The role of justice and equity in energy transition

Concepts, theories and empirical findings

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Table of Contents

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I. Introduction

1.1 Background

During the years that have followed the emerging consensus on the need for energy transition, the energy debate has generally been reduced to scientific, technological and economic matters. However, as argued by Angel (2016, 7), the political content of renewable energy transition has to be brought back if we are to challenge the energy status quo; questions of conflicts of interests, ownership and inequalities are to be asked and cannot be addressed through mainstream approaches to energy system such as economics, although it has been dominating policy-making fields. It is in this context that questions of energy justice emerged with a particular focus on distributional and procedural issues. As it will be argued, this is all the more relevant in regard to a transition to renewable energy. Indeed, energy transition is likely to contribute to unequal outcomes distribution horizontally – across different local geographies, incomes groups, genders, etc. but also vertically in regard to generations – if the energy model stays centralized, dominated by those who have historically been beneficiating from the energy system.

1.2 Objective

The aim of this report is to offer a thorough review of the literature that has been produced on the issues of justice and equity regarding the transition to renewable energy. As academia has been producing extensive amount of literature on issues of fairness and equity in energy and in energy transition, a wide number of concepts and frameworks have been created. While those terms often overlap in their meaning, they also offer slight nuances and insights which hence often make them complementary. This report thus attempts to provide comprehensive definitions of such concepts, with a particular focus being given to energy justice and equity in order to clarify and structure the different findings and knowledge available. The way energy justice is understood and used by different fields of academia will thus be implied throughout the theoretical framework but will be further clarified. Following this first objective, this report will use the energy justice framework as a conceptual tool to focus on the procedural and distributive aspects of energy systems and policies. Doing so will allow a thorough assessment of processes and outcomes

regarding the transition to renewable energy and will shed light on the different barriers which undermine fairer and more equitable energy patterns. The rationale behind such report is mainly the normative belief that this transition could and should bring more equal and fair benefits to everyone, meanwhile such fairness in distribution and processes will intrinsically beneficiate a transition to renewable energy which is far beyond necessary in regard to climate change. Both these normative and instrumental perspectives will be developed all throughout this report.

1.3 Scope of the research and limitations

When looking at issues of procedural and distributional justice – and injustices, a wide range of geographical and temporal focus could be chosen and used. In order for this paper to be useful in a Norwegian context, closely related case studies have been chosen in addition to a theoretical framework directed towards a northern/western and "developed economy" perspective. For that reason and because of the prevalent amount of research produced on those countries, the report has had a particular focus on countries such as Denmark, Germany and the United Kingdom. Another limitation worth highlighting is the lack of reference and insights on technical issues. Although energy issues and energy policies are highly dependent of technical possibilities, these have not been highlighted in this report and should be of consideration when looking particularly at the Norwegian context. Moreover, this report focuses particularly on energy community and hence doesn't provide a full review of the distributional impacts resulting from renewable energy policies.

1.4 Report's structure

The first part of this report will focus on the theoretical framework. Doing so, I will first look into the origins of energy justice which finds its foundations on environmental justice and finally became relevant in a transition to renewable energy context. I then further define and describe the concept and frameworks of energy justice, introducing its three core tenets (distributional, procedural and recognition justice) and eight pillars. I then look into the different concepts which are similar, complementary and/or overlapping energy justice. I start with energy equity which shares similar philosophical ground before introducing energy poverty and vulnerability which both relate to the distributional aspect of energy justice. I then go into energy democracy, community and citizenship which refer to some extent to the procedural aspect of

renewable energy. This brings up the different forms of collectivities and forms of energy participation which I describe briefly in order to clarify the different terms used further in the report. I finish this theoretical framework by offering insights on the relation between different academic disciplines, such as economic, business and law – which have been chosen in regard to their important role in policy-making – and energy justice.

The second part of this report intends to map the empirical research that have been produced in regard to energy justice. In order to do so I have chosen to structure the findings according to the procedural and distributional aspects of energy justice. In regard to the procedural aspect, I have first divided the findings into the normative and instrumental arguments within which I used the multi-level perspective on socio-technical transitions to shed light on the different instrumental arguments; the questions answered here are "why and how would a participative energy transition (under the form of participatory governance or community ownership) facilitate the transition to renewable, and more so a just and fair one? I then address the distributive finding; I briefly give an account of the consequences resulting from a transition to renewable energy on a larger, national scale where the cost of the transition often influences energy poverty and energy vulnerability. I then more thoroughly look into the local scale and provide an overview of the distribution of ills and benefits related to the local development of renewable energy projects, might them be community-owned or conventional projects. I finish by giving a quick account of the relevance of such research in regard to the Norwegian context.

II. Theoretical framework

2.1 Origins and evolution of energy justice

2.1.1 Environmental justice

The history of environmental justice starts in the early 1960s as the first cases of degradation of land and environmental injustices towards racial minority communities started being documented across the United States. It is in the 1980s that this isolated protesting led to the creation of a national social and racial movement under the "environmental justice movement", thus seeking social justice and environmental protection and reaching the political agenda. By the mid-1990s, this public concern transformed itself as to include other discriminations such as those made towards women, children and the poor (Bowen and Wells 2002).

In parallel to this social movement, a supporting interdisciplinary body of academic literature was developed under the "environmental justice" framework whose particular focus was hence on the consequences of environmental degradation and on subsequent remedial measures from a social justice perspective. With the use of theories and disciplines such as the philosophy of justice, environmental laws, policy, governance, sustainability and political ecology, the environmental justice literature often highlights unjust burden of environmental hazards which have been imposed upon communities of color and on low-income communities (Dobson 1998).

A major contributor to such literature was Robert Bullard who also questioned the political decisions leading to environmental discriminations (1994). The primary assessment of cost and benefit distribution is thus also combined with a thorough look into decision-making inputs since, according to Scholberg (2009), environmental justice should take into consideration the processes that construct the maldistribution and focus on social recognition so as to attain justice. Energy justice has its root on this environmental justice concept from which three previous mentioned attributes were drawn; the energy justice literature integrated energy justice as an issue of *distribution* of risks and benefits, *procedure* and *recognition* (McCauley et al 2013; Jenkins 2018).

2.1.2 Energy focus

Thus, both theoretical framework shares similar philosophical approach as they seek justice and equity, but with energy justice paying particular attention to energy policies and key elements of the energy system (McCauley et al 2013) and having for main objective to "provide all individuals

across all areas with safe, affordable and sustainable energy" (Jenkins 2018, 119). This particular focus on energy was also enriched by the concept of 'energy poverty' which looked into energy policies in developing countries and has normatively been promoting a just and spread access to energy (Szulecki 2018).

Energy justice in that sense, focuses on input and output legitimacy with its sub-concerns being good governance, availability, affordability, inter- and intra- generational equity as well as sustainability (Sovacool and Dworkin 2015). It does so by looking into energy systems and energy policies at each stage, including for instance the process of mining, the management of waste, or energy consumption while engaging at a local, regional, national and international level (Jenkins 2018). Until today, the energy sector has been strewn with harmful consequences for discriminated communities. This is in contrast to the green transition which is often seen as promising in regard to sustainability and justice. However, it can be of false promise if it worsens or creates new social inequity or negative impacts on the ecosystem (Mascarenhas-Swan 2017).

