White paper

A Just Energy Transition in the EU

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List of acronyms and abbreviations

CAI	Collective action initiative
CBAM	Carbon Border Adjustment Mechanism
CET	Clean Energy Transition
EC	European Commission
EED	Energy Efficiency Directive
EESC	European Economic and Social Committee
ETS	Emissions Trading System
EU	European Union
GHG	Greenhouse gas
IEM	Internal energy market
JET	Just Energy Transition
JRC	Joint Research Centre
JTM	Just Transition Mechanism
RED	Renewable Energy Directive
SCF	Social Climate Fund

Main questions this paper addresses

Energy system transitions are complex socio-technical processes involving changes not only to energy technologies but also to the broader social and economic aspects of energy production and consumption. These energy transitions could negatively affect the people that they claim to serve, exacerbating current vulnerabilities and creating new ones. Consequently, striving for a more equitable distribution of benefits and burdens and ensuring that vulnerable groups are not disproportionately harmed is increasingly seen as a crucial success factor for a just transition. Based on these premises, the Joint Programme *Clean Energy Transition for Sustainable Society* has published a white paper on a Just Energy Transition (JET), addressing both the theoretical and the policy challenges of ensuring that the justice dimension is properly considered and implemented in EU energy transition pathways. In this paper, JET is intended in the exclusive sense of the European socio-economic and environmental consequences and ethical implications of transitioning from fossil fuels to sustainable energy sources.

This white paper is divided into four sections and aims to answer the questions set out below.

Question 1: What is JET and why is it needed?

A JET could be argued to be just, insofar as it is based on the widely adopted conceptualisation of the three tenets of energy justice: distributive, procedural and recognition justice. *Distributive justice* concerns equity in the distribution of goods in a given society or group and is tied to the concept of substantive equality. It should not be understood as being limited to the financial situation of individuals, as it also includes community assets, such as environmental quality. *Procedural justice* relates to the right of all citizens to participate in an open and inclusive process of decision-making, and is associated with the concept of formal equality. *Recognition justice* deals with the necessity of recognising vulnerable groups and how they are negatively affected by distributive and procedural injustices, and making special arrangements to include them fairly at both levels. Energy poverty, which mainly relates to the recognition and distributive dimensions, receives special attention and is defined as the inability to secure a socially and materially sufficient level of domestic energy services. In addition to the specific socio-economic factors that might contribute to triggering energy poverty, the exposure of citizens to this condition is influenced by their energy vulnerability, which involves two perspectives: subjective factors (such as culture, household composition, health and habits) and contextual factors (such as exposure of the country to energy market disruption).

Question 2: What are the main challenges in achieving JET in Europe?

While not all the challenges for JET can be exhaustively identified, this white paper tentatively categorises them under the three energy justice tenets, which could be useful to improve awareness among citizens and policy-makers. This would ultimately support the process of generating effective policies to guide the clean energy transition towards fairer energy systems.

With regard to the *distributive* tenet, the first challenge is the inequality between social classes with diverse social class backgrounds that might have unfair access to alternative energy technologies, with low-income citizens living in less energy-efficient housing and facing higher energy costs. Ultimately, this might have possible consequences on overall quality of life and health. A further challenge is the likely economic decline of many areas that rely on fossil fuel industry jobs, since individuals might not be able to transfer their skills to other jobs and risk slipping into the detrimental situation of long-term unemployment. Then there is the unequal distribution of renewable energy generation capacity and other energy infrastructure across communities, with higher-income communities commonly being better equipped in these areas. The final challenge is the issue of intergenerational justice with the trade-off between the substantial investment of public finance and the debt growth affecting future generations. As for the *procedural* tenet, the main challenge is the limits of representative democracies in granting a sufficient level of participation in the process of making policy on fundamental changes to the system, such as the clean energy transition. Additionally, decisions related to the deployment of clean energy technologies and other infrastructure not only influence the right to voice opinions but also impact the ownership structure, which is closely linked to the issue of social acceptance. Vulnerable groups merit special attention with regard to the difficulties they encounter, with energy-poor households facing additional procedural justice hurdles, as they often lack the

ability to access and correctly interpret information, which limits their participation in general policy-making. As for the *recognition* tenet, the main challenge is the complexity of the relationships between energy services and human needs that goes beyond conventional understanding of energy poverty and vulnerability, where issues of affordability, housing quality & energy efficiency, health and income have attracted most attention.

Question 3: What are the current EU policies addressing JET?

While combating climate change will benefit everyone in the long term and provide opportunities in the medium term, not all states and citizens have the same capacity to respond. The transition entails a broader social, economic and environmental impact for those regions that rely heavily on fossil fuels for energy use or greenhouse gas-intensive industries. Such a situation creates the risk of growing disparities between areas, detrimental to the objectives of social, economic and territorial cohesion. The policy at different levels must therefore consider its economic, social and environmental implications from the outset and deploy all possible instruments to mitigate adverse consequences. A sound and comprehensive just transition policy strategy reflecting specific national and global aspects of justice and comprising different instruments, financial incentives and support is crucial in order to address the social, economic and environmental consequences, particularly for the most affected regions and communities. This paper provides a multilevel analysis of the main policies, starting from the overall JET policy context in the EU. A careful EU-level analysis is then developed, taking into account a number of complex policy provisions, interpreted through the lens of the three energy justice tenets. We next focus on specific support for the development of energy communities in Europe and their historical and potential impact on the increase in citizens' collective participation and on reducing energy poverty. The final contribution to answer this question is a comprehensive mapping of national-level policies in Europe in response to current energy challenges.

Question 4: Which policies steer JET in the EU?

The final section of this white paper builds on previous and present general policy recommendations to help achieve JET in Europe. The recommendations are again structured around the distributive, procedural and recognition energy justice tenets. The basic assumption is that incorporating the energy justice framework into the regulatory and legal frameworks in Europe could help achieve a just transition holistically. Including the energy justice tenets in the policy-design process can help bring diverse aspects of the just transition together, thus ensuring that all the most relevant topics are addressed in a comprehensive manner and that no relevant aspects of the just energy transition are overlooked. Section 4 is therefore structured around four clusters of policies: (a) overarching policy recommendations (incorporating all stages of the clean energy transition solutions design and use into the regulatory and legal JET frameworks, adopting reliable metrics and measures for monitoring JET progress in Europe and supporting energy literacy at all levels); (b) recommendations related to the distributive tenet (extending distributive justice to whole value chains, enabling community ownership of energy infrastructure and designing austerity measures that consider the distributive effects); (c) recommendations related to the procedural tenet (shifting the policy from technology acceptance to holistic implementation, empowering affected citizens and other stakeholders, including the voices of multiple stakeholders in transition discussions and designing participatory tools that acknowledge vulnerable groups' needs); and (d) recommendations related to the recognition tenet (taking an intersectional approach, supporting social innovation and prioritising the recognition principles when implementing the skills agenda).

1. Introduction - A Just Energy Transition (JET) in Europe

1.1 What is JET?

At the core of a Just Energy Transition is the recognition that the impacts of climate change and corresponding mitigation and adaptation measures are inherently uneven and that a transition always creates winners and losers. **Energy system transitions are complex socio-technical processes involving changes not only to energy technologies but also to the broader social and economic aspects of energy production and consumption [1].** These energy transitions could negatively affect the people that they claim to serve, exacerbating current vulnerabilities and creating new ones [2]. Consequently, striving for a more equitable distribution of benefits and burdens and ensuring that *vulnerable* groups are not disproportionately harmed is increasingly seen as a crucial success factor for a just transition [3], [4].

A just transition has been defined as "a fair and equitable process of moving towards a post-carbon society" [5]. In the context of this white paper, we refer to a Just Energy Transition (JET) in the exclusive sense of the European socio-economic and environmental consequences and ethical implications of transitioning from fossil fuels to sustainable energy sources. Justice in this context should be understood as a multi-dimensional concept that aims to understand where injustices occur, who is affected by them and how they can be remedied [6], [7], [8].

A JET could be argued to be just, in so far as it is based on the widely adopted conceptualisation of the three tenets of energy justice: *distributive, procedural* and *recognition justice [7]. Distributive justice* concerns equity in the distribution of goods in a given society or group and is tied to the concept of substantive equality [4]. In this context, it should not be understood as being limited to the situation of individuals, as it also includes community assets, such as environmental quality [8]. Distributive justice is equally associated with the sharing of benefits as well as burdens and risks within society [9]. *Procedural justice* relates to the right of all citizens to participate in an open and inclusive process of decision-making, and is associated with the concept of formal equality [4]. Lastly, *recognition justice* deals with the necessity of recognising vulnerable groups and how they are negatively affected by distributive and procedural injustices, and making special arrangements to include them fairly at both levels [8].

JET is also centred on justice considerations regarding the relationship between generations and the trade-off between current and future consumption levels and, even more so, the resource demands that arise from trying to meet these consumption levels. Current consumption patterns necessitate the exploitation of non-renewable and renewable natural resources, thus compromising future generations' well-being, since these consumption patterns are potentially unsustainable [10]. The potential inequity between generations extends to other dimensions outside the environmental sphere to include social and economic factors, much influenced by current governance frameworks and policies [11], which in the context of energy relate mostly to ensuring affordable and secure access to energy services for future generations.

