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Special Issue

Current Developments in Renewable Energy Communities: Decentralization, Integration and Local Opportunities and Challenges for the Energy System





Edited by

Dr. Johannes Reichl, Dr. Johannes Slacik and Prof. Dr. Mehmet Efe Biresselioglu



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Lessons Learnt and Policy Implications from Implementing the POWERPOOR Approach to Alleviate Energy Poverty

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Abstract: Energy poverty is a multifaceted phenomenon that affects many Europeans. Alleviating energy poverty is high in the EU, national, and local policy agendas. Despite the attention the phenomenon has been gaining from a policy perspective, especially after the current energy crisis, there are still some gaps due to the complexity of the issue and its vastly different manifestations across Europe. This manuscript presents the policy implications stemming from the implementation of the POWERPOOR approach in alleviating energy poverty in eight European countries, as co-created with relevant stakeholders in each country. The knowledge gained from empowering energy-poor citizens by promoting behavioural changes and small-scale energy efficiency interventions, as well as by encouraging the uptake of renewable energy sources in the form of collective energy initiatives while leveraging innovative financing schemes, resulted in policy recommendations for national and sub-national governments and lessons for civil society and the private sector.

Keywords: energy poverty; policy recommendations; joint energy initiatives; innovative financing schemes; stakeholder co-creation; Europe



Citation: Kanellou, E.; Hinsch, A.; Vorkapić, V.; Torres, A.-D.; Konstantopoulos, G.; Matsagkos, N.; Doukas, H. Lessons Learnt and Policy Implications from Implementing the POWERPOOR Approach to Alleviate Energy Poverty. *Sustainability* **2023**, *15*, 8854. <https://doi.org/10.3390/su15118854>

Academic Editors: Johannes Reichl, Johannes Slacik and Mehmet Efe Biresselioglu

Received: 1 March 2023

Revised: 9 May 2023

Accepted: 24 May 2023

Published: 31 May 2023



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1. Introduction

Energy poverty is a multifaceted phenomenon that is typically associated with low household income, high energy prices, and energy-inefficient homes. It is argued to have severe impacts on human health, including increased numbers of winter or summer deaths, detrimental effects on mental health, and respiratory and circulatory problems [1]. In 2020, about 35 million Europeans were unable to keep their homes adequately warm [1]. The issue is expected to exacerbate following the energy crisis, which has been partly driven by the COVID-19 pandemic, and further intensified by rising gas and electricity prices more recently impacted by demand–supply dynamics following Russia’s invasion of Ukraine in February 2022.

Tackling energy poverty is a prerequisite to a just energy transition that enhances energy democracy [2], and these priorities are well intertwined in the EU policy agenda. The Union displayed early ambitions in becoming the world’s first climate-neutral continent by 2050 [3]. The Clean Energy for All Europeans policy package [4] back in 2019 aimed at leaving no one behind and highlighted the need to identify energy-inefficient residential buildings and vulnerable people, and to develop effective strategies toward renovating the former and empowering the latter. The revised EU energy efficiency directive [5] framed energy poverty mitigation as an obligation for member states and further focused on tackling the phenomenon by raising awareness, such as via the operation of one-stop shops of information for citizens and concrete guidance for local authorities. The EU Green Deal [6] also mandated that the energy transition be just and socially inclusive, with the

Renovation Wave [7] being a cornerstone for this effort. More recently, the REPowerEU strategy for reducing the bloc's dependence on Russian gas explicitly aims to protect vulnerable consumers from the volatility of energy prices [8].

However, despite this increasing attention in the European policy world, there remain critical gaps in mitigating energy poverty in the region due to its complexity and its vastly different manifestations across member states.

This research draws from the results and lessons learnt from the EU-funded research and innovation project, POWERPOOR, and presents the policy implications resulting from the project implementation. This research initiative aims to facilitate behavioural change and enable the uptake of renewable energy sources and energy efficiency measures that can significantly reduce final energy consumption. It puts citizens at the heart of the solution to the problem by providing information and training sessions, while promoting the uptake of joint energy initiatives and leveraging innovative financing schemes with the potential to play a key role in addressing the associated urgent challenges. At the same time, it seeks to provide tools and guidance to local authorities to include energy poverty mitigation actions in their planning and to add the energy poverty mitigation dimension to their services by establishing an energy poverty alleviation office, acting as a one-stop shop of information for energy-poor citizens. The policy recommendations stem from implementing the POWERPOOR approach in tackling energy poverty in eight EU countries: Bulgaria, Croatia, Hungary, Greece, Estonia, Latvia, Portugal, and Spain.

We first present the current policy efforts in mitigating energy poverty on an EU level, before offering an overview of the regional context in the eight countries. We then outline the general approach followed to draft the policy implications as well as discuss and cluster the resulting policy recommendations and actions per country, according to the needs of different stakeholder groups.

2. EU Policy Efforts in Alleviating Energy Poverty

The European Commission has designed advanced and ambitious policies to tackle energy poverty, committing to protect vulnerable households. In the 2019 "Clean Energy for All Europeans" package, energy poverty was placed among the region's top energy policy priorities. Provisions for dealing with energy poverty have since been introduced in a series of European directives. Indicatively, Directive 2019/944/EU [9] outlined the internal electricity market measures aiming at protecting vulnerable and energy-poor consumers in the context of the internal electricity market (social or energy policy measures to help pay electricity bills), launching investments to improve energy efficiency and/or protect consumers (including prohibition of disconnection of energy-poor consumers in critical periods), as well as providing measures other than public interventions in setting the prices for the supply of electricity. For the internal gas market, following up on Directive 2009/73/EE [10], Directive 2019/692/EE [11] then detailed provisions for protecting energy-vulnerable households and prohibiting their disconnection in critical periods. Targeting energy efficiency, Directive 2018/2002/EC [12] had already outlined measures to tackle energy poverty and lower consumers' vulnerability, while Directive 2018/844/EU [13], outlining the energy performance of buildings and the long-term renovation strategy of the built environment, had explicitly included actions and measures to alleviate energy poverty in European households, according to criteria established by the Member States; these complemented Regulation 2018/1999/EU [14] (Governance of the Energy Union and Climate Action), which required that the consolidated National Energy and Climate Plans (NECPs) of EU Member States include estimates of the number of energy-poor households, setting a national target to mitigate energy poverty and provide reports on progress towards said target, number of energy-poor households, and associated policy measures.