2.1.3 Transition to renewable energy

Due to ageing infrastructure, limited energy resources and diverse energy production externalities such as those concerning the environment or the health sector, it seems that the energy sector will have to face a transition, perhaps heading towards a third energy revolution (Szulecki 2018). However, as put by Mascarenhas-Swan (2017, 38), although a transition is inevitable, justice is not. A new energy system could become exclusionary with new innovations brought by large companies, thus excluding the poor and creating new negative externalities whereas reframing the issue, hence conceding importance to justice matters, could lead to overall higher range of social norms and values (Jenkins et al 2018, 66). Accordingly, to describe the dynamic of energy resource, McCurtry and Tarhan (2016) for the CIRIEC congress cited:

> *"While the transition away from fossil-based resources is an important component of the fight against climate change, what is often overlooked is the centralized ownership and control of electricity generation by corporate and state actors. This ownership scheme overwhelmingly favors electricity generation for the sake of profit and growth instead of human and ecological realities. Meanwhile, those who are most directly impacted by the destructive elements of the electricity sector, namely community members and workers worldwide, are excluded from ownership and circles of decision-making. This lack of democracy in the economic and political realms produced and reproduced daily by capitalistic social relations."*

Because a low-carbon transition could become unfair and unequal without a mindful governance and distributional justice concerns (Jenkins et al 2018, 68), justice and ethics should be included in our analytical framework when approaching energy transition, defined by Sovacool (2016, 205) as in "a change in an energy system, usually to a particular fuel source, technology, or prime mover (a device that converts energy into useful services, such as an automobile or television)". Hence, in regard to a transition to renewable energy system, energy justice could allow us to "identify strategies for sharing benefits and burdens in a fair way, and ensure that energy decision-making is representative and consistent with due process particularly with respect to vulnerable and marginalized groups" (Forman 2017, 650). For this reason, 'energy justice' has been used and combined with energy transition theories and research over the past years through a socio-technological lens, allowing social elements that have been left apart to be made visible (see Miller et al 2013; Jenkins et al 2018).

To sum up, energy justice was first drawn from the environmental justice concept from which three main tenets were borrowed: distributional justice, recognition-based justice and procedural justice. This was however narrowed down to issues of energy and thus consisting in the analysis of energy systems and energy policies within an ethical and justice framework. Over the past years, the framework of energy justice happened to be applied to the even-narrower issue of energy transition since the importance of doing so has been highlighted by many authors. Now that the origins and evolution of energy justice has been mapped, the concept will be thoroughly conceptualized.

2.2 Conceptualizing energy justice

The development of a new energy system based on new infrastructures entails opportunities and thus could enhance the importance given to the social dimensions of energy production and consumption (Miller et al 2013, 146). According to Miller (2012), energy justice involves "choices about what kind of energy system to build for the future, where to build them and how to distribute their benefits, costs and risks". In response to such concern, energy justice offers philosophical and ethical answers so as to decide the kind of energy system we should be seeking to obtain in the future. This first normative output is further completed by an evaluative function since energy justice can serve as an important analytical tool for energy researchers and policy-makers (Jenkins et al 2016). This section will first shed light on the distinct philosophical ground and reflection

under the concept of energy justice. Then the three main tenets of energy justice will be introduced and developed, finally leading to the eight principles that should underpin decision-making processes. This comprehensive framework can hence be applied to energy policies and key themes of energy system. However, and as cited by Rasch and Köhne (2017, 608) it is important to keep in mind that "the meaning of energy justice, like environmental justice, is not something static that can be check-listed, but rather a process of co-construction of meaning between activists, policy makers and scholars" and is context-bound, as "imaginations and practices of energy justice are rooted in local history and power relations and are formed in relation to specific energy actualities" (Ibid, 613).

2.2.1 Philosophical ground

With the threat of climate change and rising sea level, the health risks related to high level of pollution and aggravated insecurity of energy fuels, danger related to nuclear sources and so on (Kuzemko et Al 2016), the energy field requires answers and guidance that cannot be provided by conventional energy planning and analysis. As opposed to these mainstream approaches, answers should be somewhat based on ethics, morality and equity. In that sense, energy justice can provide us with a new way of thinking about and approach the world's energy problems, and thus put energy security and access in the center of the conversation, jointly with concerns over happiness, welfare, freedom, equity and due process (see annex 1).

With a focus on the concept of "justice", we can distinguish two main moral philosophy foundations. First of all, the deontological philosophy school represented by Kant and Nozick claims that what matters is the overall process; therefore, appropriately designed decision-making mechanisms, being inclusive and participatory, are necessary. The consequentialist moral philosophy school, on the opposite, gives priority to outcomes over rights and processes. This is adopted with some variation by most utilitarian such as John Stuart Mill, Rawls or Sen. However, most definitions of Energy Justice -as for Environmental Justice- integrate rights, processes and outcomes as important elements that cannot be seen independently (Krieger et al).

Although justice can hardly be defined and has been understood differently over the past centuries, Sovacool and Dworking (2015) eventually reached the conclusion that justice should be comprehended through its functional sense; by observing its effect on actual decision. As stated by the justice theorist Michael Sandel (2009, 19), "a just society distributes the goods we prize in the right way, it gives each person his or her due". Thus, decision-makers -in a broad sense- should

be pursuing equitable actions as in maintaining or reinstate balance and fair distribution. Drawing from all these insights, Sovacool and Dworkin (2015, 436) define the concept of energy justice as ***"A global energy system that fairly disseminates both the benefits and costs of energy services, and one that has representative and impartial energy decision-making***".

This leads us back to an equity and distributive justice perspective, where the focus is on the distribution of material outcome may they be public goods (resources, wealth, services) or public bads (pollution, poverty, etc). This understanding of justice also involves the procedural justice aspect which looks into the way decisions are made, who is involved and what might influence the decisions; energy procedures should be fair, with stakeholders having access to information and participation in decision-making (Sovacool and Dworkin 2015).

2.2.2 Three tenets

As previously mentioned and in regard to its philosophical background, energy justice combines three core tenets: distributional, recognition and procedural. These three pillars are interlinked and cover many overlapping issues (McCauley et al 2013). Based on these three elements, the energy justice intends to be an integrated and synthetic framework allowing us to shed light on injustices, develop new processes of avoidance and recognize marginal segments of the society (Jenkins et Al, 2016). These are central in the operationalization of the energy justice framework.

Distributional justice

Distributional justice is a spatial concept that comprises the unequal distribution of benefits and ills, as well as their consequences and responsibilities (such as exposure to risk and the resources needed to overcome those). The main concern here is to shed light on the distribution of public goods and public bads among a society, calling for the even distribution of benefits and ills regardless of income, race, etc. (McCauley et Al 2013). Hence, questions over particular technologies being deployed are asked in relation to specific localities and particularities. In regard to energy, this first focus on infrastructure is completed as it also includes the distributional burden of energy prices impacting energy services. This is particularly relevant in the case of the transition to renewable energy since the investment required for such transition might be placed over the shoulder of the society, impacting the access to services of those that are vulnerable and thus become a burden for part of the society (Jenkins et al 2016). Availability, accessibility and affordability are important concerns, especially in regard to the transition to renewable energy.

Justice is also relevant when looking at the distribution of the benefits. An important part of the distributional tenet is thus to investigate the unfair spread of benefits and their role in creating new injustices. In regard to the normative insight of energy justice, highlighting these injustices could and should enhance the redistribution of such benefits (Jenkins et Al 2018).