1.2 Energy poverty and energy vulnerability in Europe

If not adequately regulated, the energy transition could exacerbate present inequalities. Currently, we are already experiencing the phenomenon of energy poverty in most European countries. **Energy poverty is understood as**

"the inability to attain a socially and materially necessitated level of domestic energy services" [12]. It is estimated to affect 34 million people in the EU (10% of the EU population; 2021[1]). Yet this figure may be a low estimate, as the real living conditions of many families are not accurately assessed [13]. Energy-poor households are more likely to live in energy-inefficient homes with inefficient appliances [14] and suffer from lower levels of well-being and health compared with average households [15]. These conditions are estimated to cause around 100,000 excess deaths per year in Europe [16], [17]. Furthermore, due to housing inefficiencies, low-income households demand more energy per square metre than families living in better isolated homes. Families experiencing energy poverty usually have lower incomes than their peers so that energy bills account for a higher and significant part of their income [18]. This means that fluctuations in the price of energy affect these citizens more, as they spend a higher proportion of their disposable income on energy.

The main factors that might trigger energy poverty also determine the energy vulnerability of households. A recent EC publication[2] identifies five areas of vulnerability related to (1) socio-demographic factors (social housing tenants, ethnic minorities, low level of education), (2) household composition (e.g. single or retired), (3) health (e.g. illness that requires special thermal conditions), (4) energy literacy (ability to understand the different energy options available and implement mitigation measures) and (5) cultural background (influencing perception and behaviour). Individual energy vulnerability is exposed to the general performance of the national energy system, i.e. to the combined likelihood of a country being endangered by an energy crisis and its consequences, assuming the best policy responses [19]. Nevertheless, high income or good policies can sever the relationship between energy poverty and energy vulnerability. Countries such as Luxembourg or Ireland have overall low proportions of households in energy poverty situations [12] but show a high index of energy vulnerability [19]. As the majority of the countries in the EU are dependent on energy imports, their vulnerability to energy crises is significant and can have rapid impactful effects on their citizens [20]. This has especially been the case following the disruption in fossil fuel imports from Russia.

1.3. The EU Green Deal in the context of JET

In 2019, with the EU Green Deal, the European Commission (EC) set the objective of achieving net-zero carbon emissions by 2050. This policy framework entails several consequences that pose significant challenges, bearing in mind the EU's institutional and social context, which features a far from negligible average public debt of 81% of GDP[3], a constant government deficit in recent years (2008–2017)[4] and significant relative poverty. In 2021, 95.4 million people in the EU, representing almost 22% of the population, were at risk of poverty or social exclusion[5].

European governments are facing the pressing need to deliver the energy transition to achieve the required but also ambitious climate policy targets. The measures they plan could increase the need to think about ways and means to achieve JET, as they include the following actions and related impacts [10]:

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[1] https://energy-poverty.ec.europa.eu/about-us_en

[2] https://energy-poverty.ec.europa.eu/system/files/2023-03/EPAHhandbook_diagnosis_finalpdf.pdf

[3] Eurostat. (2018). Government finance statistics. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Government_finance_statistics#Government_debt

[4] Eurostat. (2018). Government deficit/surplus, debt and associated data. Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10dd_edpt1&lang=en

[5] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220915-1

(a) ***substantially increasing the countries' renewable energy generation****, which might face local opposition for specific yet common types of infrastructure (e.g. wind turbines and biomass plants);*

(b) ***further developing national grids and international interconnections****, which are underdeveloped at the moment [21]. Once again, this may potentially give rise to local social resistance, due to concerns regarding the landscape, health impacts, real estate depreciation and other environmental issues;*

(c) ***increasing public investment in the grid while attempting to contain energy prices****, thus forcing policymakers to decide how the financial burden should be shared between current and future taxpayers;*

(d) ***increasing investments in the whole system****, e.g. renewables and energy-efficiency improvements in the building stock, when national economies might present slow growth. This raises questions regarding the role of central government in possibly facilitating or sustaining these investments and regarding which public resources should finance these policies.*

The clean energy transition therefore has the potential, if not suitably addressed by equitable policies, to maintain or even deepen socio-economic inequalities in the EU. This risk would be especially high if free-market conditions not mitigated by socially inclusive policies were to dominate the energy markets. These circumstances would make private investment in sustainable energy technologies mainly accessible or convenient only for middle- to upper-income homeowners while increasing the technological divide with lower-income households and thereby exacerbating energy vulnerability problems, particularly if energy prices were to rise [22], [23], [24]. Further socio-economic challenges, detailed in Section 2, lie ahead as a result of the forthcoming shifts from fossil fuel extraction and energy conversion activities.

It is clear that policy measures and regulations are necessary to address these challenges and that a laissez-faire approach to liberalising energy markets exacerbates them more often than not. As Healy and Barry [25] state: "A just transformation of the socio-energy system is also a decision to live in a different type of society, not simply a low-carbon version of the current one". Scholars have argued [5] that a free-market approach, which once dominated energy policy agendas in some European countries [26], has created oligopolistic markets and has contributed to social inequality, thereby failing to deliver "just outcomes" [4]. Former experiences of free-market energy transitions at national level, such as the radical free-market approach disregarding inclusive transition policies adopted by the British government for the closure of much of the mining industry in the 1980s and its devastating socio-economic effects on local communities [27], show that a substantially different approach is needed. With the EU Green Deal, the EC has already initiated an approach that diverges from the radical free-market paradigm, through policy interventions in eight key areas supported by one-third of the EUR 1.8 trillion investment from the NextGenerationEU Recovery Plan, and the EU's seven-year budget[6]. These policies represent a considerable effort; nevertheless, further policy development and resources are needed to deal with the challenges posed by the ongoing energy transition, particularly at a time of widening geographical and social inequalities[7].

[6] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

[7] https://knowledge4policy.ec.europa.eu/diversifying-inequalities_en

2. Challenges in achieving JET in Europe

In the literature, JET is based on conceptualising the three tenets of energy justice: distributive, procedural and recognition justice [7]. While we are mindful that not all the challenges can be exhaustively identified, **we believe that a tentative categorisation under these three energy justice tenets could be useful to improve awareness among citizens and policymakers, which would ultimately support the process of generating effective policies to guide the clean energy transition towards fairer energy systems.**

In the following, the main challenges of the energy transition that can be envisaged on the path towards achieving JET along the three tenets will be discussed in more depth.

2.1 Distributive justice

Distributive justice concerns equity in the distribution of goods, benefits and costs in a given society or group and is tied to the concept of substantive equality [4]. In the distributive justice tenet, several specific challenges can be identified.

Widening inequality between social classes has been suggested as one of the challenges that the clean energy transition might produce [3], [10]. It has been suggested that citizens with diverse social class backgrounds might have unfair access to alternative energy technologies necessary to reduce their energy consumption and the carbon footprint of their dwellings [3], [4]. In particular, low-income households lack financial resources and access to incentives [24] and suffer from so-called "split incentives" [28], which prevent landlords from retrofitting their properties, and tenants from investing in energy-efficiency improvements. In this situation and without adequate policies, low-income citizens appear to be bound to live in housing that is less energy-efficient and has higher energy costs per square metre due to higher energy requirements. **This means living either in energy poverty or at risk of falling into energy poverty (i.e. energy vulnerability), which is often regarded as a violation of distributive justice [12], [14], [29].** In addition, energy poverty has severe health consequences that could lead to death, as affected households usually cannot provide a healthy indoor environment [15]. These circumstances are further aggravated by the fact that policies promoting a clean energy transition, which include investments for grid development and adaptation as well as subsidies for renewable energy generation, are causing electricity retail prices to increase [3], [30], [31]. Inevitably, low-income and energy-vulnerable households are disproportionately burdened by these higher costs.

In the absence of adequate policies addressing the uneven distribution of burdens, the likely economic decline that many areas currently relying on fossil fuel industry jobs would suffer could also affect distributive justice among both individuals and whole communities [3]. Achieving the clean energy transition scenario from fossil fuel-dependent energy production and consumption to a zero-emission future entails radical changes for the economic, social and cultural livelihood of fossil fuel-dependent areas and communities. Individuals might not be able to transfer their skills to other jobs in other economic sectors without retraining programmes and therefore risk slipping into a detrimental situation of long-term unemployment. But even if this could be avoided, the new employment opportunities may offer lower wages, leading to long-term impacts, such as lower pension payments and lower tax income for the community. The undesirable distributive effect could be reinforced if job losses in the fossil fuel industry affecting a given community contribute to further job losses in the service sector related to the fossil fuel-based industry of the same community [3]. From a distributive justice perspective, the aspects mentioned demand adequate policies that help to support those who have lost their job or seen a drop in their income, for example as a result of receiving unemployment benefits or because of other mechanisms of economic redistribution [32].

The distribution of renewable energy generation capacity and other energy infrastructure necessary to deliver the clean energy transition across communities could widen the distributional gap between regions [3], [10]. Higher-income communities appear to be better equipped to oppose the undesirable construction of energy infrastructure [33], leading to inequitable outcomes that may result in lower-income communities bearing most of the negative externalities, such as those associated with infrastructure.