It is, therefore, evident that energy poverty has been high on the European Commission's energy agenda, especially amidst an ever-raging energy crisis that has been partly driven by the COVID-19 pandemic, and more recently, the skyrocketing gas and electricity prices caused by changing demand–supply dynamics and Russia's 2022 invasion

of Ukraine. In response, the REPowerEU strategy, coupled with targeted national measures to reduce reliance on imported gas from Russia, sought to protect vulnerable households from rising energy prices. Considering the role of lifestyle shifts in increasing resilience to such shocks, as well as in achieving climate and energy targets in the region [15], the strategy further encourages the adoption of behavioural changes that can prompt energy efficiency, alongside measures for increasing the energy savings target (from 9% to 13%), diversification of energy supplies, a new “joint purchasing mechanism” for gas imports, accelerated roll-out of renewable energy to replace fossil fuels (increase of the 2030 target from 40% to 45%), and reduction in fossil fuel use in industry and transport [16]. To support the above policy, additional smart investments must be provided by all sectors (private and public) and at different levels (national, cross-border, and EU). The “Fit for 55” package [17], adopted in July 2021, had already proposed specific measures to identify key drivers of energy poverty risks for consumers, such as too high energy prices, low household income, and poor energy-efficient buildings and appliances, considering structural solutions to vulnerabilities and underlying inequalities. Additionally, even before that, the Energy Performance of Buildings Directive [18] had indicated the need for new buildings to be nearly zero-energy buildings (NZEB), further stressing the importance of mitigating energy poverty in the EU. Part of the policy efforts to alleviate energy poverty for the Commission is the creation of the Energy Poverty Observatory [19] followed by the Energy Poverty Advisory Hub [20]. The main aim of this project is to collect the resources needed to map the phenomenon of energy poverty across Europe and develop a set of indicators to better assist the Member States to identify energy poverty at a local level as a first step to formulating strategies to tackle the phenomenon.

Even though all these strategies and policies have paved the way towards the uptake of retrofitting and renewables in dwellings to mitigate energy poverty, there are still challenges that may hinder progress. These challenges vary depending on the vastly different characteristics of the dwellings, the regions (i.e., social, economic, climatic), and the different types of tenures and ownership. From a geographic perspective, the vulnerability of citizens in Central and Eastern European countries can be attributed to the legacies of a centrally planned economy, such as the poor thermal insulation of housing stock, the historically low energy prices, and the predominance of an unsustainable supply mix [21,22]. However, energy poverty is present in Western and Northern European countries as well; the issue there tends to be constrained to specific demographic groups or types of housing. It is thus principally linked to the inability to purchase “affordable warmth/cold” [23] among energy-poor households living in energy-inefficient homes.

It should be noted that, in 2021, nearly 7% of the EU population was unable to properly heat their home, especially in southern European countries [24]. Bulgaria was leading the way, with one out of four people affected, followed by Lithuania and Cyprus. The countries selected in the POWERPOOR project—i.e., Bulgaria, Croatia, Hungary, Greece, Estonia, Latvia, Portugal, and Spain—also manifested a high percentage of people unable to keep their homes properly warm, featuring an old and energy-inefficient building stock, notably increased energy prices over the last year, as well as a lack of a common definition of energy poverty and of indicators monitoring the phenomenon.

3. The Regional Context in the Selected Countries

The state of play for the eight selected countries is further investigated by identifying whether energy poverty mitigation actions are included in key policy areas, i.e., in the National Energy and Climate Plans (NECPs), in renovation actions for the building sector, in social care policies, in policies aimed at enhancing community ownership of energy and encouraging the uptake of innovative and collective financing schemes, in the regulation of the energy market (e.g., social tariffs, tax incentives), in policies ensuring consumer protection, and finally in whether energy poverty mitigation is included in the sustainable energy and climate action plans (SECAPs) of municipalities.

In Bulgaria, the NECP includes in its objectives a reduction in the level of energy poverty through dedicated measures within the internal energy market dimension. It also promotes building stock renovation and improving the energy efficiency of vulnerable households [25]. Specifically, for the building sector, financial support has been given to increase energy efficiency through retrofitting interventions and uptake of RES in vulnerable households and social housing buildings; however, the energy poverty aspect is not explicitly covered in the relevant directives [26]. The energy market in Bulgaria is phasing out regulated prices with a gradual transition towards a full liberalisation of the electricity market, exposing the consumers to price volatility [27]. To protect vulnerable consumers, a mechanism has been established that includes a set of criteria for identifying vulnerable households and financial and non-financial measures to protect them [28]. There is no provision of policies promoting community ownership of energy and collective financing schemes have not been incorporated into the national law so far. The energy market is highly regulated and dominated by a few energy supply providers, while the market's dependency on fuel imports from Russia is high. In this landscape, no social tariffs are provided, while a programme that incentivises the replacement of heating system appliances in municipalities with poor air quality is currently in progress. Similarly, there are no social tariffs for vulnerable consumers in place, but at the beginning of the COVID-19 crisis, a social protection scheme against electric supply disconnections was launched; however, it lasted only during the winter season of 2019/2020. Finally, a few Bulgarian municipalities have developed an energy and climate strategy, or SECAP, and many of them have promoted energy efficiency or RES actions; however, only six have designed actions mitigating energy poverty.

In Croatia, the NECP is currently being developed [29]; however, energy poverty mitigation actions are included in the current national plans. A long-term strategy for the renovation of the national building stock until 2050 is in place, and several programmes are running that prioritise citizens at risk of energy poverty [30]. These citizens, however, are mainly targeted using the welfare system and that may exclude a lot of vulnerable, energy-poor citizens, or at-risk-of-energy-poverty citizens. As for the social care, the guaranteed minimal support programme provides financial assistance for housing costs, including electricity, gas, and heating bills to households that do not have enough funds to meet basic life needs; however, it is not focused on energy-poor citizens. Citizen and renewable energy communities have been defined but provisions for their establishment and operation are still being developed. Similarly, a directive promoting collective finance is in place; however, further provisions are needed. For consumer protection, vulnerable energy customers are given "energy vouchers" which are calculated according to the fluctuations of the energy prices and are financed by a solidarity fee paid by the energy providers. A variable one-time cash payment for energy costs has been given to pensioners and families with children. The criteria for acquiring the status of vulnerable energy consumer have been established, and the tasks of the suppliers and the competent centre for social welfare are described officially. Except for households, allowances have been given to other structures, e.g., nursing homes, to enable them to tackle high energy prices. A one-time policy to write-off unpaid debts, interest, and other related costs, including energy debts to unblock a person's energy account, ran only during the year 2018. A guaranteed electricity supply to cover social and municipal consumers (e.g., kindergartens, schools, hospitals, households with elderly, public infrastructures, etc.) is also provided. Energy poverty measures have been introduced in only three SECAPs, mainly on promoting building renovations of vulnerable family houses, soft energy efficiency measures, and an energy poverty alleviation office as a one-stop shop of information providing energy consulting and assistance to energy-poor households.

