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Annex

Table 1 - Indicators for Energy Poverty

#	**Indicator**
1	Inability to keep home adequately warm
2	Arrears on utility bill
3	High share of energy expenditure in income
4	Low absolute energy expenditure
5	Share of individuals living in households which spend more than 10% of their budget on residential energy electricity, natural gas,liquid fuels for heating like heating oil, solid fuels for heating like coal or wood, and district heating)
6	Expenditure on electricity, gas and other fuels as a proportion of total household expenditure
7	Electricity prices for household consumers – average consumption band.
8	Gas prices for household consumers – average consumption band
9	Gas prices for household consumers, lowest consumption band
10	Share of population with leak, damp or rot in their dwelling – total population
11	Final energy consumption per square metre in the residential sector, climate corrected.

Source: (EU Commission, 2023b)

Table 2 - Overview of Energy Poverty Legislation in the EU27 and UK

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
Austria	No (Under development, so-called Energiearmutsdefinitionsgesetz is in the drafting stage).	Yes (Strict reminder procedures, limited ancillary costs of late payments according to social criteria, mandatory contact and advice centers at large energy companies, disconnection protection)	Yes (Advisory services, funding for climate-friendly heating, appliance replacements, funding for renovation)	**B**	Yes (End-use energy savings achieved in households affected by energy poverty are multiplied by the factor 1.5)	Yes - WienEnergie (advisory services) - Kelag (advisory services) - Verbund AG (advisory services, free replacement of devices) - Switch (advisory services)	*(Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2024; Bundesministerium für Nachhaltigkeit und Tourismus, 2019; Klima- und Energiefonds, 2024; Koordinierungsstelle zur Bekämpfung von Energiearmut, 2022)*
Belgium	No	Yes (Social tariff for natural gas and electricity, disconnection during winter, Social Heating Fund, regional governments)	Yes (Energy and renovation grants to improve energy efficiency)	**B**	No	None identified	*(IEA, 2022a)*

[2] Options include: A) Comprehensive energy poverty program, B) limited energy poverty program or C) general social welfare scheme addresses energy poverty