Often presented as a win-win solution for people and the planet, the clean energy transition is a complex process that affects natural resources across the globe, but also communities, companies and policymakers outside the EU. The International Energy Agency (IEA) has already noted that the clean energy transition involves a progressive decline in fossil fuel demand and an increase in the demand for metals and rare earths (e.g. tin, nickel, cobalt, copper and lithium) for clean energy technologies[8]. This means an increasing demand for metals (including the critical ones) from an industry that has been seen to be a major source of environmental degradation and a repeat violator of human rights [34], [35]. Indigenous and peasant communities and socio-environmental activists living in the extraction areas (known as sacrifice zones) have already denounced the fact that the energy transition will perpetuate the multiple forms of violence that have marked the history of mineral extraction [36]. **The clean energy transition in the EU still devotes insufficient attention to the interconnected nature of the global economic system, and the challenges, impacts and needs for transitioning in primary-producer supply countries. Distributional justice impacts are therefore not sufficiently recognised.**

Distributive justice often focuses on an intragenerational perspective. However, today's decisions will impact the prospects of future generations, i.e. intergenerational justice needs to be taken into account. **The clean energy transition entails a large investment of public funds that might raise questions about the trade-off between the use of financial resources for present generations and the debt growth affecting future generations [4]** unless adequate policies are in place to minimise debt growth, for example through more progressive and equitable tax systems. At the same time, future generations are also supposed to benefit from these investments through improved and more efficient energy systems with less climate and environmental impact.

2.2 Procedural justice

Procedural justice concerns the right of all citizens to participate in an open and inclusive process of decision-making, and is associated with the concept of formal equality [4]. **In the context of the clean energy transition, procedural energy justice tenet can certainly refer to a number of shortcomings of current political systems in dealing with a fair representation and inclusion of citizens in the process of making policy that will have a profound and long-lasting impact on our present-day societies.** It has been pointed out [37] that citizenship and representation in the context of climate justice are further complicated by intergenerational justice considerations, which highlight the trade-off between prioritising the welfare of current generations versus that of future generations.

Even if the problem of representation and inclusiveness in decision-making is limited to current generations, the limits of representative democracies in granting a sufficient level of participation in the process of designing policy on fundamental changes to the system, such as the clean energy transition, appear worthy of consideration. As pointed out by Newell and Mulvaney [38], decisions about methods of production and allocation of energy for particular purposes are rarely taken as part of a fully democratic and inclusive process; nor are they made transparent to the public. If the limits of the current political systems to further include citizens in policy-making

[8] https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

processes are evident, the policies that could be adopted to solve this problem are not as clear. Määttä [39] proposes a Whole-of-Society approach to policy-making, which consists of multi-stakeholder involvement of citizens, organisations and businesses in contributing to policy and the delivery of shared goals. Nevertheless, this approach remains rather vague on the practical tools and regulations that could be deployed to facilitate this inclusivity.

Further participation in decision-making on policies should be considered alongside issues of procedural justice regarding decision-making related to the specific cases of deployment of clean energy technologies and other infrastructure necessary for the energy transition [3], [10]. This leads to questions on the opportunity given to citizens to have a say not only in the siting of these developments but also in their characteristics, ownership structure [40] and the possibility of compensation for those communities that are disproportionately affected [41]. The latter issue inevitably ties in with the problem of social acceptance of clean energy technologies [10], which is connected to the distributive, procedural and recognition justice tenets, particularly where routinely disadvantaged communities are affected due to their social disadvantage or minority status.

Social acceptance of the energy transition, here mainly understood as socio-political and community acceptance, is to a large extent based on procedural justice, i.e. the extent to which all affected parties are given the right and the instruments to be active participants in the discussion and decision-making processes related to the design and implementation of clean energy transition solutions. Socio-political and community acceptance comes from the acceptance triad of *socio-political*, *community* and *market* acceptance [42].

Social acceptance could be further distinguished by social acceptability, i.e. the disposition of an individual towards a proposed energy project [10], [43]. Procedural justice is mainly concerned with social acceptability, as it demands a process of involvement and democratic participation that includes the local community hosting the energy development, whereas distributive justice is chiefly concerned with social acceptance, i.e. the attitude that an individual would have towards an implemented energy project.

Specific consideration should be given to vulnerable groups' difficulties in participating in the democratic process of policy-making and community energy schemes. In both cases, participation in collective processes might require skills, confidence and the removal of cultural barriers that could significantly influence the possibility of including vulnerable groups in collective processes to varying degrees, depending on their characteristics.

Additionally, energy-poor households face other procedural justice hurdles [44]. **Due to economic and educational constraints, energy-poor households often lack the capability to access and correctly interpret information [45], which restricts their participation in general policy-making (not only in energy transition-related processes), hinders their capacity to mitigate the adverse effects of their condition and reduces their ability to leverage existing policy instruments.** Furthermore, they experience long and difficult legal procedures related to their energy condition, namely regarding conflict resolution with energy utility companies and landlords [46]. Even the social stigma, isolation and shame these households suffer have been found to negatively influence the receipt of support [47].

2.3 Recognition justice

As Jenkins et al. [8] state, **recognition justice "includes calls to acknowledge the divergent perspectives rooted in social, cultural, ethnic, racial and gender differences".** This translates into the recognition of the specific long-lasting conditions of vulnerability and disadvantage that vulnerable groups, such as low-income communities, women, the elderly, young people and ethnic minorities, might suffer. Specifically, in the energy transition context,

this necessarily refers to the missed opportunities/means to benefit from the transition and the risk that they might bear the burden without reaping the benefits. In fact, the recognition of justice stresses the importance of protecting vulnerable groups and individuals from the distributive and procedural injustices mentioned in previous sections. This specific protection necessarily translates into policies that use positive discrimination (affirmative action) to promote the welfare of vulnerable groups. One example could be targeted policy measures to address energy poverty, which might increase as a result of the clean energy transition, given the risk of widening the gap between low-income and high-income citizens belonging to vulnerable groups.

The literature suggests that recognising the needs of people that are directly vulnerable because of the actions and omissions of the clean energy transition represents a significant challenge for JET [9]. The complexity of the relationships between energy services and human needs goes beyond conventional understanding of energy poverty and vulnerability [48], [49] if energy vulnerability is understood either as the risk of falling into energy poverty [12] or, broadly, as any energy-related negative impact on household well-being [50]. **Energy poverty has been of interest to the EU for at least a decade, with issues of energy affordability, housing quality & energy efficiency, health, and income receiving most attention [15], [51], and other relevant aspects left mostly ignored, such as capability enablement, community organisation, energy provision quality, consumption patterns and energy literacy.**

On the other hand, overlooking intersectionalities between energy vulnerability and other social problems is another source of violation of the recognition justice principle, which can lead to further deterioration in the well-being of already vulnerable groups [52], [53]. For example, there are strong links between energy poverty and transport poverty, both of which are directly related to socio-technical energy transitions [54], [55]. While it is widely recognised that low-income households are significantly affected by energy poverty, the energy vulnerability of other income groups with or without other vulnerabilities is little understood [56]. Additionally, other intersectionalities of energy poverty with social, gender, cultural and race discrimination have surfaced [49], [57], [58], [59]. Furthermore, similarly targeted policies would need to be considered concerning access to ownership of renewable energy infrastructure and access to energy-efficiency measures.

3. Current EU policies addressing JET

The transition to a climate-neutral, circular economy constitutes one of the most important objectives in the EU. It has different impacts on citizens at local, national, European and global levels due to complex interconnected supply chains. **While combating climate change will benefit everyone in the long term and provide opportunities in the medium term, not all governments and citizens have the same capacity to respond.** The transition entails a broader social, economic and environmental impact for those regions that rely heavily on fossil fuels for energy use or greenhouse gas-intensive industries. Such a situation creates the risk of growing disparities between areas, detrimental to the objectives of social, economic and territorial cohesion. The transition has to be fair and inclusive to be socially acceptable for all. The policy at different levels must therefore consider its economic, social and environmental implications from the outset and deploy all possible instruments to mitigate adverse consequences. **To address the social, economic and environmental consequences, particularly for the most affected regions and communities, it is crucial to have a sound and comprehensive JET policy strategy reflecting specific national and global aspects of justice and comprising different instruments, financial incentives and support.** Particular attention should be paid to communities and citizens at risk of energy poverty. Another critical aspect of the EU policy for more justice should be to promote gender equality and ensure equal opportunities for women in the transition in terms of labour market participation, entrepreneurship and equal pay.

3.1. The recent JET policy context in the EU

Currently, the EU does not have a comprehensive JET framework that will address the JET aspects mentioned earlier in this paper in an overarching manner. However, just transition is declared to be one of the top priorities of EU policies and there are multiple JET-related aspects that are addressed, albeit often in a fragmented and disconnected way, by different EU policy mechanisms and instruments.

Since the establishment of the EU, the pursuit of equal opportunities for all citizens has been a primary focus of European policies. The Gini ratio[9], a measure of income inequality, indicates that EU countries have generally performed well in this regard, ensuring decent living standards compared with countries outside the Union. However, the recent turmoil in energy markets caused by Russia's full-scale invasion of Ukraine poses a significant challenge to the EU Member States' ability to secure affordable and reliable energy sources.