In Estonia, the NECP that was developed in 2019 reports the number of households affected by energy poverty, estimating that it is close to the EU average and is mainly caused by cooling, while heating is not that problematic [31]. Regarding the building sector, building renovations under the national long-term strategy do not take energy

poverty into account. Energy poverty is also not officially addressed as an independent issue but listed under the general definition of poverty mitigation. However, the “Energy Sector Organization Act” sets aside the energy poverty definition from the Social Welfare Act and recommends a relevant framework for supporting the energy poor for building renovations and energy self-consumption actions in respect to social care. To promote community ownership of energy, the Energy Sector Organisation Act introduced the “renewable energy community” definition but set neither clear national target numbers nor recognise the vulnerable consumers as a focus group. Collective financing policies are promoted through grants for solar panels of apartment buildings and apartment building renovation loans. In the field of energy market, subsidies were given to minimise the impact of high energy prices in 2021–2022. Households and businesses were given an 80% refund for the electricity, gas, and district heating costs. There were no protective measures identified for the consumers, except for the subsidies for energy bills. Lastly, Tallinn and Tartu local energy plans point out that there is a need to address energy poverty and propose measures to mitigate it, mainly through the establishment of energy cooperatives, awareness-raising campaigns, and supporting provisions for maturing home renovations.

In Greece, the goal of addressing energy poverty is stated in the NECP developed in 2019 as part of the clean energy and energy efficiency axes of action [32]. The long-term renovation strategy accompanies the NECP and places special emphasis on the energy retrofitting of the Greek building stock to zero energy consumption, addressing energy poverty indirectly, while there is legalisation allowing tax deduction for households that undertake energy efficiency interventions. A heating allowance to aid with heating expenses and compensate for the increase in fuel prices over the last few years has been given, namely the Minimum Guaranteed Income/Social Solidarity monthly income, the social tariff for electricity, water supply, and municipal costs, and housing allowances for tenants that are offered to support vulnerable households in respect to social care. Energy communities have been defined covering a broad spectrum of activities, municipalities, and regions that plan to support energy vulnerable households through energy community schemes, and these are supported through various funds. As for the policies to promote collective finance, the regulatory framework has been updated only to remove barriers to cross-border crowdfunding within the EU. A significant number of incentives and allowances are given to support citizens against high energy prices. Special protective measures are provided (by all electricity and gas suppliers) to enable vulnerable energy consumers to access the full benefits of the liberalised energy market. These measures consist of a protection framework against disconnection of electricity and gas supply for those in need, the partial payment of energy bills, and support to those who need energy for special issues (extreme weather conditions, health support, etc.) to ensure consumer protection. As for the SECAPs, about 25% of Greek municipalities have declared commitments for energy poverty mitigation on the covenant of their mayors’ platforms. However, only a few municipalities have actively promoted energy poverty mitigation actions in their action plans.

In Hungary, energy poverty alleviation provisions are not included in the NECP [33]. The National Building Sector Strategy sets the goals and a roadmap for the modernisation of the domestic real estate stock and a significant reduction in energy demand until 2030, while the long-term Building Renovation Strategy sets the path for achieving a sustainable energy and cost-efficient domestic building stock by 2050 through energy efficiency, value, comfort and health improvements measures, renewable energy, and smart technology usage. Energy poverty is not covered in the social care aspect but there are provisions for poverty mitigation. Policies to promote community ownership of energy include a framework for electricity/energy communities that was only set up in 2020 and detailed regulation is missing. In practice, there are no established energy communities, except for a few pilot cases. For collective finance promotion, there are active websites allowing crowdfunding; however, there is no specific national regulation. Moreover, a household utility cost reduction programme allows energy prices to be independent from market

prices and has fixed them at a low level (since 2013). It covers natural gas, electricity, district heating, and piped water services. There is no carbon or energy tax on residential households. Lastly, as for SECAPs, only the Józsefváros Municipality supports low-cost measures and interest-free loan options for large household appliance modernisation, while making efforts in targeting energy-poor households and supporting them.

In Latvia, official national targets are set in the NECP for reducing energy poverty and ensuring a fair transition, improving innovation, research, and competitiveness, and ensuring that relevant measures to protect vulnerable energy customers and reduce energy poverty are taken [34]. Although there are energy performance targets for buildings, no relevant national long-term strategy has been elaborated so far. The National program for improvement of energy efficiency in multi-residential buildings grants 50% of the eligible costs for the refurbishment and energy efficiency measures [35]. During the recent rise of the energy prices starting from 2021, financial support was provided to all households. Referring to policies to promote community-ownership of energy, a law defining energy communities has been in force since July 2022, but regulations set by the Cabinet of Ministers are yet to be developed. Collective finance in Latvia is not widespread yet. Regarding consumer protection, there are some measures for vulnerable consumers in place. Ultimately, three SECAPs have incorporated energy poverty alleviation measures, such as increasing the energy efficiency of residential buildings, promoting energy self-generation for self-consumption, setting up of a behavioural change awareness campaign, and demanding response through smart meters.

In Portugal, a long-term strategy to combat energy poverty is in place; however, a NECP has not yet been developed [36]. For the building sector, existing actions to renovate buildings are covered by the Resilience and Recuperation Plan 2021–2026, including actions for increasing energy efficiency in private and public buildings; however, energy poverty has not been addressed [37]. Some social tariffs are in place but are not targeting energy-poor households. Laws for renewable self-consumption as well as energy communities are in place in order to promote community ownership of energy, in contrast to promotion of collective finance where there are no relevant policies. Regarding the energy market, there is a family support package measure (2022–2023) that reduces the VAT rate in electricity. An energy bill protection mechanism supports families that face difficulties in paying for energy and a mechanism is being developed to identify the energy poor. Lastly, there are no measures to alleviate energy poverty in SECAPs.

Spain's integrated national plan for climate and energy for 2021–2030 includes the protection of vulnerable consumers, households, and companies, in addition to the energy saving and renovation measures already adopted [38]. The long-term strategy for the building sector was updated in 2020 and gives special attention to vulnerable households when providing public grants, as well as when designing support mechanisms. The National strategy against energy poverty 2019–2024 is based on the four axes of improving awareness of energy poverty, improving the response to the current situation of energy poverty, creating a structural change for the reduction in energy poverty, and promoting consumer protection measures and social awareness. Laws for the regulation of administrative, technical, and economic conditions for electricity's self-consumption and laws defining measures for simplification of administrative procedures to improve the access to renewable energy sources are enforced to promote community ownership of energy. The Law 5/2015 for the promotion of business financing establishes a legal regime for participatory financing platforms (crowdfunding). In the field of energy, urgent measures for the protection of consumers and the introduction of transparency in the wholesale and retail markets for electricity and natural gas have been in place since 2021 to inform customers of changes in contract conditions one month in advance. Moreover, a previous law on transparency in the wholesale and retail markets for electricity and natural gas provides customer protection against price volatility. Finally, no measures alleviating energy poverty in SECAPs have been identified. In Table 1 the regional context in the eight countries is summarised.