Procedural justice

Procedural justice involves the need for equitable and non-discriminatory procedures that engage all stakeholders (Walker, 2009). Hence, every impacted or concerned group should be able and allowed to participate in the decision-making processes, with their decision being taken seriously, impartially, and eventually having concrete impacts on decisions and future implications. Reaching such a level of participation requires a full information disclosure with a high-level transparency (from government and industries) in a system of appropriate and inclusive engagement mechanisms (McCauley et Al 2013). Hence, procedural justice approaches *how* decisions are taken in the pursuit of social goals, but also *who* influences decision-making and is involved in the process. These questions, and more generally procedural justice, are reflected in four different elements; (1) access to information, (2) access to meaningful participation, (3) lack of bias from decision-makers and (4) possibility to access legal processes for appeal (Sovacool and Dworkin 2015). This procedural focus reflects both legal aspects - through multi-level governance for instance - and softer elements such as practices, norms, values and behaviors (Jenkins et Al 2016). This tenet shares similar elements and ground with the framework of energy democracy which will be further developed below.

Zoellner et al (2008) argue that in the case of renewable-energy projects, in order to have a successful and non-conflicting process, six essential procedural criteria should be taken into account when planning and building the projects. These criteria, postulated by Leventhal (1980) are (a) the equal treatment of persons and situations (consistency); (b) the absence of self-interest (bias-suppression); (c) full and correct information (accuracy); (d) the possibility to retract decision (correctability); (e) the involvement of all parties into the decision-making process (representativeness); (f) the adherence to elementary moral and ethical values (ethicality).

Recognition Justice

Recognition justice has to be differentiated from procedural justice as it refers to “the process of disrespect, insult and degradation that devalue some people and some place identities in comparison to others” (Walker 2009, 615). According to this, all individuals should be more than tolerated as they should be fairly represented and free from any physical threats and insecurities.

As opposed, failing to acknowledge them might take several forms such as political domination, insults, degradation and devaluation. Not only can this be the result of a lack of recognition, it can also stem from misrecognition; a misunderstanding in regard to people's view. Hence, it is important to recognize the different perspectives and opinions within social, cultural, ethnic, racial and gender differences (Schlosberg 2003).

2.2.3 Eight principles

In addition to the three main pillars of the energy justice concept, **Sovacool and Dworkin** (2015) and Sovacool et al (2016) suggest a comprehensive energy justice decision-making framework that can be used to assess the quality of decision-making and energy systems. This framework is based on eight main aspects (see annex 2) which should be promoted by and actively guiding energy decisions as it comprehensively address a wide area of justice concerns. Those elements have for ambition to be synthetic meanwhile intertwining many notions of justice, underpinning a wide array of ideas under the pillars of distribution, procedural and recognition justice. This eight-principle decision-making framework is however considerably more complex regarding the operationalization in research and policy and thus has been less used in the energy justice literature than the three core-tenets framework (Sari et al 2017, 6). This goes in accordance with the review of empirical work on energy justice where these eight elements are often mentioned but rarely used for operationalization.

Availability

This element refers to the basic capacity of an economy, market or system to guarantee sufficient energy resources when needed. This refers to other concerns such as security of supply, sufficiency and reliability. Assessing the availability of energy is possible when simultaneously looking into the physical resources present in a geographical area and the technological solutions available to produce, transport, conserve, store or distribute energy. Consequently, the amount of capital and investment required to keep such system functioning should be taken into account. The diversity of resources as well as the ability to promote infrastructure that can bear accidental and intentional disruption are two main elements to take into consideration.

Affordability

The term affordability here has two main meanings. First and most obviously, prices should be sufficiently low for energy consumers who subsequently can beneficiate from warm and lit homes and other necessary energy services. It also entails that energy bills should not overly

burden consumers; prices should be stable, equitable and shouldn't require lower income households to spend an overwhelming share of their income on essential services. This brings up the distinction between relatively or absolutely income-poor households. Consequently, highly available fuel and resources is pointless unless consumers and more precisely households can afford and utilize such resources.

Due Process

Mainly reflecting the procedural tenet of energy justice, the due process element focuses on the necessity for the effective participation of every stakeholders in the energy policy making process, and the possibility to appeal against decisions taken through judicial and administrative remedies and forms of redress, with neutral arbitration available when or if conflicts rises. Consequently, it implies that communities should be involved in deciding about projects, and even more so when directly influenced by such measures. They should be given fair and informed consent while the projects should be based on environmental and social impact assessments involving genuine community participation.

Good Governance

Such due process goes hand in hand with good governance principle according to which everybody should have access to high-quality information about energy and the environment if we are to minimize corruption and improve accountability of energy actors. Good governance, which is seen as valuable in our society, centers on democratic and transparent decision-making processes and financial accounting, effective measures against corruption and information about energy revenues and policies. Information, accountability and transparency are therefore the key elements of good governance, subsequently promoting democracy, business stability and confidence as well as social stability.

Sustainability

Sustainability commonly refers to the Brundtland Commission defined as "development that meets the needs of the present without compromising the ability of future generation to meet their own needs" (WCED 1987, 43). As for energy sustainability, it leads to the obligation for States to ensure the sustainable use of natural resource; use that doesn't lead to the fast depletion of the resources, that doesn't cause undue damage to the environment.

Intra-generational equity

Intra-generational equity induces distributive elements, having for main claim that present people have a right to access energy services fairly. It focuses on three aspects of distribution; (1)

what goods are to be distributed? (2) Between what groups/entities are they distributed? (3) On what is based the mode of distribution (e.g. merit, property rights)? Basing ourselves on the assumption that physical security is a basic right, it is argued that so are the conditions creating such security. Energy services which are enabling people to enjoy a minimum level of wellbeing are thus basic requirements.

Inter-generational equity

Inter-generational equity is about distributive justice between present and future generation, based on the assumption that future people hold the same right to enjoy a good life than us, contemporary humans. Consequently, it is our duty to ensure that our children and future generation don't inherit from a world worse than the one we have inherited ourselves. This entails our responsibility to prevent climate change through mitigation and to invest in adaption strategies.

Responsibility

This final principle underpins several of the previous ideas as it intends to shed light on the responsibilities shared by many of the energy actors. Nations first have the responsibility to protect the environment while minimizing negative externalities. More particularly, industrialized countries also have the responsibility for their consequences on climate change known under the "polluter pays principle". Moreover, current generations should protect the futures ones meanwhile humans acknowledge the importance of non-human species, as opposed to our mainstream anthropocentric vision. This environmental and responsible ethic is more certainly highly controversial.

2.3 Alternative and complementary concepts

There are several other concepts around environmental sustainability and political theory which have as particular focus energy systems. As a matter of fact, energy justice being such a comprehensive term (under the three pillars and 8 principles), other widespread academic concepts in the energy justice literature address some of the same issues under somewhat different angles. Such variation sometime stem from the academic field the concept arises from. It is interesting to approach such concepts in order to have an acquaintance with their literature and own conceptualized framework, which can further provide key tools for the operationalization of energy justice itself.