This fact adds another layer to the energy transition challenges in which the EU is already immersed, threatening to jeopardise energy security and increase energy poverty. Aware of these challenges, the EC published the REPowerEU plan and has accelerated the recast of the Energy Efficiency Directive (EED) to ensure that the energy transition becomes a public endeavour. The issue of energy poverty and vulnerability therefore remains the focus of the European institutions, which understand that involving low-income households in the energy transition requires holistic implementation approaches and additional funding. For this purpose, the Social Climate Fund (SCF) mechanism is proposed to turn into opportunities the threats created by the extension of the ETS (also referred to as ETS2) to the building and road transport sectors. **The reason behind these threats is that implementation of ETS2 (expected from 2026) is designed to reduce emissions from these sectors by establishing yearly maximums. Nevertheless, the cost associated with reducing these emissions could easily be passed on to end consumers who have limited capacity to reduce their use of transport (for example, in rural areas) or heating.** The idea of the SCF is therefore to reinject the revenues from the ETS and ETS2 to support investments in energy

[9] https://en.wikipedia.org/wiki/Gini_coefficient

efficiency and sustainable transport for specific social groups, including consumers and micro-enterprises at risk of energy or transport poverty. To benefit from the SCF, the EU Member States need to present national social climate plans and have them approved. As the heterogeneity of countries in the EU dictates, each Member State should build its own strategy to maximise the possibility that the SCF will have a positive impact on reducing the social inequalities of the energy transition. Nevertheless, many issues remain open, as it is not clear whether the revenues allocated to the SCF are sufficient, what the communication strategies should be to ensure that the funding is seen by low-income citizens as an opportunity or when the mechanism should come into effect [60]. In addition, it is essential to coordinate the SCF with other energy-efficiency mechanisms, such as the National Energy Efficiency Fund[10], to ensure good coverage and avoid overlapping.

3.2. EU-level policy analysis through the lens of the energy justice tenets

Most recent legislative packages in the EU are part of an ambitious EU plan to make the clean energy transition just, serving the interests of EU citizens. Table 1 is a summary of the selected EU policy packages analysed through the lens of the specific aspects of the distributive, procedural and recognition justice tenets discussed earlier. Analysis has been conducted using documents published in the Official Journal of the EU, rather than relying solely on direct provisions (primary rules and regulations). This approach ensures a more comprehensive understanding of the overall legislative intent. **Methodologically, the analysis incorporates all the main aspects of the distributive, procedural and recognition justice tenets discussed in Section 2 of this paper. In fact, this is an example of how JET scholarship can be applied to the analysis and design of JET policy.**

[10] https://www.eeef.lu/home.html

Objective/scheme	IEM directives (until 2019)	EU Green Deal - JTM (2021)	SCF (parts 1 and 2)	REPowerEU (2022)	RED - Art.22 Energy Communities (2022)	EED - 2012 amended (2018)
1. Distributive justice tenet						
1.1. Prevent widening inequality gap driven by the energy transition	Indirect mention	Adequately considered	Well addressed	General mention	General mention	Indirect mention
1.2 Consider impacts of the clean energy transition on job losses	Insufficiently considered	Well addressed	Adequately considered	General mention	Indirect mention	Indirect mention
1.3 Consider equal access to clean energy infrastructure	Indirect mention	General mention	Adequately considered	General mention	Adequately considered	Adequately considered
1.4 Consider adequate access to financial resources and incentives	Indirect mention	Indirect mention	Adequately considered	Adequately considered	Indirect mention	Indirect mention
1.5 Consider aspects of ownership of the renewable energy infrastructure	Insufficiently considered	Insufficiently considered	Indirect mention	Indirect mention	Adequately considered	Insufficiently considered
1.6 Consider aspects of access to energy-efficiency measures	Indirect mention	General mention	Well addressed	Adequately considered	Adequately considered	Well addressed
1.7 Address global justice aspects of the clean energy transition (e.g. materials supply)	Insufficiently considered	Well addressed	Well addressed	Insufficiently considered	Indirect mention	Insufficiently considered
1.8 Acknowledge intergenerational aspect of clean energy investment (e.g. public debt)	Insufficiently considered	Indirect mention	Indirect mention	Indirect mention	Indirect mention	Insufficiently considered

2. Procedural justice tenet						
2.1. Consider mechanisms to include citizens and other key stakeholders in the design and implementation of policies	Insufficiently considered	Well addressed	Well addressed	Insufficiently considered	Well addressed	Insufficiently considered
2.2. Consider stakeholder participation in the social acceptance of technology stage	Insufficiently considered	Adequately considered	Indirect mention	Indirect mention	Well addressed	Insufficiently considered
2.3. Consider stakeholder participation beyond social acceptance of technology	Insufficiently considered	Indirect mentioned	Indirect mention	Indirect mention	Well addressed	Indirect mention
2.4. Address participation obstacles that vulnerable groups of stakeholders face	Insufficiently considered	Insufficiently considered	Adequately considered	Indirect mention	Well addressed	Insufficiently considered
3. Recognition justice tenet						
3.1. Acknowledge vulnerable actors, groups that are likely to be affected by the policy	General mention	Well addressed	Well addressed	Well addressed	Adequately considered	Adequately considered
3.2. Consider the impact that a policy might have on energy-vulnerable and energy-poor people	Insufficiently considered	Adequately considered	Well addressed	Well addressed	General mention	Adequately considered
3.3. Address social and economic impacts that are associated with energy poverty (e.g. energy mobility poverty)	Insufficiently considered	Adequately considered	Well addressed	Well addressed	Adequately considered	General mention

Table 1: *Summary of the different EU initiatives in response to specific challenges of the energy justice tenets. A grey-blue gradient colour code is used to illustrate the involvement level of the policy scheme with the listed issue: "Insufficiently considered", "Indirect mention", "General mention", "Adequately considered" and "Well addressed".*

Of the legislation analysed, the Renewable Energy Directive (RED) appears to be the scheme that better addresses social justice issues arising from the clean energy transition. Aspects such as the mention of ownership ("*...the role of the citizen in the energy transition, where citizens take ownership of the energy transition, benefit from new technologies to reduce their bills, and participate actively in the market*"), the holistic view of the energy market ("*...it is necessary to take into account the positive impact on regional and local development opportunities, export prospects, social cohesion and employment opportunities*") or the need to make all households beneficiaries of the technological opportunities of the energy transition ("*...provides opportunities for renewable energy communities to advance energy efficiency at household level and helps fight energy poverty through reduced consumption and lower supply tariffs")*[11] are certainly reasons why the Directive scores high in the analysis performed for this paper.

The idea of creating social justice through energy-efficiency measures is well presented across practically all of the legislation packages (e.g. *EU Green Deal: "To address the twin challenge of energy efficiency and affordability, the EU and the Member States should engage in a 'renovation wave' of public and private buildings").* As a mechanism to allocate the benefits of energy-efficiency measures to those needing them, the SCF aims to reinvest the payments obtained through implementation of the ETS and ETS2 with a view to compensating for the financial burden the energy transition places on low-income households. In order for this mechanism to effectively address the socio-economic challenges, particularly in light of the revised ambitions of the REPowerEU initiative, it is crucial to allocate an ample budget to support it adequately. To make the SCF work as intended, each EU Member State needs to build its own strategy to ensure that the SCF really minimises the "social gap" of the energy transition (in line with Art. 4 of the legislation[12]). Additionally, the SCF should be coordinated with other relevant policy mechanisms, such as the National Energy Efficiency Fund, to ensure more coherence between different policies designed to support JET.

Organisations such as the European Economic and Social Committee (EESC) call for the Member States' strategies to attract private funds ("*...the proposed financial envelope for the Social Climate Fund will not provide sufficient financial support ... A correspondingly high budget is therefore needed*"). In turn, the Energy Efficiency Directive (EED), amended in 2018, highlights the need for Member States to allocate funding for vulnerable consumers, with backing from funding organisations such as the European Fund for Strategic Investments or the European Investment Bank.

Finally, the directives under the title Internal Energy Market (IEM) consider the first four energy packages adopted at EU level: (1) the first package, transposed into national law in 1998 and 2000 (electricity and gas); (2) the second package entering into force in 2004 (free choice of gas and electricity suppliers); (3) the third package of 2009 (facilitating the implementation of the IEM); and (4) the fourth package of June 2019 (introduction of new market rules to favour the deployment of renewables). The IEM lacks any concrete recognition of vulnerable groups and stresses the overall importance of considering consumer rights such as change of supplier or direct information on real consumption (through smart meters primarily).

Overall, our analysis shows that while the recognition justice tenet receives adequate attention overall in the EU legislation reviewed, the procedural and especially the distributive tenet are much less addressed. One reason for this is purely pragmatic. **Acknowledging the right of vulnerable groups to participate in the energy transition**

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11 European Commission, DIRECTIVE (EU) 2018/2001 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the promotion of the use of energy from renewable sources (recast).
12 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R0955

(recognition tenet) is often easier than considering assets and funding opportunities (distributive tenet) or defining and implementing inclusive processes of participation (procedural tenet). The need to address global justice aspects of the clean energy transition such as the scarcity of raw materials or the delocalisation from Europe of the supply chains is an important issue, only addressed by the CBAM[13] in the Green Deal and Fit for 55 schemes. Ownership of the energy sources and the long-term vision, including the intergenerational impact of the energy transition on policy-making, also lack some consideration across the majority of the policy schemes. Nevertheless, stakeholder consultation is considered crucial in the Green Deal (national energy and climate plans) and SCF proposals.