Table 1. Regional context in the eight countries across the policy axes.

	National Energy and Climate Plans (NECPs)	Renovation Wave/Building Sector	Social Care	Policy to Promote Community-Ownership of Energy	Policy to Promote (Collective) Finance/Crowdfunding	The Energy Market (e.g., Social Tariffs/Tax Incentives)	Consumer Protection	SECAPs
Bulgaria	✓	-	✓	-	-	-	-	-
Croatia	-	✓	✓	✓	✓	✓	✓	-
Estonia	✓	-	-	✓	✓	✓	✓	-
Greece	✓	-	✓	✓	✓	✓	✓	-
Hungary	-	-	-	✓	-	✓	-	-
Latvia	✓	-	✓	✓	-	-	✓	-
Portugal	-	-	-	✓	-	-	✓	-
Spain	✓	✓	✓	✓	✓	✓	✓	-

Most of the countries have a national and energy climate plan in place that covers energy poverty mitigation. Even in those without an NECP in place that explicitly covers such a provision, there exist other action plans or strategies that include energy poverty alleviation. Hungary and Portugal have not yet included energy poverty mitigation in the national action planning. As for policies taking energy poverty into account in renovating and retrofitting the building sector, most of the countries do not take energy poverty into account. If they do, it happens indirectly, as for instance in Greece. Similarly, in policies aimed at providing social care, energy poverty is not taken into account and most of the measures are given using a welfare approach. This is justified since, in most of the countries, energy poverty is not yet defined, and vulnerable households are identified only using the welfare system. Although the potential of leveraging joint energy initiatives in Central and Eastern European countries is huge, the overall quantitative contribution of energy communities/cooperatives to the energy generation, and the implementation of energy crowdfunding projects, are quite scant. What is more, in some of the countries there are some policies regulating the energy market and there are some policies aimed at protecting consumers, but they have limited effect and they are mainly emergency measures taken to protect consumers in light of the rising energy prices. Finally, in most of the countries, municipalities have developed a SECAP or a similar action plan; however, only a few cases include energy poverty mitigation actions.

In this respect, the uptake of actions aimed at facilitating behavioural changes and the uptake of renewable energy sources and energy efficiency measures that can significantly reduce final energy consumption, putting citizens at the heart of the solution through a gradual transition from an energy-poor citizen to that of an informed consumer and later an active prosumer, can play an important role in accelerating energy democracy. At the same time, promoting energy community projects that have the potential to play a key role in addressing the urgent challenges of energy poverty can be key, as the energy cooperative model allows for closeness with the local community and the creation of an environment of trust where the cooperative forms a central part of the community's activities and helps it become an inclusive, resilient society.

4. General Approach of Co-Creating the Recommendations

To develop policy recommendations, a co-creative approach with key stakeholders was followed. The aim of the recommendations is to promote integrated energy poverty mitigation policies across all regions and cities within the eight pilot countries. To develop them, initially the stakeholders were mapped, and their commitment and mobilisation towards alleviating energy poverty was estimated. The expectations of the different stakeholders in the eight countries in alleviating energy poverty, as well as their influence and expertise, were also assessed. To depict the results of this exercise, the stakeholder universe approach was adopted, as outlined in the Climate KIC Visual Toolbox for system innovation in 2020 [39].

Following up the stakeholder mapping, an assessment of the current policy context in alleviating energy poverty per country took place, as presented above. The assessment of the current situation was useful to align the recommendations to the existing policies and bring forward potential gaps. Now that the stakeholders have been gathered, committed, and the national regulatory context assessed, a common understanding of what alleviating energy poverty actually means for the different stakeholder groups was needed; thus, a vision to alleviate energy poverty per country was set. Focus groups were held with selected stakeholders in each country to validate the assessment of the current policy context and on how realistic the vision that was set is. The composition of the stakeholders that participated in the focus groups were as diverse and gender-balanced as possible, taking into account that both gender [40] and different social aspects [41] play an important role in the multifaceted phenomenon that is energy poverty.

To reach the desired vision, concrete and step-by-step actions were formulated along with the stakeholders across different policy sectors. To better address the different needs of the various stakeholders, the resulting policy recommendations were clustered. The clustering of the stakeholder groups includes recommendations for sub-national governments, national governments, civil society, and the private sector. To depict this exercise, the future radar approach from the Climate KIC Visual Toolbox for System Innovation 2020 [39] was again employed to further enable us to narrow down feasible policy recommendations, as well as to ensure ownership of the actions among the stakeholders who participated in the co-creation process.

5. Policy Recommendations per Stakeholder Group per Country across Policy Sectors

Following the co-creative approach, the policy recommendations per country were developed and clustered in stakeholder groups. All the policy recommendations emerge from experiences and lessons learnt in alleviating energy poverty using the POWERPOOR approach. The four stakeholder groups that are identified are sub-national governments, national government, civil society, and the private sector.

In Bulgaria, the component of energy poverty alleviation needs to be included in the relevant action plans of municipalities, with measures dedicated to supporting energy-poor households (e.g., energy-efficiency actions and technical assistance) and administrative changes within the municipalities (i.e., definition of energy poverty, establishment of a one-stop shop of information, and targeting–planning–monitoring procedures). EU directives should be transposed to Bulgarian legislation to facilitate the development of energy communities in the country. An energy poverty alleviation strategy needs to be designed and implemented. The strategy should be developed with the close collaboration of the different Ministries (Energy, Labour, Social Policy, Finance, Regional Development, Education, and Public Works) to be inclusive and just. Civil society organisations need to contribute to the dialogue when drafting the legislation related to the establishment and operation of successful energy communities and one-stop shops of information need to be established to provide insights about the challenges various social groups may face. Moreover, one-stop shops can play a valuable role in raising public awareness and encouraging stakeholder engagement. Energy providers should work in cooperation with the relevant ministries to provide protection to vulnerable customers (i.e., social tariffs). Building companies should adopt the latest energy efficiency standards for residential buildings and provide their expertise to energy-poor households for technical and financial assistance for energy saving actions. Consultation assistance also needs to be provided by energy appliance companies in cooperation with the one-stop shops that may be established within the structure of local authorities.