2.3.1 Energy equity

According to Sovacool et Dworkin (2014, 5), an energy-just world is one that "equitably shares both the benefits and burdens involved in the production and consumption of energy services as well as one that is fair in how it treats people and communities in energy decision-making". Fair distribution of costs and benefits, fair procedural aspect and recognition are key elements of this definition. Justice thus reflects equity which is to be accomplished through democratic ethic (Martinez 2017). Whereas it is based on a similar philosophical ground - reflecting on what is a "just" society - the energy equity concept focuses more particularly on the dimension of accessibility and affordability of energy sources and energy services (World Council 2015). Krieger et al., in their essay for InCluESEV have defined energy equity "in terms both of access to affordable, safe and reliable energy and the distribution of the risks and benefits of new technologies" through a contextualized perspective since those elements "vary over space and time, and between and within social groups".

When in regard to developing countries, much attention is paid to financial viability of energy project, as well as their losses and quality services. According to Ljung (2017) however, such efficiency improvement might only benefit the private owners and operators and not the consumers and the society at large. For this reason, to promote strategies for growth, sustainability and equity, we need to conduct an assessment of the overall impact on public welfare of energy projects and systems. In order to consider private enterprises as beneficial for developing countries, they should allow the introduction of smaller, locally owned and generating projects. Another approach of equity in regard to developing country is one from Grimpsy (2011) who approaches the matter of equity from a global perspective, claiming that developed nations owe to decrease their consumption and thus allowing developing ones to access more energy, vital for their development.

It is also interesting to distinguish the concept of energy equity from the seemingly alike concept of energy equality. Whereas energy inequality is a highly descriptive concept which focuses on the imbalances occurring in society, energy equity, as for energy justice, offers a more normative approach, designating some actions or outcome as desirable and permissible and others as non-desirable and non-permissible (Krieger et al).

As a conclusion, it is useful to bring back these elements to the more comprehensive framework of the energy justice theory. As they share a common philosophical ground, both concept of energy

justice and equity reflect on what a fair and just energy society should be and entail. Passed this normative insight, energy equity questions if the energy system provide energy services that is affordable, safe, and reliable with a fair distribution of risks and benefits in regard to a particular context. Therefore, in addition to base its ideology on the intra-generational equity principle according to which everybody should have access to energy services to fulfill needs, this concept mainly relates to the first two principles of energy justice; does the broad energy system offer energy services that are available and affordable for all?

2.3.2 Energy poverty

When questions of energy and social justice were raised in energy research over the past decade, it has mainly been through the concept of "fuel poverty" and "energy poverty" (Hall et al 2013). Fuel poverty, recent concept predominantly used in the UK, was first used to refer to the ability for a household to afford to heat its home to an adequate standard. In a pragmatic approach, relatively or absolutely energy/fuel poor households are at the intersection of household income, energy prices and energy efficiency (Boardman 1991). With a broader look into energy services, energy poverty is defined by Reddy (2000, 44) as "the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development." According to González-Eguino (2015), this definition is relevant as it embodies several key elements. Such elements entail slight variations when applied to "developed" or "developing" countries.

The *first element* refers to the access of basic services such as cooking, heating, but also other elements that are vital for social development and collective integration. In line with Sen Amartya's capability approach, this includes for instance access to education, health, information and participation in politics.

Second, it involves the physical ability to meet demand for energy services. This relate to the provision of energy services from the various sources of energy and to a larger extent to the reliability of the entire energy system. In contrast to "developed" countries, "developing" countries tend to be more vulnerable as they have less alternative in energy resources.

Third, technologies must be reliable and safe, thus not incline to continual breaks in services nor likely to endanger health and physical wellbeing (González-Eguino 2013).

Fourth, technologies must be affordable. In developing countries, this means that they should be as cheap as possible compared to other alternative available. As average income raises biomass

sources tend to be progressively replaced by oil, kerosene and ultimately electricity. This is commonly known as the "energy ladder theory" according to which lower-quality fuels are replaced by higher-quality fuel as income increases; It is however important to note that low-quality fuels aren't always the cheapest, they simply tend to be the only option (González-Eguino 2015). In regard to developed countries such as in the European context, it usually reflects the burden of rising energy prices for households and individuals who cannot afford (absolute poverty) or who have to pour a substantial amount of their income (relative poverty) into energy and energy services which are deemed necessary (Hall et al 2013). Some provide more quantified definition such as the United Kingdom, for instance, according to who households shouldn't pour more than 10% of their income into fuel to maintain an adequate level of warmth -21° for main living area (Hiteva 2013, 492).

Whereas this 'energy poverty' concept reflects the way unfairness and disadvantages are created within energy system through measurements and distributions, it has been unable to engage with the wider spectrum of equity, justice and vulnerability (Hall et al 2013). Indeed, this concept is not comprehensive and doesn't take into consideration matters of ethics and fair sharing of resources. Hiteva (2013) goes that way as she argues that looking at fuel poverty through its three common main elements; energy price, income and structures leads to only examining the implications of fuel poverty at the end of the pipeline; this perspective cannot be sufficient since energy challenges are created all through the energy system.

In regard to energy justice, we can say that energy poverty defined this way is captured quite thoroughly by the distribution tenet and share the availability and affordability principles with energy justice. However, due to the very precise focus of the concept, Grimsby (2011) claims that energy poverty is not sufficient to assess energy systems and energy policies, or when trying to achieve access to energy for everyone, on a national or international scale -such as promoted by the Millennium Development Goals.

2.3.3 Energy vulnerability

The concept of energy vulnerability is very similar yet complementary to the one of energy poverty. It reflects the propensity of being unable to secure materially or socially needed levels of domestic energy services. This risk of becoming energy poor is at the intersection of energy needs and practices, energy affordability and energy efficiency (Bouzarovski and Petrova 2015). By attempting to create links between the socio-demographic and housing vulnerabilities, thus

shedding light on what causes energy poverty, Bouzarovski and Thamson (2018) attempt to reveal systemic underpinning of energy injustices.

The goal of such framework is to understand the broader socio-technical risks that drag households into energy poverty across space and over time. To operationalize such phenomena, a mainstream approach is to look into higher energy prices and lower incomes, the inability to invest in the energy efficiency of a home, the inability to purchase cheaper fuels. It might also address the greater energy needs of some (Bouzarovski and Thomson 2015). Hence, this concept also wishes to recognize those who are more likely to suffer from energy poverty. It commonly refers to vulnerable households which are defined as "those containing older householders, families with children and householders who are disabled or suffering from a long-term illness" (Moore 2012, 24).

As is the case for energy poverty, this mainstream definition of energy vulnerabilities should, according to Hall et al (2013), be widened. Energy vulnerabilities are constituted in everyday life through experiences within the home, through the use of materials and technology, etc. Hence, the concept of energy vulnerabilities should also aspire to shed light on the unequal energy practices which reflects and reinforce existing power structures. It is not only a matter of prices and income; attention should be paid to structural differences that are produced and reinforced over time and through space. Energy vulnerabilities being such a dynamic phenomenon, it can be operationalized and constructed in many ways while being hardly reduced to one single metric (Hall et al 2013, 416).

This academic concept enters once more the distribution spectrum of energy justice, while borrowing some of its complexity from the recognition aspect. Once more, it mainly reflects the principles of availability and affordability of energy justice. However, this concept should entail a more comprehensive perspective and thus include the overall fairness aspects of energy justice and equity hence providing a broader insight on the complete energy structure.