The approach of analysing the legislation through the energy justice lens demonstrated in this section can be used by policymakers as an example of how JET-oriented policies can be analysed and designed. **The categories we used for the analysis under each of the energy justice tenets are not exhaustive and are primarily supposed to serve as a showcase for how the energy justice framework can be used for policy design purposes.**

3.3. Role of energy communities in Europe in reducing energy poverty

Energy communities deserve a separate discussion in the context of JET policies and especially energy poverty. They can be defined as collective action initiatives (CAIs) aimed at sharing resources among their members in order to satisfy their energy needs [61]. The majority of energy communities have historically focused on the self-consumption of electricity, and this is also the main focus of recent EU Directives[14]. This is done by aggregating distributed generation and loads of a small geographical area to exchange power among them and provide services to the power system [62]. Beyond this trend, energy communities have also promoted the collective management of other energy sources (e.g. residual heat and shallow geothermal systems) and uses (heating and cooling). **As a result of the creation of these communities, consumers would operate in the market not as individuals but as an association of consumers.** This would enable consumers to reduce and optimise investment and operating costs. For example, prosumers self-consuming locally produced solar energy can save an additional 8% of the cost if they belong to an energy community [63]. **Thanks to their ability to empower end consumers, energy communities can be considered a strategic niche for social innovation** [61]. An energy community relies on two main principles to create valuable impact: the first relates to the involvement of the different parties, and the second to its capacity to generate distributed benefits [64]. The benefits for citizens to participate in an energy community are multiple and include:

- participation in and ownership of the sustainable energy infrastructure in place
- lower energy bills as a result of collective energy-efficiency initiatives
- promotion of social cohesion practices
- regeneration of the local economy through job creation and the development of educational programmes offering new skills

[13] https://taxation-customs.ec.europa.eu/green-taxation-0/carbon-border-adjustment-mechanism_en

[14] In Directives 2001/2018 and 944/2019, collective self-consumption is now recognised as a system that allows locally produced electricity to be virtually shared (and incentivised) between producers and consumers connected to the distribution network, within the same geographical area.

- better health and well-being due to improved living conditions

As a result, **energy communities' initiatives can be seen as mechanisms to reduce the risk of households experiencing energy poverty and minimise its consequences.** Energy community membership has positive impacts in softening energy grid price increases [65] and facilitating the integration of new low-voltage technologies, such as electric vehicles or heat pumps [66]. Energy communities are also an excellent way of exploiting flexibility by allowing the implementation of tailored pricing schemes [65] or by promoting the integration of technologies offering flexibility [67]. In addition, energy community initiatives can also take direct action to combat energy poverty [68]. For instance, under the Énergie Solidaire scheme in France, members of the Enercoop community can donate 1 eurocent per kWh consumed to alleviate energy poverty[15]. The funds raised support improvements in building energy efficiency through innovative actions (e.g. guidance on renovation works, use of sustainable local materials, etc.) directly on the ground. In other countries, such as Greece, the law requires that a percentage of the profits made by energy communities must be allocated to support households in energy poverty [68]. **Energy communities offer clear opportunities to tackle energy poverty; nevertheless, their initial investment costs are significant, limiting membership to middle- or upper-class citizens in the absence of public subsidies [64].** For this reason, supporting the development and implementation of CAIs should be accompanied by tailored schemes and regulations that reduce income limitations and foster community trust [45]. Overall, the role that energy communities have in addressing energy poverty has not yet been well investigated, despite the fact that some stakeholders have drawn attention to the opportunities [61]. For example, future research is needed to identify schemes in which energy communities can include low-income participants without relying on external funding.

3.4. National-level policies in Europe in response to the current energy crisis

When it comes to the national, Member States level, JET policies differ. This section does not analyse the relevant policies in all the EU Member States. Instead, it follows up on the EU-level policy analysis by focusing on national responses to the most recent energy crisis. By mapping and analysing different crisis-response measures taken by national governments, we explore to what extent these measures are in line with the goals and principles of JET and CET.

Figure 1 shows various measures and initiatives taken by a selection of European countries in the face of soaring energy prices, both before and after the full-scale Russian invasion of Ukraine, starting in 2021 when energy prices in Europe began to increase rapidly. The main types of actions taken by the European states include the following[16]:

- measures related to supporting vulnerable groups of citizens and businesses,
- measures related to reducing energy demand,
- measures supporting faster deployment of renewables and low-carbon energy generation (e.g. nuclear power),
- measures related to energy tariff regulation.

A complete list of the measures shown in Figure 1 is as follows:

[15] https://www.energie-solidaire.org/

[16] The list of measures underlying Figure 1 is based on the authors' own research. If you would like a full list of references, contact the authors by e-mail.

	Subsidies, fixed payments or tax reductions for energy bills **low-income and vulnerable** households and/or **businesses**
	Income tax reduction/ Min salary increase
	Buildings retrofit measures
	Measures encouraging energy **demand reduction**
	Measures supporting shift to **electrified or renewable heating**
	Measures supporting **deployment of renewables**
	Measures supporting **extension of nuclear energy (lifetime and/or new projects)**
	Electricity **VAT reduction** or exemption
	Freezing or capping electricity and/or gas tariffs
	Fossil fuel subsidies
	Other measures

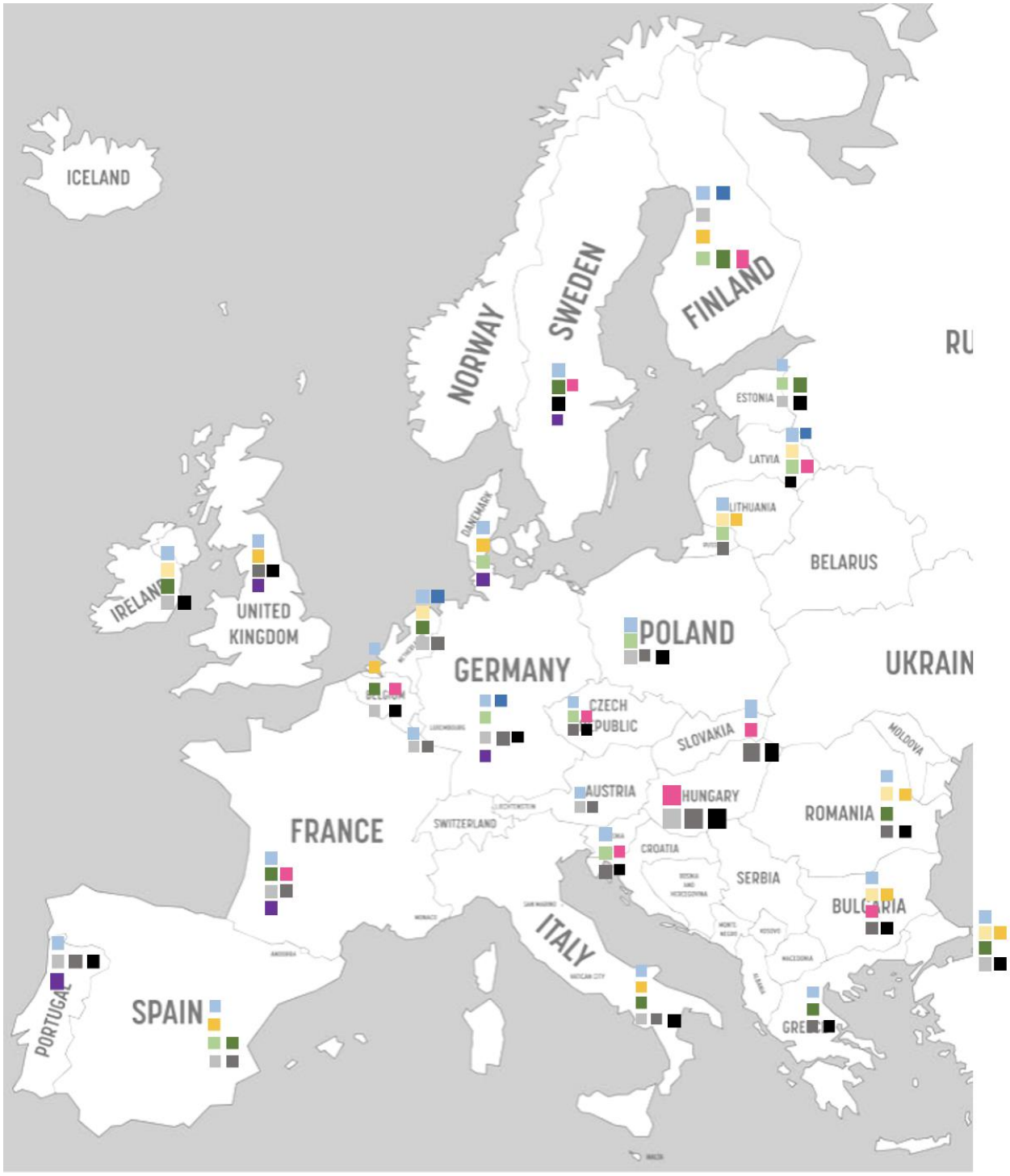

Fig. 1. *National-level policies in Europe in response to the current energy crisis*

The measures and initiatives taken by European countries differ in nuance and depend on specific national contexts, such as level of economic development, type of energy mix, already existing level of energy poverty, etc. Here, the intention is to show the scope of the measures taken by European states in response to the energy crisis without going into detail about national nuances.