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
Bulgaria	Yes	Yes (Winter supplement and social tariffs for heating)	No	**C**	Yes	None identified	*(Bogdanov & Zahariev, 2022; Ministry of Energy & Ministry of Environment and Water, 2024; ONPE, 2024)*
Croatia	No	Yes (Energy cost compensation, firewood allowance)	Yes (Energy renovation, installation of renewable energy sources)	**A**	Yes (Uplift factors varying from 1.1. to 1.3 for actions in special state welfare areas and for vulnerable customers)	Yes - HEP ESCO d.o.o./ HEP Elektra (energy efficient lighting, advisory services in centers set up around Croatia)	*(Ministry of Spatial Planning, Construction and State Property, n.d.; SocialWatt, 2023a)*
Cyprus	Yes	No	Yes (Saving energy - upgrading of households program to fund renovations; extra financial aid to install photovoltaic system)	**B**	Yes (Uplift factor of 1.5 for actions in energy poor households)	None identified	*(ENSMOV, 2022; EU Energy Poverty Observatory, 2020; Ministry of Energy, Commerce and Industry, 2012)*
Czech Republic	No	Yes (Partially addressed via social policy and subsidy programmes,	No	**C**	No	None identified	*(European Commission, 2023c)*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
		disconnection protection)					
Denmark	No	No (Only exceptional measures during the energy crisis)	Yes (Subsidies for household energy efficiency measures; Advisory services)	**C**	No	None identified	*(Danish Ministry of Climate, Energy and Utilities, 2019; Energistyrelsen, 2023b)*
Estonia	Yes	Yes (Social policies, disconnection protection)	Yes (Reconstruction support programme, grants and loans for energy efficiency)	**B**	No	None identified	*(European Commission, 2023a; PowerPoor, 2020)*
Finland	No	Yes (Social policies)	No	**C**	No	None identified	*(IEA, 2023a)*
France	Yes	Yes (Funds and vouchers)	Yes (Building renovation measures)	**A**	Yes (36% in low-income households, which has replaced the uplift factor of 2 for actions in very low-income households)	Yes - EDF (advisory services, renovation support) - ENGIE (advisory services, renovation support)	*(European Commission, 2023b; European Commission, 2021; EDF, 2022; ENGIE, 2024)*
Germany	No	Yes (Basic energy	Yes (Local initiatives	**C**	No	None identified	*(SocialWatt, 2023b)*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
		needs as part of minimum subsistence level that includes housing benefit; relief package for energy crisis)	to provide counseling on energy savings)				
Greece	Yes	Yes (Social tariff; financial support covering energy bills; energy vouchers; subsidies)	Yes (Action Plan for Alleviating Energy Poverty; energy communities; information and education; subsidies and free-interest loan for energy efficiency interventions)	**A**	Yes (Since 2021 savings in low-income households get a bonus factor of 1.4 for technical measures)	Yes - PPC	*(SocialWatt, 2023b); (Greek Government, 2021)*
Hungary	No	Yes (Disconnection protection for vulnerable households)	Yes (Loans or savings account to support housing renovation)	**B**	Yes	None identified	*(EU Energy Poverty Observatory, 2020; IEA, 2022b)*
Ireland	Yes	Yes (Fuel allowance to provide direct support to cover	Yes (Free energy upgrades; better energy warmer homes	**A**	Yes (5% of EEOS targets have to be achieved in energy	Yes - Electric Ireland	*(EnergyMeasures, 2021; EU Energy Poverty Observatory, 2020;*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
		heating costs; electricity & gas allowance)	scheme; communities energy grant scheme)		poor homes)		*Government of Ireland, 2022; SocialWatt, 2023b)*
Italy	No (National strategy against energy poverty planned)	Yes (Rebates on energy bills; electricity and gas bonuses; tax reductions)	Yes (Income tax deductions for energy efficiency renovations; white certificates)	**B**	Yes (White certificate, but no target and mostly involving non-residential sector)	Yes - Enel - eVISO	*(SocialWatt, 2023b); (Ministero dell'Ambiente e della Sicurezza Energetica, 2023)*
Latvia	Yes	Yes (Social policies)	Yes (Energy efficiency programme)	**B**	Yes	No	*(European Commission, 2020)*
Lithuania	No	Yes (Heating compensation for households that cannot afford sufficient heating;	Yes (Support with cost of loans to renovate a building; government-sponsored programs for EE improvements in multi-apartment buildings	**B**	Yes (most energy suppliers have an obligation towards the Ministry of Energy to make public the agreements on energy saving)	Yes (energy suppliers are legally required to commit to educating and advising households on energy efficient measures to achieve energy savings of 3 TWh due to changes in consumer behavior)	*(CA EED, 2022; EU Energy Poverty Observatory, 2020; European Commission, n.d.)*
Luxem-bourg	No	Yes (Subsidy schemes, zero-interest rate	Yes (Energy efficiency renovations)	**B**	Yes	None identified	*(IEA, 2020)*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
		loan)					
Malta	No (discussions about indicators)	Yes (Energy benefit scheme with financial assistance to cover electricity and LPG Bills)	Yes (House visits to raise awareness for energy savings)	**B**	Yes	None identified	(Department of Social Security Malta, n.d.; EU Commission, 2023b; EU Energy Poverty Observatory, 2020)
Netherlands	No	Yes (Disconnection protection measure for vulnerable households; overall national poverty alleviation and welfare programs)	Yes (Local initiatives of energy advisors visiting households; energy saving mortgage to support increasing energy efficiency of vulnerable homeowners)	**C**	No	None identified	*(EnergyMeasures, 2021; EU Energy Poverty Observatory, 2020; Middlemiss et al., 2020)*
Poland	No	Yes (Caps for energy prices)	Yes (Incentives for energy efficiency renovations; designated strategy against energy poverty	**B**	Yes (White certificates, but no subtarget)	None identified	*(Polish Economic Institute, 2023)*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
			planned)				
Portugal	Yes	Yes (Social tariff for energy; tax reductions on bills)	Yes (National Long-Term Strategy for the fight against Energy Poverty; energy efficiency vouchers; improved access to energy communities; improved knowledge and access to information)	**A**	No	Yes - EDP	*(SocialWatt, 2023b)*
Romania	Yes	Yes (Relief package during energy crisis with price ceilings, compensation of bills and energy vouchers)	Yes (National strategy on social inclusion and poverty reduction; national long-term renovation strategy)	**B**	No	Yes - CEZ Vanzare	*(EU Energy Poverty Observatory, 2020; SocialWatt, 2023b, 2023c)*
Slovakia	Yes	Yes (Social policies)	Yes (Renovation support via MunSEFF and SlovSEFF programmes and energy efficiency	**B**	No	None identified	