Other usage

It is also important to note some other insight on energy vulnerability, coming from a political perspective. According to Gnansounou (2008), energy vulnerability refers to the vulnerability of an energy system which is hence unable to cope with adverse events (those of reasonable likelihood and high damages are of particular interest). With energy supply issues and energy security concerns becoming increasingly important on the political stage due to growing

dependence on important from insecure regions, the volatility of energy prices, substantial increase of energy demand in the world and in OECD countries, and so on (Kuzemko et al 2016). In that case, the political and technical implications of energy security is what is implied in energy vulnerability. The dimensions addressed are those of diversification of energy sources in energy supply, long-term political stability and depletion of resources (Gnansounou 2008). This further leads to distinguishing vulnerability from the international relation 'energy (in)dependency' concept; an importing country that also has diversified supply sources is dependent but not vulnerable (Percebois 2007). This political approach to energy vulnerability holds the *availability* principle of energy justice with *reliance, security of supply* and *sufficiency* as exclusive concerns. This understanding of energy vulnerability, although recognized and used in the scientific literature, is not the way through which this paper uses energy vulnerability since our main focus is on aspect of equity and justice.

In a technical perspective, energy vulnerability might as well refer to technical failure, accidents or operator errors characterizing the flux of energy. Indeed, according to O'brien and Hope (2010, 7552) "conventional energy systems rely on energy resources that have been produced, concentrated and stored over geological times. High energy density inputs characterize conventional energy production processes. A transition to a low carbon pathway relies on the use of renewable resources. Use of such intermittent low energy density resources requires a development strategy that is based on the principle of 'carbon/harvest-when-available' and 'store-until-required'. Fundamental to this approach is high end-use efficiency and culture of energy conservation".

2.3.4 Energy democracy

Energy democracy has emerged in climate justice movement and further proliferated in academia and political circles in the hope that it might offer a new arena for ecological, social, economic and justice movements to discuss and thus integrate the demand for low-carbon energy with affordable tariffs and just transition (Angel 2016, 9). In regard to this overarching idea, the Lausitz Climate Camp (2012), a German climate justice movement, agreed upon a definition of energy democracy, stating that:

> "*Energy democracy means that everybody is ensured access to sufficient energy. Energy production must thereby neither pollute the environment nor harm people. More concretely, this means that fossil fuel resources must be left in the ground, the means of production need*

to be socialized and democratized, and that we must rethink our overall attitude towards energy consumption".

Based on the original concepts of this quote, Kunze and Becker (2014a, 8) have attempted to produce a more academic definition, highlighting four main elements in energy democracy.

First, energy democracy induces an increased public participation in decision-making. *Public participation* takes shape through a variety of forms and practices so as to engage the public (Mah and Hills 2007, 341). This all relates to the idea that the power and influence of the energy political sector is, so far, limited due to its hierarchical and expert-centered approach. This grants political and commercial interests to those in control and is hence insufficient for policy-making and problem solving (Stirling 2005, 219). The participatory governance approach therefore claims that non-state stakeholders – such as business sector and civil society – should be included in decision- making to enhance governing capacities, achieve social goal and solve problems (Xavier et Al. 2017, 622).

This school of thought is particularly relevant in the context of the current energy transition where members of the civil society becomes simultaneously consumers and producers. As the structure of the energy market moves from a centralized to a more interactive and decentralized system, the role of the end user in the energy sector changes, and consumers, who are empowered and encouraged to participate actively in the production and use of energy, hence become *prosumers* (Kotilainen and Saari 2018, 1). This same phenomenon is also referred to in '*civic ownership*' (used by Szulecki 2018, 35). This is the second element highlighted by Kunze and Becker (2014); the idea of property entails an increased civic and public ownership with energy production, distribution and consumption being regulated through collective political settings (such as energy cooperatives).

Third, energy democracy should lead to surplus value production and employment, which includes benefits on capital and the creation of employment. Fourth, "ecology and sufficiency" brings forward the idea of post-growth, self- sufficiency and new form of 'the good life' as opposed to the predominant idea that infinite growth is a necessity for our capitalist economies. In that sense, when escaping from the logic of profit maximization, we could reduce total energy consumption.

The core characteristics of energy democracy were brought together and further deepened in Szulecki's interpretation (2018, 35) who argues that energy democracy is an ideal political goal

where citizens, as producers and consumers, are responsible of the energy sector policy meanwhile the governance process is characterized by a "wide participation of informed, aware and responsible subjects, in an inclusive and transparent decision-making process related to energy choices, with the public good as its goal." Energy democracy therefore reflects the idea of an ambitious decarbonization process which entails the decentralization and enlightened citizen-based development of energy initiatives (link to Good Governance 'energy justice' principle).

To conclude, the energy democracy concept shares many common ground with energy justice as they are both concerned with the distributive impacts and procedural processes of energy production and consumption (Simcock and Muller 2016, 3). In that sense, both framework supports democratic decision-making in the energy sector, encouraging a meaningful involvement of all in decision-making so as to avoid discrimination and inequalities (Sovacool et Al 2018, 69). We can conclude that energy democracy shares most of its elements with the procedural aspect of energy justice meanwhile its output aspect, filled with ethical elements of equitable distribution and fairness, reflects the distributional tenet of energy justice. The concept of energy democracy could hence offer additional tools in regard to operationalization since the analytical concept of energy democracy provides a set of indicators (Szulecki 2018, 22, See Annex 3).