As the energy crisis-response measures discussed were implemented relatively recently, it is too early to say what kind of long-term effect they might have on achieving JET and CET goals. What can be observed now, however, is that European states differ in their choice of instruments to respond to the energy crisis, and some of the measures can potentially undermine the goals of the accelerated CET. **Support for vulnerable citizens is the only measure universally found in all European states. Efforts to lower energy demand, especially beyond the 15% gas reduction goals[17] set by REPowerEU, are less common. At the same time, a reduction in energy demand, especially that associated with the structural changes in the economy, is one fundamental measure for creating a resilient energy system that reduces vulnerability to future energy crises [69].**

Support for faster deployment of renewables (for electricity production or renewable heating) exists in many European countries. Apart from support for renewables, some European states with domestic nuclear power generation capacity have increased their backing for nuclear energy by prolonging the lifetime of existing nuclear plants or planning the extension of existing capacity. **Subsidising fossil fuel consumption is another measure commonly included in Europe's energy crisis mitigation toolkit[18]. While "cheaper" fossil fuels might support the energy vulnerable and the energy poor, they can hinder the clean energy transition due to market distortion, making fossil fuels cheaper and thus more affordable.** According to the IEA's latest estimate, subsidies worldwide for fossil fuel consumption skyrocketed in 2022 to more than USD 1 trillion, with around USD 350 billion spent on reducing energy bills in Europe[19]. In comparison, the total additional investment set out in the REPowerEU plan between now and 2027 to phase out Russian fossil fuel imports is EUR 210 billion (around USD 226 billion)[20].

It is important that energy-crisis response measures are carefully monitored and analysed concerning their short-term and long-term impact on JET and CET in the EU.

[17] https://www.consilium.europa.eu/en/press/press-releases/2022/08/05/council-adopts-regulation-on-reducing-gas-demand-by-15-this-winter/

[18] Some EU Member States even increased investment in new fossil fuel infrastructure in response to the energy crisis, but this data is not included in the list of measures analysed in this paper.

[19] https://www.iea.org/reports/fossil-fuels-consumption-subsidies-2022

[20] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

4. Policy recommendations

The following policy recommendations are structured around the distributive, procedural and recognition energy justice tenets. **We believe that incorporating the energy justice framework into the regulatory and legal frameworks in Europe could help achieve a just transition holistically.** Although there have been improvements to make the European transition fairer and more inclusive, with more recent initiatives implicitly addressing the energy justice tenets, there are still structural issues that need to be addressed more effectively, as shown in Table 1.

The energy justice literature offers a great deal of material for a policy framework that could be adopted by policymakers. **Including the energy justice tenets in the policy-design process can help bring diverse aspects of the just transition together, thus ensuring that all the most relevant topics are addressed in a comprehensive manner and that no relevant aspects of the just energy transition are overlooked.** As mentioned earlier, it is often difficult to draw a strict line between the different energy justice tenets and many topics can be related to several tenets. The proposed division of policy recommendations across different energy justice tenets should therefore be seen as a proposal for structuring policies rather than an exhaustive framework.

4.1. Overarching policy recommendations to achieve JET

In this section, we list the recommendations that are overarching, relevant for JET overall, but that cannot be attributed to a specific justice tenet:

- **Include JET regulatory and legal frameworks at every stage of energy transition initiatives**
  The clean energy transition requires multiple technological and social solutions to be designed and implemented. The JET regulatory and legal frameworks, incorporating energy justice principles, should cover all stages of the development of such solutions - from the early design phase through to implementation and end-of-life. These frameworks should be set at multiple governance levels (EU, national and regional).

- **Adopt reliable metrics and measures for monitoring JET progress in Europe**
  Current European policy frameworks lack the metrics that can help keep track of various justice aspects of the clean energy transition. Introducing transparent universal metrics (see, the metrics examples at [70], [71]) for JET in Europe can help policy design and monitoring processes at national and EU levels. Additionally, JET metrics can help with the continuous assessment of business initiatives and projects related to the clean energy transition, ensuring such projects do not reinforce societal injustices.

- **Support energy literacy at all levels**
  Energy literacy should be acknowledged by policymakers as a fundamental component of JET. General knowledge of how energy systems work at local, national, European and global levels and of the goals of the clean energy transition has high societal value, as it empowers citizens to become active agents of the clean energy transition.

- **The scope of JET should go beyond the energy sector**
  The clean energy transition incorporates socio-technical transitions that go way beyond the energy sector alone. To ensure truly system-level change and in accordance with social justice principles, all key

sectors of the economy, including "aligned industries", digitalisation-enabling sectors, the financial sector, etc., should incorporate the JET framework.

4.2. Policy recommendations related to the distributive justice tenet

- **Enable community ownership of energy infrastructure with policy and regulatory frameworks**

  Ownership is one of the central components of the distributive justice tenet. Multiple evidence suggests that community ownership of energy-related assets (such as energy generation systems, energy storage systems, energy efficiency systems, district cooling and heating systems, etc.) brings numerous benefits for the energy systems and the communities. Community-based planning of the clean energy transition and community ownership should be encouraged by making policy and regulation the cornerstones of a just energy transition. When ownership of energy infrastructure is not immediately possible, mechanisms should be put in place to enable communities to benefit from energy production and distribution.

- **Design austerity measures that consider the distributive justice aspects**

  Austerity measures can disproportionally affect the energy vulnerable and the energy poor. In times of crisis, when austerity measures become widespread across Europe, it is crucial for policy-makers to consider how the costs and benefits of such measures are distributed across society and introduce corresponding mechanisms that would compensate for the potential negative impacts on the most vulnerable groups and individuals.

- **Extend distributive justice principles to the global supply and value chains necessary for energy transition in Europe**

  Clean energy transition in Europe is not possible without using natural materials, technologies, knowledge and skills from countries outside Europe. It is therefore crucial to apply just transition principles not only in Europe but also globally. All costs and benefits (e.g. economic, social and environmental) associated with the clean energy transition in Europe must be fairly distributed both within and outside Europe in accordance with distributive justice principles to avoid potential "spillover" of global injustices. Establishing fair international rules and standards concerning mining, supply chains, skills building and other relevant aspects of energy transitions is key for ensuring that JET in Europe creates benefits beyond Europe and that new injustices are minimised. For example, the global justice implications of mining and processing the raw materials required for manufacturing clean energy technologies have so far attracted insufficient attention in Europe. To improve matters, the European Critical Raw Materials Act should incorporate distributive justice principles.

4.3. Policy recommendations related to the procedural justice tenet

- **Shift the implementation focus of policies and initiatives from technology acceptance to holistic implementation of procedural justice principles**

  Accepting ready-made technological solutions entails involving citizens, local communities and other relevant stakeholders in the later stages of clean energy transition projects. This approach contradicts the principles of procedural justice and the co-design mindset. Implementing the procedural justice principles in a streamlined manner at all stages of clean energy transition projects benefits the quality of the projects and minimises social acceptance risks at the project implementation stage. Stakeholder engagement should happen not only at the beginning and end of initiatives, but also during the design, deployment and maintenance phases.

- **Empower affected citizens and other stakeholders to shape just transition agendas**
  Agenda-setting for what, when and how to explore the potentially just and unjust aspects of clean energy transitions should be driven by the affected groups and should avoid an exclusive top-down mindset.

- **Include the voices of multiple stakeholders in European just energy transition discussions**
  The clean energy transition in Europe is a complex process that includes multiple processes and actors within and outside Europe. The broad participation of representative European and non-European stakeholders should be mandatory and not tokenistic. Such participation would be relevant in relation to virtually every stage of the clean energy transition value chain: from mining of raw materials, through manufacturing and deployment of CET technologies (including energy carriers such as hydrogen) to end-of-life solutions for technologies.

- **Design and implement participatory tools that acknowledge vulnerable groups' needs**
  There are multiple difficulties in the participatory democratic process for policy design and for setting up community energy schemes. Even the most comprehensive EU legislation addressing social justice issues (such as the Energy Communities Directive) can be exclusive when it comes to the most vulnerable groups in society. Policies that use positive discrimination (affirmative action) to promote the well-being of vulnerable groups could be considered to ensure that JET policy is inclusive for the most vulnerable groups and individuals.

4.4. Policy recommendations related to the recognition justice tenet

- **Take an intersectional approach to address multiple issues associated with energy poverty and energy vulnerability**
  In EU policy agendas, energy poverty is normally considered in connection with the issues of energy affordability, energy efficiency, health and income. To ensure that energy vulnerability and poverty are being tackled in a systematic manner, key intersectionalities leading to deterioration in the well-being of certain groups and individuals must be examined. These include, for example, transport poverty, access to affordable ways to increase energy efficiency, access to quality housing, etc.

- **Support social innovation within the energy transition to "leave no one behind"**
  Innovative social practices are as important for the energy transition as technological innovations. Successful implementation of "leave no one behind" principles requires knowledge and commitment. Recognition justice principles can be applied here to assess who the affected and vulnerable groups are and how their well-being can be improved. It is also important to acknowledge that situations of poverty, vulnerability and disenfranchisement change over time for some societal groups and individuals. Policies and strategies to tackle these should therefore be flexible and nuanced to ensure that everyone to whom those categories apply is properly taken into account. For example, energy communities – one of the most successful forms of citizen-driven energy action – although proven to be an effective tool for benefiting social innovation and a just energy transition, often lack instruments for including and empowering vulnerable groups. Consequently, it is crucial to support policy and legislation frameworks for a "non-elitist" approach to social innovation. For example, policies need to support schemes in which energy communities can include low-income participants without relying on external funding.

- **Prioritise recognition justice principles when implementing the skills agenda for the clean energy transition**

  The shortage of skills required to achieve the goals of the clean energy transition is one of the main bottlenecks of accelerated clean energy transitions. Design and implementation of training and retraining programmes in the EU Member States and Associated Countries should not only prioritise the key groups that might be adversely affected by the clean energy transitions (e.g. coal miners) but also consider a broad range of disadvantaged or discriminated groups of citizens and include, for example, the energy vulnerable, the energy poor, refugees and indigenous groups. On top of that, the gender equality principle must prevail, as it remains a major problem within the energy transition process.