In Croatia, municipalities need to incorporate measures for energy-poor households in their SECAPs, as well as collect the required relevant data to be able to identify vulnerable households and adopt indicators to monitor their progress. Creating local energy poverty centers or one-stop shops to assist energy-poor households can be a flagship action within SECAPs. Designing and providing new financial instruments for the renovation

of energy-poor households and creating local schemes for affordable living/housing are recommended. A national strategy for energy poverty alleviation that includes a national definition of energy poverty, clear criteria for targeting energy-poor households, specific measures for alleviating energy poverty, and monitoring mechanisms are the main recommendations in place. Civil society can play an important role in supporting the local and regional governments in establishing one-stop shops, in implementing awareness-raising activities, and in disseminating the various actions in different regions. The private sector can also be an actor in establishing one-stop shops for energy-poor households. The financial/banking institutions can develop new financial tools for supporting energy-poor households.

In Estonia, it is recommended that municipalities plan and implement a wide range of energy poverty alleviation actions, including the provision of technical, legal, and economic counselling to apartment associations, homeowners, and persons who are interested in establishing or joining energy communities, including delivery of awareness raising and education activities enhancing energy efficiency and provision of financial support measures for energy efficiency solutions. The national government can develop a high-level facilitation role on a number of energy poverty related issues, such as legislation and support for renewable energy communities, awareness raising regarding the problem and the ways to mitigate it, technical assistance provision for the standardisation to building retrofitting procedures and documentation, securing the long-term sustainability of relevant financing measures, and development of sustainable housing policy that combines climate and social policies and investments in electric-grid expansions for high RES penetration. Civil society groups and organisations are encouraged to promote activities regarding awareness-raising and education on energy efficiency and energy poverty issues, as well as the engagement of households in community activities (i.e., establishing energy communities) and roundtables to discuss the possible ways to mitigate energy poverty. The private sector can contribute to the development and implementation of new solutions by providing technical and digital support for the building retrofitting of energy-poor households. Such solutions may be renovations with prefabricated panels or the adoption of the digital twin of Estonian housing stock in the design process.

In Greece, it is recommended that local and regional energy governments contribute actively to the dialogue for the definition of energy poverty, give local insights of the phenomenon, establish and reinforce one-stop shops of information, adopt the energy efficiency first principle as a cornerstone to their energy and climate planning, and secure funds and political commitment. In this effort, an action team acting as the municipal facility for the coordination of the relevant actions (support the one-stop shops, setup, financing and running of the energy community, design and implementation of the energy poverty actions, building in-house capacity, etc.), interdepartmental cooperation and dialogue between different governance levels when planning energy poverty mitigation actions are recommended as factors for success in the targeting, data gathering, capacity building, planning, and monitoring of energy poverty alleviation efforts. On a national level, co-creative formulation of an inclusive definition of energy poverty, aligned with the EU and Greek national energy strategy, is a first step. The institutionalisation of the “energy efficiency first” principle in energy poverty alleviation planning and the revitalisation of the National Energy Poverty Observatory are also recommended. Financial and technical assistance to energy-poor households is needed, along with investments in electricity grids and financial support for smart grid solutions. Regarding the legal framework, it is recommended that national authorities institutionalise the self-production (independently or collectively) of a minimum amount of energy for all and ensure the uninterrupted supply of energy to vulnerable citizens. The legislations relevant to energy communities should be upgraded to include energy poverty mitigation as a core part, and procedural and technical barriers should be removed in order to ensure the wide implementation of self-consumption schemes while optimising the electricity and heating allowances framework in such a way that promotes the fair clean energy transition for all. Civil society groups can contribute to

the dialogue for the definition of energy poverty as well as to the reshaping of financing tools providing the energy-poor households' point-of-view. Energy communities should work on mapping the challenges that energy-poor households face towards participating in community energy actions (collective self-consumption, citizen-led renovations, etc.), join forces between themselves and other actors to create mechanisms of mutual support and capacity-building opportunities, and participate in the national dialogue for the energy community legislative upgrade. Civil society groups, including energy communities, along with national authorities and academia, should work on the establishment of an energy supporter/mentor network, be active in public awareness campaigns regarding energy citizenship by activating their communication channels, networks, and tools, and combine forces with municipalities in the establishment of EP mitigation offices. The private sector, which is subject to the Energy Efficiency Obligation Scheme, should enhance cooperation with relevant ministries to redesign building renovation financing schemes for energy-poor households, with the consideration that smart energy meters and the promotion of new digital technologies need to be part of these actions. The network infrastructures and digital tools that support the integration of self-consumption units under versatile schemes should be upgraded. Energy providers and private businesses should promote actions regarding public awareness of energy poverty mitigation actions and facilitate the format of clean energy bills.

In Hungary, it is recommended that municipalities map and assess buildings' thermal conditions within their territory and establish a renovation steering committee to design and promote relevant renovation measures for the least energy effective buildings. A one-stop shop in each municipality can act as a supportive municipal infrastructure to raise awareness on energy poverty, to feed the municipality's energy poverty alleviation strategy, and to provide citizens with customized help. Establishing energy communities can be used in the municipalities' actions against energy poverty. The national government needs to provide funds dedicated to building stock renovation and needs to create financial support mechanisms strictly tied to energy efficiency related measures. Establishment of net-zero certificate requirements for building renovations and removal of administrative barriers in public procurement, as well as recruitment of an energy community framework, are recommended to maximize the impact of energy poverty alleviation actions. Civil society can promote actions to raise awareness about energy efficiency and energy consumption habits, energy communities as a vehicle to fair energy transition and support, or establish one-stop shops that provide support to all citizens that face high energy costs. The private sector is recommended to promote or participate in awareness-raising campaigns both for the wide society and their own staff, organise volunteering events for employees where they can help households living in energy poverty, and actively support the penetration of the renewables in account of vulnerable households.

In Latvia, it is recommended that municipalities establish one-stop shops to alleviate energy poverty, equipped with energy experts to support energy vulnerable households. In this context, one-stop shops are recommended to use the POWERPOOR toolkit to target energy vulnerable households, design energy poverty alleviation actions, and finance collective action at the local level. The national government and the relevant ministries need to accelerate their efforts on sustainable energy production to reduce the energy costs of energy-poor households. This is recommended to be achieved by supporting energy communities and self-consumption schemes, financing energy efficiency measures and RES production, establishing one-stop shops, removing legislative barriers on these topics, and increasing the awareness of citizens. Civil society groups are recommended to support the one-stop shops, raise awareness for the uptake of energy efficiency measures, and encourage the uptake of renewables and energy communities. Self-consumption schemes, electromobility ideally combined with energy self-generation, use of waste heat, and energy efficiency in processes and buildings are seen as possible measures to provide self-sufficiency, reduced energy costs and carbon footprint, and increased efficiency in the private sector.