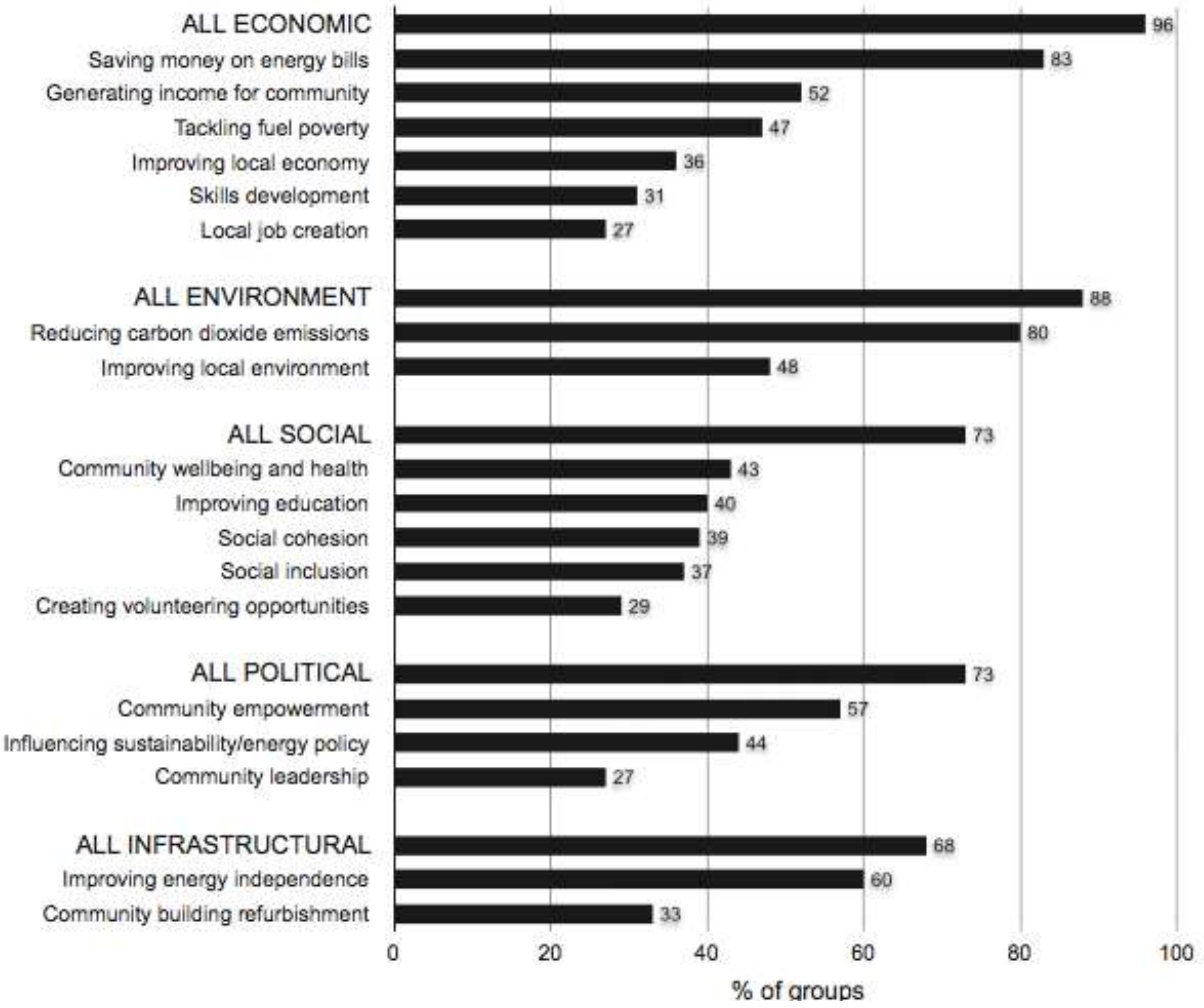
2.3.5 Energy community

In regard to these different insights, energy democracy shares and reflects many aspects of "community energy" or "***energy community***" defined by Walker and Devine-Wright (2008 in Seyfang et al 2013, 978) as "projects where communities (of place or interest) exhibit a high degree of ownership and control, (and are) benefiting collectively from the outcomes". Based on this definition, Kunze and Becker (2014b, 181) highlights three core elements, the input, process and output. The '***input***' touches on communities of place or interests whereas the ownership and control over the sources of energy can be referred to as the '***process'*** aspect of community participation. In that sense, citizen participation schemes are characterized by local citizens being the driving force of RES-E projects through the planning, mobilization of resources, and implementation. Hence, the control of the energy sector goes from government-owned or private companies to a more heterogeneous group of producers (Fraune, 2015). These two elements are further joined by the ***'output'*** aspect which suggests a decarbonization which brings collective benefits, such as those mentioned by Szulecki (2018, 35) in regard to energy democracy; employment, sustainability, sufficiency and quality of life.

As IRENA (2018, 3) highlighted the plurality of definitions regarding community energy that can be found worldwide, they have also produced a simple definition and shed light on its core elements. They defined Community Energy as an "economic and operational participation and/or ownership by citizens or members of a defined community in a renewable energy project. Community energy is not limited by size, taking place on both large and small scales". In that sense, community energy is any combination of a least two of the following elements: "(1) local stakeholders own the majority or all of a renewable energy project; (2) voting control rests with a community-based organization; (3) the majority of social and economic benefits are distributed locally".

To add to the complexity of its definition, these energy community or community energy rarely address only one aspect of technology or of behavior. On the contrary, they usually combine behavioral initiatives related to efficiency measures and micro generation of energy under several forms (Seyfang et al 2013, 979) such as micro-grid generation technologies, collective behavior change, community-owned wind turbines or cooperatively-run small scale energy systems. They are usually investigated or run by a wide range of actors including civil society groups, voluntary organization, cooperatives, informal associations, and so on. They can also be conducted as partnerships with enterprises or businesses, schools, local government or utility companies (Seyfang et al 2013, 978).

Seyfang et al. (2013, 982), conducting a quantitative study on energy community in the UK, have also highlighted the underlying reasons behind these energy generative and behavior-oriented (efficiency) community projects. They have discovered that most common objective is to save money on energy bills. This is followed by the aim to reduce carbon dioxide emissions, improving local energy independence, empower the community and to a lesser extent to improve local environment, tackle fuel poverty, influence climate change policies and improve community health and wellbeing. They then divided these objectives into 5 broad groups; economic, environmental, social, political and infrastructural.



Seyfang et al. 2013: Objectives of UK Community Energy Groups

2.3.6 Energy citizenship

Energy citizenship is another concept offering normative insights on the energy system and is particularly relevant in the context of energy transition. It is often used in opposition to the mainstream perspective on energy within the commodity paradigm. First and foremost, it is necessary to distinguish the term "citizen" from "consumers" since they are used to identify "a particular field of relationships, identities and practices" (Clarke et al 2007, 1). According to Clarke et al (2007, 2), citizenship refers to a political construct which reflects egalitarian principles and mutual obligations between the States and the citizens; it is a mutually benefitting relations which provides consent and profitable conditions that allow citizens to live their lives. On the contrary, "consumers" reflect an economic construct, with transactions being made in the

marketplace by a rational individual which is self-directing, responsible of its ow-decision so as to improve its well-being (2007, 2-3). Further down the path, this relationship is transformed as citizens engage into consuming practice, thus mutating into a consumer (consumer-citizen) leading to a different form of relationship with the State (2007, 20). In regard to the threat created by climate change, the individual becomes a responsible-self again, but whose decisions are constrained by networks of practices and social structures (Paterson and Stripple 2016, 196).

This need for sustainability created an opening for "energy as a social necessity" and hence the concept of "energy citizen" emerged and argues for the importance of public engagement and participation within policy-making and planning processes through local empowerment and action derived from local agenda. Energy citizenship is defined by Devine-Wright (2007, 71-72) as "a view of the public that emphasizes awareness of responsibility for climate change, equity and justice in relation to siting controversies as well as fuel poverty, and finally the potential for collective energy actions, including acts of consumption and the setting up of new community renewable energy projects such as energy cooperatives".

A clear distinction is thereby made between energy commodity and energy as a social necessity. On the one hand, energy as a commodity reflects a centralized energy system where the 'energy public' is characterized by deficits of interests, knowledge and rationality. The governance is one of technocratic superiority excluding wider public engagement since consumers are deficient; The public engagement owes to be minimized since they bring resistance, delay, refusal and inefficient or incorrect use of technologies. Consequently, the role of the state is to create public acceptance through low prices, reliable supply, etc. On the other hand, energy as a social necessity highlights the benefits of small-scale generation, co-evolving with more engaged and aware publics where sustainable energy should involve greater level of participation in public decision-making based on local energy agenda. This perspective claims that obtaining public acceptance requires greater level of engagement with the public in regard to technologies as this engagement will eventually create better conditions for the emergence of a new consensus (Devine-Wright 2007, 69-71).

To sum up, the idea of energy citizenship has emerged within an "energy transition" discourse which supports a change in the current energy system alongside with giving credence to the potentiality of citizenship. This concept hence mainly relates to the procedural aspect of energy justice, suggesting an extended implication of citizens in order to reach a most desirable transition

to renewable energy. The issue of fairness in distributive consequences however isn't a central element in this concept.