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
			advice via Live Energy measure)				
Slovenia	No	Yes (Energy bonuses; general income support)	Yes (Action Plan to Alleviate Energy Poverty for 2024-2026; investment support and guidance for energy efficiency improvements; inclusion in energy communities)	**A**	Yes (No subtarget)	None identified	*(GOV.SI, 2024); (Stropnik, 2022)*
Spain	Yes	Yes (Bonuses for electricity and thermal energy; tax reductions; cap on natural gas tariff increase; minimum vital supply)	Yes (National Strategy against Energy Poverty; information services on saving practices; grants for energy renovation of buildings; white certificates)	**A**	Yes (financial contribution to National Energy Efficiency Fund and white certificates, but no subtarget)	Yes - Naturgy	*(SocialWatt, 2023b); (Gobierno de España, 2019)*
Sweden	No (Addressed through the general	No (Only exceptional measures during the energy crisis)	Yes (Advisory services on municipality level; subsidies for solar panels; grants for	**C**	No	None identified	*(Energimyndigheten, 2024; Regeringskansliet, 2023)*

	Country-level				Utility-level		
Countries	**Is there an official energy poverty definition?** (Yes / No)	**Measures to address energy affordability (= prices/subsidies)?** (Yes / No)	**Measures to address root causes of energy poverty with structural measures?** (Yes / No)	**Classifi-cation of energy poverty schemes** (A / B / C)[2]	**Are utilities subject to an EEOS?** (Yes / No; if yes & applicable, are there provisions for vulnerable households?	**Is there at least one energy utility company implementing a scheme targeting vulnerable households?** (Yes / No; if yes, which one?)	**Sources**
	welfare system)		energy efficiency measures in houses)				
UK	Yes	Yes (Energy tariff caps; rebate on energy bills; tax reductions; income support as part of the social welfare program)	Yes (National strategies for energy poverty; delivery of energy efficiency and heating measures by energy suppliers; social housing decarbonisation fund; advise and support)	**A**	Yes (Energy Company Obligation, since 2018 the entire scheme targets energy poor households; 15% are supposed to occur in rural areas)	Yes, all medium and large energy companies are obligated parties under ECO, including: - British Gas - Ecotricity - Scottish Power - EDF - SSE Electricity - Octopus Energy - E (Gas and Electricity) Ltd - Shell Energy - So Energy - The Utility Warehouse	*(SocialWatt, 2023b); (UK Government, 2000); (Ofgem, 2023)*

Table 3 - Electric Ireland Energy Efficiency Incentive Scheme

Job completed	Electric Ireland Credit (maximum credit)
External Wall Insulation	€472
Attic Insulation	€104
Internal Dry Lining Insulation	€400
Boiler Upgrade	€150
Heating Controls Upgrade	€128
Fully Integrated Heating Controls Upgrade with Remote Access	€325.60
Full Window Replacement	€132
Solar Water Heating Installation	€132
Biomass Boiler with Thermal Store and Fully Integrated Heating Controls Upgrade with Remote Access	€745.60