In Portugal, it is recommended that local governments establish one-stop shops to support energy-poor citizens in undertaking energy efficiency interventions and in mitigating the phenomenon through joint energy initiatives. Municipalities' roles could also be reinforced to develop training and educational activities to encourage the enhancement of energy saving, adopt new tools in targeting and monitoring the phenomenon, and provide support with customised consultation to households. The national government needs to act towards developing an awareness-raising strategy relevant to tackling energy poverty, to show greater political will and capacity to tackle energy poverty effectively, and to support energy communities and cooperatives for better access to renewable energy production. Moreover, subsidies for covering the current energy costs of energy-poor citizens and financial incentives for their participation in energy cooperatives would be highly recommended as relief measures. Civil society groups are needed to activate their channels and networks mostly on promoting awareness-raising and training activities with those in need on subjects such as energy efficiency, air quality, lighting quality, etc. They can also contribute to data collection and monitoring, thus supporting the authorities in mitigating energy poverty. Property management companies should invest more in training their agents to provide clients with a service that is more focused on the energy efficiency of buildings.

In Spain, local governments need to simplify administrative procedures and remove bureaucratic barriers to facilitate support programmes for vulnerable citizens who, in most cases, face a lack of technical capacity for financing tools, applying for supporting programs, etc. Other supporting actions, such as increasing the number of municipal housing stock with thermal comfort and better living conditions, renovation of building stock prioritising the most vulnerable citizens, giving local grants on efficiency measures, provision of resources for establishing one-stop shops, and the creation of coordination networks in each region to improve the coordination between key actors and enhance the implementation of their foreseen actions are also recommended. National authorities can establish a network to gather key entities in the energy poverty field for the development of a national strategy of energy poverty mitigation, and work as a coordinating entity in the relevant aspects. They can also make administrative processes simpler and remove barriers making support programmes for vulnerable citizens accessible, as well as channel more funds for building renovations to the most vulnerable households. Regarding the collective energy initiatives, the national government needs to promote the Social and Solidarity Economy and Financing schemes to protect and empower energy-vulnerable communities and include energy poverty mitigation actions as an obligation of energy communities. The energy certification methodology needs to be updated to consider energy consumption and to have more realistic information about each house, while the institutionalisation of the progressive energy tariff—the energy tariff should take into consideration not only the incomes but the energy usage per capita—and energy market regulation can provide extra support to the energy poor. Civil society organisations can establish networks for support and advocacy of energy-poor citizens and promote awareness-raising campaigns to inform and empower citizens. Energy providers should consider energy poverty mitigation as a goal and provide tariffs depending on the customer's income to make energy an economically accessible service to the consumer. In Table 2 the key policy recommendations per category are summarised.

Table 2. Key policy recommendations to alleviate energy poverty per stakeholder group.

	Sub-National Governments	National Governments	Civil Society	Private Sector
Bulgaria	Include energy poverty mitigation in action planning. Add energy poverty mitigation to social services.	EU directives to be included in the legislation. Development of a national energy poverty alleviation strategy.	Contribute to the dialogue. Raise awareness. Staff one-stop shops.	Adopt the latest energy efficiency standards. Provide financial assistance. Support the development of one-stop shops.
Croatia	Incorporate measures in SECAPs and action planning. Establish one-stop shops. Provide new financial instruments for renovations.	Define energy poverty in a national level and adopt indicators to target the energy poor.	Support regional authorities, raise awareness, and disseminate best practices.	Establish one-stop shops, develop, and provide financing mechanisms.
Estonia	Plan and implement specific measures.	Develop legislative framework regulating joint energy initiatives. Standardise building retrofitting. Make available financing mechanisms.	Promote activities and raise awareness. Educate and disseminate information to the wider public.	Contribute to the development and implementation of new solutions.
Greece	Contribute to the national dialogue sharing local experiences. Establish one-stop shops. Develop a team to implement the actions. Encourage interdepartmental cooperation among different governance levels.	Co-create an inclusive definition. Revitalise the National Energy Poverty Observatory. Reserve sufficient funds. Institutionalise the self-production of energy.	Contribute to the dialogue in developing the definition. Be part of the energy supporters' network. Staff the one-stop shops.	Enhance collaboration with the relevant ministries to redesign financing schemes. Promote actions raising awareness and encourage the uptake of renewables.
Hungary	Assess the buildings' conditions and promote measures to renovate. Establish one-stop shops. Raise awareness.	Provide funds. Bring up to date legislation about energy communities. Remove administrative barriers.	Promote actions raising awareness. Support the one-stop shops.	Promote relevant actions and awareness campaigns. Support the penetration of renewables.
Latvia	Establish one-stop shops, staff them with experts.	Accelerate the efforts of sustainable energy production. Remove legislative barriers for self-consumption.	Support the one-stop shops. Promote relevant actions.	Encourage self-consumption schemes. Promote energy efficiency.
Portugal	Provide training and information. Adopt indicators to target the energy poor and monitor the progress of the relevant actions.	Develop an awareness-raising strategy. Enhance the uptake of renewable energy self-production. Make available financing schemes.	Develop and maintain a network. Raise awareness. Contribute to identifying the energy poor.	Invest in training. Focus on enhancing energy efficiency.
Spain	Simplify the administrative processes. Dedicate funds to renovations. Establish one-stop shops.	Establish a network of experts to monitor the progress of the strategy. Remove bureaucratic barriers. Channel more funds to building renovations. Promote innovative financing schemes.	Support and advocate for the energy poor. Raise awareness.	Energy providers to include energy poverty in their actions. Provide relevant services.

In the eight countries the recommendations vary depending on the local circumstances and on how integrated energy poverty mitigation is in the current agenda. In most of the countries, the recommendation for the national governments is to set a definition for energy poverty and to adopt indicators that can target the energy poor and monitor the progress of mitigation actions. Furthermore, it is recommended to appropriately allocate the available funds keeping the energy efficiency first principle and to promote energy efficiency interventions in households, prioritising the energy poor. It is also recommended to sub-national governments to establish energy poverty alleviation offices as one-stop shops of information providing support and guidance to energy-poor citizens on how to alleviate energy poverty through soft measures (i.e., behavioural changes and small scale energy efficiency interventions), how to implement large scale energy efficiency interventions, and how to take part in community energy projects while leveraging innovative financing schemes. This ties well with the activities of the POWERPOOR project that has developed a toolkit and a guidebook to be used by municipalities to support citizens undertaking energy poverty alleviation actions and has supported municipalities in establishing and operating energy poverty alleviation offices. It is also recommended that information and knowledge need to be provided to citizens about the notion of joint energy initiatives (i.e., energy communities/cooperatives) and how they can benefit from joining and from the uptake of renewable energy. Civil society can help with this by raising awareness and bringing forward the issues of energy efficiency, building renovations, and the available funding schemes. Finally, the private sector is also expected to play a role in democratising energy by promoting relevant actions and raising awareness campaigns.