References

[1] F. W. Geels, B. K. Sovacool, T. Schwanen, and S. Sorrell, 'Sociotechnical transitions for deep decarbonization', Science, vol. 357, no. 6357, pp. 1242–1244, Sep. 2017, doi: 10.1126/science.aao3760.

[2] B. K. Sovacool BK, Roman V. Sidortsov, and Benjamin R. Jones, Energy Security, Equality and Justice. Routledge, 2013. doi: 10.4324/9780203066348.

[3] S. Carley and D. M. Konisky, 'The justice and equity implications of the clean energy transition', Nat. Energy, vol. 5, no. 8, Art. no. 8, Aug. 2020, doi: 10.1038/s41560-020-0641-6.

[4] G. Pellegrini-Masini, A. Pirni, and S. Maran, 'Energy justice revisited: A critical review on the philosophical and political origins of equality', Energy Res. Soc. Sci., vol. 59, p. 101310, Jan. 2020, doi: 10.1016/j.erss.2019.101310.

[5] D. McCauley and R. Heffron, 'Just transition: Integrating climate, energy and environmental justice', Energy Policy, vol. 119, pp. 1–7, Aug. 2018, doi: 10.1016/j.enpol.2018.04.014.

[6] G. Walker, 'Environmental Justice and Normative Thinking', Antipode, vol. 41, no. 1, pp. 203–205, 2009, doi: 10.1111/j.1467-8330.2008.00663.x.

[7] D. A. McCauley, R. J. Heffron, H. Stephan, and K. Jenkins, 'Advancing Energy Justice: The Triumvirate of Tenets', Int. Energy Law Rev., vol. 32, no. 3, pp. 107–110, 2013.

[8] K. Jenkins, D. McCauley, R. Heffron, H. Stephan, and R. Rehner, 'Energy justice: A conceptual review', Energy Res. Soc. Sci., vol. 11, pp. 174–182, Jan. 2016, doi: 10.1016/j.erss.2015.10.004.

[9] J. von Platten, 'In the Name of Energy Efficiency: Justice and energy poverty in the energy transition of Swedish housing', Doctoral Thesis (compilation), Department of Building and Environmental Technology, Lund University, Lund, 2022.

[10] G. Pellegrini-Masini, A. Pirni, S. Maran, and C. A. Klöckner, 'Delivering a timely and Just Energy Transition: Which policy research priorities?', Environ. Policy Gov., vol. 30, no. 6, pp. 293–305, 2020, doi: 10.1002/eet.1892.

[11] R. Vasconcellos Oliveira, 'Back to the Future: The Potential of Intergenerational Justice for the Achievement of the Sustainable Development Goals', Sustainability, vol. 10, no. 2, Art. no. 2, Feb. 2018, doi: 10.3390/su10020427.

[12] S. Bouzarovski and S. Petrova, 'A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary', Energy Res. Soc. Sci., vol. 10, pp. 31–40, Nov. 2015, doi: 10.1016/j.erss.2015.06.007.

[13] A. Boeri, V. Gianfrate, S. O. M. Boulanger, and M. Massari, 'Future Design Approaches for Energy Poverty: Users Profiling and Services for No-Vulnerable Condition', Energies, vol. 13, no. 8, Art. no. 8, Jan. 2020, doi: 10.3390/en13082115.

[14] B. Boardman, 'Fuel poverty synthesis: Lessons learnt, actions needed', Energy Policy, vol. 49, pp. 143–148, Oct. 2012, doi: 10.1016/j.enpol.2012.02.035.

[15] H. Thomson, C. Snell, and S. Bouzarovski, 'Health, Well-Being and Energy Poverty in Europe: A Comparative Study of 32 European Countries', Int. J. Environ. Res. Public. Health, vol. 14, no. 6, p. 584, May 2017, doi: 10.3390/ijerph14060584.

[16] Chlechowitz Mara and Reuter Matthias, 'Energy Poverty in the EU. Policy Brief'. Odyssee-Mure project, 2021. [Online]. Available: https://www.odyssee-mure.eu/publications/policy-brief/european-energy-poverty.pdf

[17] J. Zhao, Q. Jiang, X. Dong, and K. Dong, 'Assessing energy poverty and its effect on CO2 emissions: The case of China', Energy Econ., vol. 97, p. 105191, May 2021, doi: 10.1016/j.eneco.2021.105191.

[18] F. Filippidou, N. Nieboer, and H. Visscher, 'Effectiveness of energy renovations: a reassessment based on actual consumption savings', Energy Effic., vol. 12, no. 1, pp. 19–35, Jan. 2019, doi: 10.1007/s12053-018-9634-8.

[19] E. Gnansounou, 'Assessing the energy vulnerability: Case of industrialised countries', Energy Policy, vol. 36, no. 10, pp. 3734–3744, Oct. 2008, doi: 10.1016/j.enpol.2008.07.004.

[20] A. Gatto and F. Busato, 'Energy vulnerability around the world: The global energy vulnerability index (GEVI)', J. Clean. Prod., vol. 253, p. 118691, Apr. 2020, doi: 10.1016/j.jclepro.2019.118691.

[21] N. Komendantova and A. Battaglini, 'Beyond Decide-Announce-Defend (DAD) and Not-in-My-Backyard (NIMBY) models? Addressing the social and public acceptance of electric transmission lines in Germany', Energy Res. Soc. Sci., vol. 22, pp. 224–231, Dec. 2016, doi: 10.1016/j.erss.2016.10.001.

[22] Wolsink Maarten, 'Fair Distribution of Power Generating Capacity: Justice, Microgrids and Utilizing the Common Pool of Renewable Energy', in Energy Justice in a Changing Climate. Social equity and low-carbon energy, Zed Books, 2013. [Online]. Available: 10.5040/9781350219908.ch-007

[23] F. Bartiaux, L. Schmidt, A. Horta, and A. Correia, 'Social diffusion of energy-related practices and representations: Patterns and policies in Portugal and Belgium', Energy Policy, vol. 88, pp. 413–421, Jan. 2016, doi: 10.1016/j.enpol.2015.10.046.

[24] L. E. Egner and C. A. Klöckner, 'Temporal spillover of private housing energy retrofitting: Distribution of home energy retrofits and implications for subsidy policies', Energy Policy, vol. 157, p. 112451, Oct. 2021, doi: 10.1016/j.enpol.2021.112451.

[25] N. Healy and J. Barry, 'Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition"', Energy Policy, vol. 108, pp. 451–459, Sep. 2017, doi: 10.1016/j.enpol.2017.06.014.

[26] M. C. LaBelle, 'In pursuit of energy justice', Energy Policy, vol. 107, pp. 615–620, Aug. 2017, doi: 10.1016/j.enpol.2017.03.054.