Source: (Electric Ireland, 2020)

Table 4 - ECO 4 Measures Table

Tenure type	Owner Occupied	Private rented sector	Social housing	Social housing
Starting SAP band	SAP Band D to G	SAP Band E to G	SAP Band D	SAP Band E to G
Boiler - Upgrade to a non-renewable heating system	✓	×	×	×
Boiler - Upgrade to a renewable heating system	✓	✓		
Boiler - Repair of a broken heating system	✓	×	×	×
Boiler - Replacement of a broken efficient heating system	✓	×		
First Time Central Heating	✓	✓		✓
ESH - Upgrade to an HHR electric storage heater in a home without solar PV	✓		×	
ESH – Upgrade to an HHR electric storage heater in a home with solar PV	✓	✓		
ESH - Repair or replacement of a broken efficient ESH	✓	×	×	×
Connection to a district heating system	✓	✓	×	✓
Heating controls - Compensation, P&RT, Smart thermostat, TRV, TTZC	✓			
Solar PV				
External / Hybrid / Internal insulation of a solid wall	✓	✓		✓
External / Hybrid / Internal wall insulation of a cavity wall	✓			✓

Cavity Wall Insulation - including partial fill and party wall insulation measures	✓			✓
Loft Insulation	✓			✓
Pitched Roof Insulation	✓			✓
Flat Roof Insulation	✓			✓
Room in Roof Insulation	✓			✓
Underfloor Insulation	✓			✓
Solid Floor Insulation	✓			✓
Draught Proofing	✓			✓
Window Glazing	✓			✓
Higher Performance External Doors	✓			✓

Colour	Description
	Boiler measures include the installation of renewables: Air to water ASHP, GSHP, Biomass Boiler and Fuel Cell mCHP.
	Properties in social E-G can receive IMs
	Measure eligible under certain conditions

Source: Ofgem, ECO 4 Delivery Guidance (2024)

Annex A - Interview guide

Interview questions

Part 1: A general outlook on EU27+UK energy poverty efforts

1. ***Statement***: Energy efficiency schemes targeting energy poverty reduction in Europe are moving in the right direction at the right pace. Meaning that initiatives are aligned with the intended goals and are making effective progress in addressing energy poverty:

   Scale: Strongly disagree to strongly agree

   a. For "agree" to strongly "disagree": What are the main push factors?

   b. For "disagree" to strongly "disagree": What are the main roadblocks?

2. **Do you see any frontrunners among the EU member states and the UK in terms of transposition and national implementation of the part of the EED that is related to energy poverty?**

   a. If yes: Please name three frontrunner countries but also elaborate on the biggest policy gaps you see.

   b. If no: What is the stage the most countries are stuck in? Also, please elaborate on the biggest policy gaps you see.

   c. We are familiar with for example the SocialWatt, EnergyMeasures and ENPOR projects, do you know of any other projects aiming at introducing energy efficiency schemes aimed at addressing energy poverty in the EU or UK that you would recommend us to contact/look into? Or elsewhere?

3. **From your experience in the field, how do most of the existing energy efficiency schemes normally work?**

   a. Including:

      i. How do energy poor consumers usually access the support that is offered?

      ii. How are responsibilities divided, in terms of who provides what services to consumers (incl. authorities, utilities, etc.)?

iii. How are they usually financed?

4. **Are there any utilities doing prominent work on energy efficiency schemes aimed at energy poverty (Yes/No)**

   a. What specific work are these doing?

   b. If possible to judge: Who are the most active utilities in this regard?

   c. What are the main issues utilities face for obtaining info on energy poverty and engaging in energy efficiency schemes addressing energy poverty?

5. **Statement:** Please put yourself in the shoes of a member in an energy poor household and answer the following: It is easy to access institutional support for energy efficiency.