6. Findings across the EU

Energy poverty mitigation is a key priority in the EU agenda, so a wide range of support actions are provided to Member States and sub-national authorities directly. The latter happens, e.g., within the framework of the EU Energy Poverty Advisory Hub (EPAH) and the new energy poverty pillar of the EU Covenant of Mayors (EU CoM). Both initiatives are good examples of how multi-level governance and policy can promote more effective energy poverty mitigation actions and signatory authorities of the CoM are encouraged to make energy poverty a priority within their SECAPs.

Given the most recent geo-political developments and the rising energy prices, the need to step up the efforts of mitigating energy poverty has been brought forward. The process of developing the policy recommendations has indicated that mitigating energy poverty is not only an energy issue but rather a systems issue, in the sense that it requires action on multiple levels of governance across different sectors. That is why the policy implications from the POWERPOOR approach tie nicely with the current discussions about revising the energy market, establishing the Social Climate Fund, and the “Fit for 55” Package.

Energy poverty mitigation actions go hand-in-hand with actions aimed at increasing the uptake of renewable energy in general as, in the long run, higher penetration of renewables in the energy mix can lower the final cost of energy. Thus, it can be recommended to increase the ambition for the EU’s 2030 renewable targets and for the national binding targets. At the same time, to secure the energy supply and protect consumers from price volatility, it is recommended to promote local ownership of energy. Currently, across the EU, policies that aim to encourage energy-poor citizens to participate in Renewable Energy Communities are lacking. It is recommended for the Commission to work together with the member states to promote such measures and incentivise renewable energy communities as a means of alleviating energy poverty. To support the role of citizens and communities especially in the ongoing energy crisis, it is recommended that the Commission in its Electricity Market Design legislative proposal takes into account the democratic local ownership of renewable energy production and supply and recognise the right of energy communities and local authorities to engage in local renewable electricity production and supply, without becoming a fully regulated retail supplier.

It is also important for the member states to properly use the available funds to support the uptake of renovation efforts and to establish one-stop shops for information sharing and guidance provision to this end at a local level. The available funds, among others, include the Recovery and Resilience Fund (RRF) as well as the upcoming Social Climate Fund (SCF). Furthermore, from a social point-of-view there is the need to establish tariffs or grant schemes to support citizens facing energy poverty. For these schemes to work successfully, best practices must be brought forward as well as the needs and challenges of energy-poor citizens must be identified and explored. To this end, it is recommended to consider, on a European level, the introduction of a more inclusive energy poverty definition and to introduce an indicator set, possibly complementing indicator sets currently used by the European Energy Poverty Advisory Hub and the EU Covenant of Mayors to allow to better identify vulnerable citizens and monitor their progress. Finally, it is suggested to use data-driven approaches and existing technologies to facilitate the identification of energy-poor households and better understand their needs.

7. Conclusions

The effort to develop policy recommendations from implementing the POWERPOOR approach in alleviating energy poverty has resulted in a diverse set of recommendations that speak to the needs of each member state. Even though the circumstances differ in each of the study's countries and energy poverty has multiple manifestations, there emerge some common EU-wide policy recommendations. Since the methodology employed is cyclical and based on a co-creative approach, the recommendations are easy to adapt as time progresses and policies are accelerated through the years. One of the key takeaways of the POWERPOOR approach in alleviating energy poverty is that the need to empower citizens is prominent. Bottom-up approaches should be brought forward, and local authorities should play a crucial role in alleviating energy poverty. Local heroes can play a crucial role in accelerating progress in these bottom-up approaches and training them to understand energy poverty and how to mitigate it is crucial. One-stop shops providing information and guidance to energy poor within the local authorities can also be key. At the same time, energy poverty mitigation actions call for collaboration between the different stakeholder groups. Across the EU, there is considerable, untapped potential of leveraging joint energy initiatives to democratise energy; however, the notion is still not developed at a policy level, and these initiatives remain untrustworthy among the public, especially for the eight countries we studied. Energy poverty mitigation actions need to be brought forward to achieve an energy transition that is just and leaves no one behind.