2.4 Collectivities of participation

Before going ahead with insights on distributive and procedural aspects of a transition to renewable energy, it is interesting to highlight and clarify the different forms and configurations of collectivities of participation. These will be referred to and mentioned at multiple occasions throughout the report. The following typology is based on Chilvers and Longhurst (2016).

"*Deliberative citizens*" first refers to those who are able to deliberate and be involved in the energy transition process by giving their opinion in discursive surveys, discussions or public consultation which will eventually inform decisions made by others. This model of participation is mainly produced when citizens are invited, with a deliberative and professionally facilitated process. Deliberative citizens should first become informed and educated to effectively deliberate and take decision regarding such complex issues.

"*Grassroots innovations projects*" (closely linked to energy community) consists in civil groups that are building new forms of institutions, organization or commitments thus going beyond political claims or objections. In these scenarios, the public is perceived as active and technically competent. Such bottom-up projects also lead to the creation of a feeling and notion of ethic and mutual aid, with citizens influenced by their peers and neighbors (linked to psychological understanding of behavioral changes).

"*Social practice"* theory also offers participation forms as it explores the role that energy consumers play in sharing and constructing energy systems. In this perspective, consumers are practitioners whose interactions with the energy system are shaped by the daily performances of everyday life. The public is perceived as a consumer citizen which require a higher degree of engagement which then will shift the consumer from passive user to empowered and active part of the system.

"*Social movements*" can also play a role in the transition with civil society actors engaging in contentious politics. In this case scenario citizens are active in shaping the future possible pathways meanwhile it challenges the discourse of "individual lifestyle change" promoted by mainstream environmentalist and government bodies.

When looking into processes and initiatives which aim at promoting a more locally-oriented type of energy governance, thus referring to the re-appropriation of energy by the local level, Energy Cities (2017, 12) use a somewhat simpler typology as they identify and define 5 different processes:

"(1) ***Local energy ownership*** *encompasses all the initiatives and processes undertaken by local authorities and citizens to promote local energy governance; these fall into the following four categories; (2)* ***re-municipalisation*** *refers to the operating role of local authorities and the economic decisions (setting up or taking over local energy companies, managing and developing energy infrastructures, etc.) they make to increase municipal control over energy management; (3)* ***devolution*** *covers the strategic and political role of local authorities through the transfer of powers from the national government, notably regarding the preparation and implementation of energy planning and regulations; (4)* ***community projects*** *include all projects directly initiated by citizens (independently or in collaboration with local authorities), these usually concern renewable energy projects; (5)* ***participative governance*** *refers to all the tools implemented to promote direct democracy and the influence of citizens on energy and climate policies: discussions, forums, participative budgets, co-building of planning schemes, etc.)".*

2.5 Justice across disciplines

The term energy justice has been used in practice longer than in academia. Albeit to a small extent, it has for instance appeared in commercial and public sectors discussions. Two NGO's have also used the term ahead of academic research in the US (1999) and in the UK (at least since 2009) before being used by the Chief Executive of National Energy Action (UK) in 2011 as the government was discussing fuel poverty (Heffron and McCauley 2017, 659). Academia started referring to the term in 2010, although its definition remained unclear since it was used to address multiple things such as ethical consumption, sustainable development, etc. The concept itself started being properly defined in 2013, with McCauley et al (2013) using the three core elements of energy justice to offer a comprehensive understanding of it. Following this, the literature on energy justice has increased tremendously (Heffron and McCauley 2017, 659).

As argued by Becker et al (1997, 37 in Heffron and McCauley 2017, 662): "attempts to cope with the complexity of issues raised by sustainability cannot simply aim at adding some new pieces

to an already existing knowledge base" but rather there needs to be a "paradigm shift towards a new knowledge base" characterized by "practices of integration". This goes in favor of energy justice which has an interdisciplinary aim through its inherent complexity and broadness and thus encourages practices of integration (Heffron and McCauley 2017, 662). Although interdisciplinary by nature, energy justice and its closely related concepts such as energy democracy have mainly found their sources and been developed within social sciences (human geography and political science) and the humanities fields (development studies, gender studies, philosophy and ethics).

Energy justice should aim to have a more direct link with policy as there is little in the literature that provide examples of successful engagement. Indeed, environmental and climate justice have been naïve in their approach, presupposing that society would support their "ideal". However, policy formulation in the energy sector has been dominated by economists and industry with economic benefits and costs being the core focus in decision-making (Heffron and McCauley 2017, 664). Hence, it is relevant to look into the relationship between "energy justice" and the field of economics and within the business sector, especially regarding their importance when it comes to influencing policy-makers.

2.5.1 Economics

It appears that the majority of economic-led energy research has contributed to the protection of the status quo due to their seeking of low-cost and efficient outcomes, consequently protecting the fossil-fuel energy system at the expense of a transition to low-carbon economy (Gobal Studies Initiative 2010). The economic perspective represented by the World Energy Council for instance has attributed particular importance to the "affordability aspect" of the energy trilemma therefore neglecting issues of equity and justice (Heffron and McCauley 2017, 665).

The transition to renewable energy will lead to unfairly distributed outcomes within (income groups, ethnicity, gender) and between generations. Because the issues will be multifaceted and related to fossil-fuel lock-in, inherent market failures (coordination failures, information asymmetries, externalities…), negative spill-over effects (use of biogas as RES-E leading to food crisis) and distribution issues, the field of economics will have to adapt so as to deal with these structural changes (Sari et al 2017, 7). The fields of economics thus should move away from its mainstream approach which has been dominant in the energy system research (Heffron et al 2015).

According to Sari et al (2017, 7), the economic field has separated the idea of low-cost and efficient energy outcomes from the issue of equity. This reflects the underlying Coasean

Perspective (Coase 1960) which has been predominant in the economic field and according to which "in the absence of transaction costs, the market exchange will lead to an efficient resource allocation regardless of the distribution of the rights" hence suggesting that "the process of minimizing the burden of internalizing an externality is independent of the burden sharing scheme" (Sari et al 2017, 7). The market efficiency and equity are therefore separate issues. Optimizing such efficiency will be accomplished through a utilitarian approach which has long been predominant in energy economics and energy policy. In regard to this utilitarian, maximum efficiency approach, the way public good and bad are assigned are irrelevant; unfair or unjust energy policies can be corrected further down the path through policies of redistribution or reallocation of the policy rights. This claim is denied by energy justice academics according to whom efficiency and distribution issues should not be separated. Resource allocation can potentially be efficient and simultaneously be ill-designed as it deprives most future generations from vital resources, for instance. Hence, energy justice applied to economic policy-making processes entails economists to include more than the issue of efficiency (Sari et al 2017, 8).

It is however interesting to note that if energy justice hasn't played a dominant role in the field of economics, the concept of fuel poverty, energy poverty and energy vulnerability are slightly more frequent in economic related research journals or have been focused on by economists (see Krishnan 2016; Kulinska 2017). Indeed, since less comprehensive and normative than energy justice, it is easier to quantify these concepts, may that be with a household or international comparative scope. Pachauri and Spreng (2004, 271) in *Economic and Political Weekly* have for instance suggested approaches to measure energy poverty through "the estimation of basic energy needs of a household based on engineering calculations and certain normative assumptions" or by "combining the elements of access and consumption of energy in order to examine how these relate to the well-being of households (…) examining well-being in terms of access to clean and efficient energy sources and sufficiency in terms of the quantity of energy consumed".