   Scale: Strongly disagree to strongly agree

   a. For "agree" to strongly "disagree":

      i. What specific support measures do you find accessible?

      ii. What factors do you attribute to the ease of accessing institutional support for energy efficiency in your experience?

   b. For "disagree" to strongly "disagree":

      i. How do you think the current system or process for accessing institutional support for energy efficiency could be improved?

      ii. Are there alternative sources of support for energy efficiency initiatives due to challenges with institutional support? If so, what were they?

      iii. In your opinion, what role could institutions or policymakers play in addressing the difficulties faced by energy poor households in accessing energy efficiency support?

Part 2: Your project

1. **Since the project is now concluded, could you please elaborate on how you plan to manage the project outputs generated thus far?** Specifically, what strategies or arrangements are in place for the utilization, dissemination, or preservation of the project outcomes?

a. Are you seeking to continue the project?

   i. If yes: What do you think are the prospects for a continuation of the project and what would a second phase entail?

   ii. If no: Why?

b. Do you believe it will ensure sustainable energy poverty alleviation through the project actions?

2. Who are the main stakeholders that have been involved in the project?

a. Could you identify the key stakeholders essential for ensuring the effective delivery of benefits to energy poor households?

3. What do you think are the biggest successes of the project you were coordinating/ involved in?

a. Do you think these can be replicated throughout EU Member states + UK through similar projects?

   i. *If yes:* Under what conditions?

   ii. *If no:* What are the major barriers?

4. What were the main barriers or challenges for the project implementation?

a. *If not mentioned:* related to EU, national, utility and household level?

b. What were the greatest challenges to recruiting households for the energy engagement programmes (if any)? How open were households to participating?

[Updated] Interview questions

1. ***Statement***: Energy efficiency schemes targeting energy poverty reduction in Europe are moving in the right direction at the right pace. Meaning that initiatives are aligned with the intended goals and are making effective progress in addressing energy poverty:

   Scale: Strongly disagree to strongly agree

   a. For "agree" to strongly "disagree": What are the main push factors?

   b. For "disagree" to strongly "disagree": What are the main roadblocks?

2. **Do you see any frontrunners among the EU member states and the UK in terms of transposition and national implementation of the part of the EED that is related to energy poverty?**

   a. If yes: Please name three frontrunner countries but also elaborate on the biggest policy gaps you see.

   b. If no: What is the stage the most countries are stuck in? Also, please elaborate on the biggest policy gaps you see.

   c. We are familiar with for example the SocialWatt, EnergyMeasures and ENPOR projects, do you know of any other projects aiming at introducing energy efficiency schemes aimed at addressing energy poverty in the EU or UK that you would recommend us to contact/look into? Or elsewhere?

3. **Are there any utilities doing prominent work on energy efficiency schemes aimed at energy poverty (Yes/No)**

   a. What specific work are these doing?

   b. If possible to judge: Who are the most active utilities in this regard?

   c. What are the main issues utilities face for obtaining info on energy poverty and engaging in energy efficiency schemes addressing energy poverty?

4. **In what way were utilities supported through SocialWatt and how did it translate into energy efficiency schemes for energy poor households?**

a. Have the utilities that participated continued the scheme and if so have they elaborated it further?
b. Do you perceive the schemes as replicable and if so, what are the main enablers?

5. **Were the utilities supported through SocialWatt previously acting on energy poverty?**

6. **Statement:** Please put yourself in the shoes of a member in an energy poor household and answer the following: It is easy to access institutional support for energy efficiency.

Scale: Strongly disagree to strongly agree

a. For "agree" to strongly "disagree":

i. What specific support measures do you find accessible?

ii. What factors do you attribute to the ease of accessing institutional support for energy efficiency in your experience?

b. For "disagree" to strongly "disagree":

i. How do you think the current system or process for accessing institutional support for energy efficiency could be improved?

ii. Are there alternative sources of support for energy efficiency initiatives due to challenges with institutional support? If so, what were they?

iii. In your opinion, what role could institutions or policymakers play in addressing the difficulties faced by energy poor households in accessing energy efficiency support?