Author Contributions: Conceptualization, E.K. and A.H.; Methodology, A.H., V.V. and A.-D.T.; Writing—original draft, E.K. and G.K.; Writing—review & editing, E.K., A.H., V.V., A.-D.T. and N.M.; Supervision, H.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: This work was supported by the H2020 European Commission Project "POWER-POOR" under Grant Agreement No. 890437. The responsibility for the content of this paper lies solely with the authors. The paper does not necessarily reflect the opinion of the funding organisation.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. European Commission. Energy Poverty in the EU. Available online: https://energy.ec.europa.eu/topics/markets-and-consumers/energy-consumer-rights/energy-poverty-eu_en#:~:text=Energy%20poverty%20occurs%20when%20energy,their%20health%20and%20well-being (accessed on 23 February 2023).
2. Jenkins, K.E.H. Energy Justice, Energy Democracy, and Sustainability: Normative Approaches to the Consumer Ownership of Renewables. In *Energy Transition*; Lowitzsch, J., Ed.; Springer International Publishing: Cham, Switzerland, 2019; pp. 79–97.
3. European Commission. 2050 Long-Term Strategy. Available online: https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en (accessed on 23 February 2023).
4. European Commission. Clean Energy for All Europeans Package. Available online: https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en (accessed on 23 February 2023).
5. European Commission. Energy Efficiency Directive. Available online: https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive_en (accessed on 23 February 2023).
6. European Commission. A European Green Deal. Available online: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en (accessed on 23 February 2023).
7. European Commission. Renovation Wave. Available online: [https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en#:~:text=The%20Renovation%20Wave%20initiative%20builds,and%20climate%20plans%20\(NECPs\)](https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en#:~:text=The%20Renovation%20Wave%20initiative%20builds,and%20climate%20plans%20(NECPs)) (accessed on 23 February 2023).
8. European Commission. REPowerEU: Affordable, Secure and Sustainable Energy for Europe. Available online: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en (accessed on 23 February 2023).
9. Directive (EU) 2019/944/EU of the European Parliament and of the Council of 5 June 2019 on Common Rules for the Internal Market for Electricity and Amending Directive 2012/27/EU. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019L0944> (accessed on 23 February 2023).
10. Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 Concerning Common Rules for the Internal Market in Natural Gas and Repealing Directive 2003/55/EC. Available online: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0073> (accessed on 23 February 2023).
11. Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 Amending Directive 2009/73/EC Concerning Common Rules for the Internal Market in Natural Gas. Available online: <https://eur-lex.europa.eu/eli/dir/2019/692/oj> (accessed on 23 February 2023).
12. Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 Amending Directive 2012/27/EU on Energy Efficiency. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.328.01.0210.01.ENG (accessed on 23 February 2023).
13. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.156.01.0075.01.ENG (accessed on 23 February 2023).
14. Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.328.01.0001.01.ENG (accessed on 23 February 2023).
15. Cassetti, G.; Boitier, B.; Elia, A.; Le Mouël, P.; Gargiulo, M.; Zagamé, P.; Nikas, A.; Koasidis, K.; Doukas, H.; Chiodi, A. The interplay among COVID-19 economic recovery, behavioural changes, and the European Green Deal: An energy-economic modelling perspective. *Energy* **2023**, *263*, 125798, ISSN 0360-5442. [CrossRef] [PubMed]
16. Frilingou, N.; Xexakis, G.; Koasidis, K.; Nikas, A.; Campagnolo, L.; Delpiazzi, E.; Chiodi, A.; Gargiulo, M.; McWilliams, B.; Koutsellis, T.; et al. Navigating through an energy crisis: Challenges and progress towards electricity decarbonisation, reliability, and affordability in Italy. *Energy Res. Soc. Sci.* **2023**, *96*, 102934, ISSN 2214-6296. [CrossRef]
17. European Commission. “Fit for 55’: Delivering the EU’s 2030 Climate Target on the Way to Climate Neutrality”, 14 July 2021. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0550> (accessed on 23 February 2023).
18. Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the Energy Performance of Buildings. Available online: https://eur-lex.europa.eu/legal-content/EN/ALL/;ELX_SESSIONID=FZMjThLLzfxmmMCQGp2Y1s2d3Tjwtd8QS3pqdkhXZbwqGwlgY9KNI!2064651424?uri=CELEX:32010L0031 (accessed on 23 February 2023).
19. European Commission. Energy Poverty Observatory. Available online: https://energy-poverty.ec.europa.eu/observing-energy-poverty_en (accessed on 23 February 2023).
20. European Commission. Energy Poverty Advisory Hub. Available online: https://energy-poverty.ec.europa.eu/index_en (accessed on 23 February 2023).
21. Robić, S.; Rogulj, I.; Ančić, B. Energy poverty in the Western Balkans. In *Energy Poverty and Vulnerability*, 1st ed.; Simcock, N., Thomson, H., Petrova, S., Bouzarovski, S., Eds.; Routledge: New York, NY, USA, 2017; pp. 202–217.
22. Bouzarovski, S.; Herrero, S.T.; Petrova, S.; Ürge-Vorsatz, D. Unpacking the spaces and politics of energy poverty: Path-dependencies, deprivation and fuel switching in post-communist Hungary. *Local Environ.* **2016**, *21*, 1151–1170. [CrossRef]
23. Boardman, B. *Fixing Fuel Poverty: Challenges and Solutions*, 1st ed.; Routledge: New York, NY, USA, 2009. [CrossRef]

24. World Economic Forum. Here's where Energy Poverty is Felt most in Europe. Available online: <https://www.weforum.org/agenda/2022/11/energy-poverty-in-europe-heating-gas/#:~:text=The%20lowest%20rates%20were%20recorded,these%20figures%20to%20be%20worse> (accessed on 23 February 2023).
25. European Commission. Assessment of the draft National Energy and Climate Plan of Bulgaria. 2019. Available online: https://energy.ec.europa.eu/document/download/98f0b060-fc84-48cf-967d-145b31f2408e_en?filename=bg_swd_en.pdf (accessed on 8 May 2023).
26. Republic of Bulgaria: Ministry of Energy and Ministry of Environment and Water. Integrated Plan in the Field of Energy and Climate of the Republic of Bulgaria. 2020. Available online: https://www.me.government.bg/files/useruploads/files/national_energy_and_climate_plan_bulgaria_clear_22.02.20.pdf (accessed on 8 May 2023).
27. IEA. Bulgaria. Available online: <https://www.iea.org/countries/bulgaria> (accessed on 8 May 2023).
28. The Republic of Bulgaria: Ministry of Labor and Social Policy. Available online: <https://www.mlsp.government.bg/strategii> (accessed on 8 May 2023).
29. European Commission. Assessment of the Draft National Energy and Climate Plan of Croatia. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/hr_swd_en_0.pdf (accessed on 8 May 2023).
30. Republic of Croatia: Ministry of Physical Planning, Construction and State Assets. Official Gazette, No. 120/12, 14/14, 102/15, 68/18. Available online: <https://mpgi.gov.hr/access-to-information/regulations-126/regulations-in-the-field-of-state-assets-management/7028> (accessed on 8 May 2023).
31. European Commission. Assessment of the Draft National Energy and Climate Plan of Estonia. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/ee_swd_en_0.pdf (accessed on 8 May 2023).
32. European Commission. Assessment of the Draft National Energy and Climate Plan of Greece. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/gr_swd_en_0.pdf (accessed on 8 May 2023).
33. European Commission. Assessment of the Draft National Energy and Climate Plan of Hungary. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/hu_swd_en_0.pdf (accessed on 8 May 2023).
34. European Commission. Assessment of the Draft National Energy and Climate Plan of Latvia. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/lv_swd_lv_0.pdf (accessed on 8 May 2023).
35. National Development Plan of Latvia for 2021–2027. Available online: https://www.pkc.gov.lv/sites/default/files/inline-files/NAP2027_ENG.pdf (accessed on 8 May 2023).
36. European Commission. Assessment of the Draft National Energy and Climate Plan of Portugal. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/pt_swd_en_0.pdf (accessed on 8 May 2023).
37. Portugal. Resilience and Recuperation Plan 2021–26. Available online: <https://files.dre.pt/1s/2021/02/02301/0000200105.pdf> (accessed on 8 May 2023).
38. European Commission. Assessment of the Draft National Energy and Climate Plan of Spain. 2019. Available online: https://energy.ec.europa.eu/system/files/2019-06/es_swd_en_0.pdf (accessed on 8 May 2023).
39. Climate-KIC. Visual Toolbox for System Innovation. Available online: <https://transitionsclub.climate-kic.org/publications/visual-toolbox-for-system-innovation/> (accessed on 23 February 2023).
40. European Parliament. The Gender Dimension and Impact of the FITfor55 Package. Available online: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2022\)736899](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2022)736899) (accessed on 8 May 2023).
41. Bouzarovski, S.; Tirado, H.S. The energy divide: Integrating energy transitions, regional inequalities and poverty trends in the European Union. *Eur. Urban Reg. Stud.* **2017**, *24*, 69–86. [CrossRef] [PubMed]

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