[27] A. Perchard and N. Mackenzie, '"Too much on the Highlands?" Recasting the Economic History of the Highlands and Islands', North. Scotl., vol. 4, no. 1, pp. 3–22, May 2013, doi: 10.3366/nor.2013.0049.
[28] J. Melvin, 'The split incentives energy efficiency problem: Evidence of underinvestment by landlords', Energy Policy, vol. 115, pp. 342–352, Apr. 2018, doi: 10.1016/j.enpol.2017.11.069.
[29] R. Gillard, C. Snell, and M. Bevan, 'Advancing an energy justice perspective of fuel poverty: Household vulnerability and domestic retrofit policy in the United Kingdom', Energy Res. Soc. Sci., vol. 29, pp. 53–61, Jul. 2017, doi: 10.1016/j.erss.2017.05.012.
[30] P. Grösche and C. Schröder, 'On the redistributive effects of Germany's feed-in tariff', Empir. Econ., vol. 46, no. 4, pp. 1339–1383, Jun. 2014, doi: 10.1007/s00181-013-0728-z.
[31] L. Schlesewsky and S. Winter, 'Inequalities in Energy Transition: The Case of Network Charges in Germany', Int. J. Energy Econ. Policy, vol. 8, no. 6, Art. no. 6, Oct. 2018.
[32] R. Pollin and B. Callaci, 'The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States', Labor Stud. J., vol. 44, no. 2, pp. 93–138, Jun. 2019, doi: 10.1177/0160449X18787051.
[33] D. van der Horst and D. Toke, 'Exploring the landscape of wind farm developments; local area characteristics and planning process outcomes in rural England', Land Use Policy, vol. 27, no. 2, pp. 214–221, Apr. 2010, doi: 10.1016/j.landusepol.2009.05.006.
[34] D. Kemp, C. J. Bond, D. M. Franks, and C. Cote, 'Mining, water and human rights: making the connection', J. Clean. Prod., vol. 18, no. 15, pp. 1553–1562, Nov. 2010, doi: 10.1016/j.jclepro.2010.06.008.
[35] D. B. Agusdinata, W. Liu, H. Eakin, and H. Romero, 'Socio-environmental impacts of lithium mineral extraction: towards a research agenda', Environ. Res. Lett., vol. 13, no. 12, p. 123001, Nov. 2018, doi: 10.1088/1748-9326/aae9b1.
[36] P. L. Billon, The Geopolitics of Resource Wars. Routledge, 2017.
[37] Pellegrini-Masini, G., Corvino, F., and Pirni, A., A Research Agenda for Climate Justice. Edward Elgar Publishing, 2019. Accessed: Dec. 21, 2022. [Online]. Available: https://www.elgaronline.com/display/edcoll/9781788118163/9781788118163.xml
[38] P. Newell and D. Mulvaney, 'The political economy of the "just transition"', Geogr. J., vol. 179, no. 2, pp. 132–140, 2013, doi: 10.1111/geoj.12008.
[39] S. Määttä, 'Rethinking collaborative action and citizen empowerment: Characterising a Whole-of-Society approach to the energy transition', Energy Res. Soc. Sci., vol. 81, p. 102277, Nov. 2021, doi: 10.1016/j.erss.2021.102277.
[40] G. Pellegrini-Masini, F. Corvino, and A. Pirni, 'Climate justice in practice: adapting democratic institutions for environmental citizenship', Res. Agenda Clim. Justice, pp. 104–117, Nov. 2019.
[41] F. Corvino, G. Pellegrini-Masini, A. Pirni, and S. Maran, 'Compensation for Energy Infrastructures: Can a Capability Approach be More Equitable?', J. Hum. Dev. Capab., vol. 22, no. 2, pp. 197–217, Apr. 2021, doi: 10.1080/19452829.2021.1887106.
[42] R. Wüstenhagen, M. Wolsink, and M. J. Bürer, 'Social acceptance of renewable energy innovation: An introduction to the concept', Energy Policy, vol. 35, no. 5, pp. 2683–2691, May 2007, doi: 10.1016/j.enpol.2006.12.001.
[43] S. H. Lundheim, G. Pellegrini-Masini, C. A. Klöckner, and S. Geiss, 'Developing a Theoretical Framework to Explain the Social Acceptability of Wind Energy', Energies, vol. 15, no. 14, Art. no. 14, Jan. 2022, doi: 10.3390/en15144934.
[44] G. Walker and R. Day, 'Fuel poverty as injustice: Integrating distribution, recognition and procedure in the struggle for affordable warmth', Energy Policy, vol. 49, pp. 69–75, Oct. 2012, doi: 10.1016/j.enpol.2012.01.044.
[45] N. DellaValle and V. Czako, 'Empowering energy citizenship among the energy poor', Energy Res. Soc. Sci., vol. 89, p. 102654, Jul. 2022, doi: 10.1016/j.erss.2022.102654.
[46] N. Shortt and J. Rugkåsa, '"The walls were so damp and cold" fuel poverty and ill health in Northern Ireland: Results from a housing intervention', Health Place, vol. 13, no. 1, pp. 99–110, Mar. 2007, doi: 10.1016/j.healthplace.2005.10.004.
[47] N. Longhurst and T. Hargreaves, 'Emotions and fuel poverty: The lived experience of social housing tenants in the United Kingdom', Energy Res. Soc. Sci., vol. 56, p. 101207, Oct. 2019, doi: 10.1016/j.erss.2019.05.017.
[48] L. I. Brand-Correa and J. K. Steinberger, 'A Framework for Decoupling Human Need Satisfaction From Energy Use', Ecol. Econ., vol. 141, pp. 43–52, Nov. 2017, doi: 10.1016/j.ecolecon.2017.05.019.
[49] J. Smith and M. M. High, 'Exploring the anthropology of energy: Ethnography, energy and ethics', Energy Res. Soc. Sci., vol. 30, pp. 1–6, Aug. 2017, doi: 10.1016/j.erss.2017.06.027.
[50] C. Sanchez-Guevara, M. Núñez Peiró, J. Taylor, A. Mavrogianni, and J. Neila González, 'Assessing population vulnerability towards summer energy poverty: Case studies of Madrid and London', Energy Build., vol. 190, pp. 132–143, May 2019, doi: 10.1016/j.enbuild.2019.02.024.
[51] D. Ivanova and L. Middlemiss, 'Characterizing the energy use of disabled people in the European Union towards inclusion in the energy transition', Nat. Energy, vol. 6, no. 12, Art. no. 12, Dec. 2021, doi: 10.1038/s41560-021-00932-4.
[52] K. Großmann and A. Kahlheber, : 'On multiple deprivation, discriminatory systems, and the effects of policies', in Energy Poverty and Vulnerability, Routledge, 2017.
[53] B. K. Sovacool, M. Burke, L. Baker, C. K. Kotikalapudi, and H. Wlokas, 'New frontiers and conceptual frameworks for energy justice', Energy Policy, vol. 105, pp. 677–691, Jun. 2017, doi: 10.1016/j.enpol.2017.03.005.
[54] C. Robinson and G. Mattioli, 'Double energy vulnerability: Spatial intersections of domestic and transport energy poverty in England', Energy Res. Soc. Sci., vol. 70, p. 101699, Dec. 2020, doi: 10.1016/j.erss.2020.101699.

[55] N. Simcock, K. E. H. Jenkins, M. Lacey-Barnacle, M. Martiskainen, G. Mattioli, and D. Hopkins, 'Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north', Energy Res. Soc. Sci., vol. 82, p. 102351, Dec. 2021, doi: 10.1016/j.erss.2021.102351.
[56] T. L. Bredvold, '"Where no one is poor, and energy is abundant": A study of energy poverty in Norwegian households', Master thesis, 2020. Accessed: Dec. 19, 2022. [Online]. Available: https://www.duo.uio.no/handle/10852/80221
[57] R. Listo, 'Gender myths in energy poverty literature: A Critical Discourse Analysis', Energy Res. Soc. Sci., vol. 38, pp. 9–18, Apr. 2018, doi: 10.1016/j.erss.2018.01.010.
[58] E. D. Rasch and M. Köhne, 'Practices and imaginations of energy justice in transition. A case study of the Noordoostpolder, the Netherlands', Energy Policy, vol. 107, pp. 607–614, Aug. 2017, doi: 10.1016/j.enpol.2017.03.037.
[59] W. Guoyu, Guan, Jianing, and Li Lei, 'Energy Justice and Construction of Community with a Shared Future for Mankind', in Energy Justice Accross Borders, Springer Open, 2020. [Online]. Available: https://doi.org/10.1007/978-3-030-24021-9
[60] E. Cornago, 'The EU emissions trading system after the energy price spike', Centre for European Reform, 2022. [Online]. Available: https://www.cer.org.uk/sites/default/files/pbrief_ets_EC_4.4.22.pdf
[61] A. Sciullo et al., 'Exploring Institutional and Socio-Economic Settings for the Development of Energy Communities in Europe', Energies, vol. 15, no. 4, Art. no. 4, Jan. 2022, doi: 10.3390/en15041597.
[62] L. Mendicino et al., 'DSO Flexibility Market Framework for Renewable Energy Community of Nanogrids', Energies, vol. 14, no. 12, Art. no. 12, Jan. 2021, doi: 10.3390/en14123460.
[63] H. Algarvio, 'The Role of Local Citizen Energy Communities in the Road to Carbon-Neutral Power Systems: Outcomes from a Case Study in Portugal', Smart Cities, vol. 4, no. 2, Art. no. 2, Jun. 2021, doi: 10.3390/smartcities4020043.
[64] E. Creamer, G. Taylor Aiken, B. van Veelen, G. Walker, and P. Devine-Wright, 'Community renewable energy: What does it do? Walker and Devine-Wright (2008) ten years on', Energy Res. Soc. Sci., vol. 57, p. 101223, Nov. 2019, doi: 10.1016/j.erss.2019.101223.
[65] I. Mamounakis, N. Efthymiopoulos, P. Makris, D. J. Vergados, G. Tsaousoglou, and E. (Manos) Varvarigos, 'A novel pricing scheme for managing virtual energy communities and promoting behavioral change towards energy efficiency', Electr. Power Syst. Res., vol. 167, pp. 130–137, Feb. 2019, doi: 10.1016/j.epsr.2018.10.028.
[66] J. Lowitzsch, C. E. Hoicka, and F. J. van Tulder, 'Renewable energy communities under the 2019 European Clean Energy Package – Governance model for the energy clusters of the future?', Renew. Sustain. Energy Rev., vol. 122, p. 109489, Apr. 2020, doi: 10.1016/j.rser.2019.109489.
[67] A. Felice, L. Rakocevic, L. Peeters, M. Messagie, T. Coosemans, and L. Ramirez Camargo, 'Renewable energy communities: Do they have a business case in Flanders?', Appl. Energy, vol. 322, p. 119419, Sep. 2022, doi: 10.1016/j.apenergy.2022.119419.
[68] Joint Research Center (EC), 'Energy communities - Publications Office of the EU'. Accessed: Dec. 19, 2022. [Online]. Available: https://op.europa.eu/en/publication-detail/-/publication/a2df89ea-545a-11ea-aece-01aa75ed71a1/language-en
[69] EERA, 'Energy demand reduction as part of the clean energy transition in Europe: Research and policy strategies', 2023. [Online]. Available: https://www.eera-set.eu/component/attachments/attachments.html?task=view&id=1234
[70] S. Sareen, H. Thomson, S. Tirado Herrero, J. P. Gouveia, I. Lippert, and A. Lis, 'European energy poverty metrics: Scales, prospects and limits', Glob. Transit., vol. 2, pp. 26–36, Jan. 2020, doi: 10.1016/j.glt.2020.01.003.
[71] J. P. Gouveia, P. Palma, and S. G. Simoes, 'Energy poverty vulnerability index: A multidimensional tool to identify hotspots for local action', Energy Rep., vol. 5, pp. 187–201, Nov. 2019, doi: 10.1016/j.egyr.2018.12.004.

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