Another distinction is to be made as energy poverty seemed to be first approached by economist in an international development perspective. With energy poverty being highlighted by international agencies such as the World Bank, UNDP and the World Energy Council, economists such as Birol (2007) and Pachauri and Sprend (2004) started focusing on and measuring energy poverty based on development concerns. Further down the path, as energy poverty started having

higher priority on political agendas in developed countries (US, EU), the concern changed geographical focus and gained farther academic importance (see Krishnan 2016; Kulinska 2017).

2.5.2 Business

Business ethics and more particularly environmental ethics in business and corporate social responsibility has been important and its role is expected to increase in regard to environmental risks and consumer awareness. Environmentally responsible investments could also become influential in regard to stock holders and financial risks. Energy justice, however, has had a lesser influence (Socavool and Dworkin 2015).

Due to its complexity, a global energy system comprises a wide range of stakeholders which can hardly be understood through the dominant 'stakeholder's theory approach' praised by the business field. This approach, originally proposed by Freeman (1984) is limited due to its micro corporate basis, economic value focus and 'dyadic' stakeholder relationship management approach. This should change as the energy system shall be understood as a network of relationships (as opposed to a corporate-stakeholders relationship) with multiple values, demands and interests from a variety of stakeholders (Sari et al 2017, 9). An energy company which provide energy services to poor households through corporate social responsibility consequently create a social value for the society while eliminating distributional injustices (Karababa and Kjeldgaard 2014).

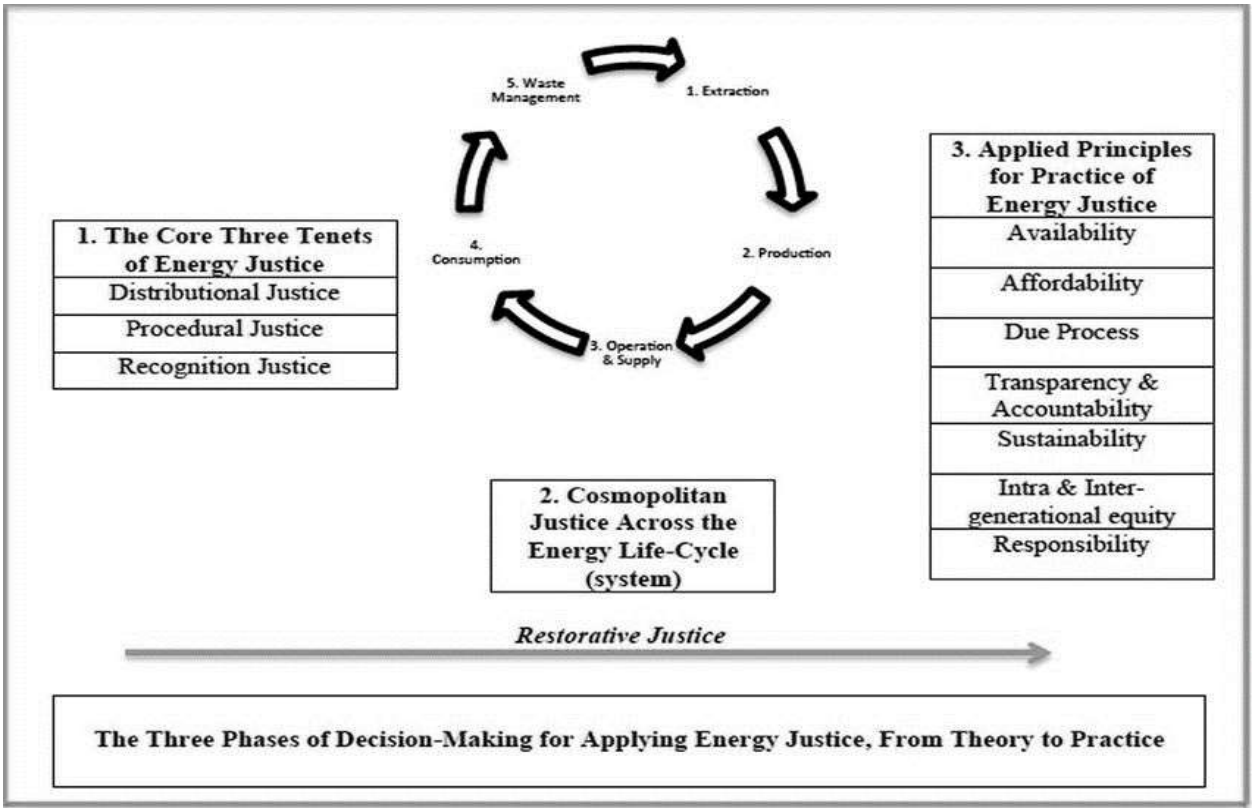
Another way corporate social responsibility effort could impact energy systems is by seeking to shape different consumption patterns so as to promote distributional justice. Indeed, higher consumption by middle classes might create injustice of distribution for others. Socially and environmental conscious business could attempt to influence these routine consumption practices and use integrated marketing communications to create alternative standard of comfort, for instance (Sari et al 2017, 9).

The procedural aspect of energy justice is also relevant in a business sector since introducing participatory action research through democratic techniques – hence involving disadvantages groups, companies, local governments, NGO's and other stakeholders – would also lead to more ethical and just outcomes but once again, this requires a shift of paradigm as it entails the weakening of traditional stakeholder theory perspectives (Sari et al 2017, 9).

2.5.3 Law

One insight can also be highlighted regarding law and energy justice. Coming from and used in criminal law, the application of restorative justice to energy can provide a uniting goal of the energy justice concept regardless of the disciplinary focus. According to Heffron and McCauley 2017 (660), "restorative justice arose from society questioning after an injustice has occurred what has been the response to the victim. Restorative justice aims to repair the harm done to people (and/or society/nature), rather than solely focus on punishing the offender. Further, restorative justice can assist in pinpointing where prevention needs to occur". Hence, restorative justice reflects on how we should respond to injustices and what injustices should be focused on in the first place.

This can then be applied to energy justice as it forces decision-makers to engage with justice concerns and consider the full range of issues related to the energy system. The cost of 'restoration' could reach a prohibitive level and hence bring such energy activity to an end. In this context, the three core tenets and 8 main elements of energy justice play a predominant role as they would identify the area where restorative action would apply (Heffron and McCauley 2017, 661). Decision-makers would thus reflect on the true cost of their decision (// internalizing externalities).



2.6 Summary

Building on older social justice and environmental philosophical background, energy justice encourages the equitable sharing of costs and benefits related to the energy system in addition to a more inclusive decision-making process. Doing so, it provides a framework to identify where, when and how injustices happen within energy system and thus shares insights on how these injustices can be avoided and eliminated (Jenkins et al 2016; Sovacool and Dworkin 2015). Drawing heavily from philosophy, policy-oriented approaches and environmental justice, two main complementary frameworks are offered so as to conceptualize and clarify the application of the energy justice concept.

The first framework sees the concept of energy justice as based on three core tenets of modern justice being (McCauley et al 2013; Jenkins et al 2016; Sovacool 2016); (1) *Distributional justice* which focuses on the distribution of goods and benefits as a result of the energy justice processes; (2) *Procedural justice* which highlights the need for democratic decision-making processes in the field of energy with public participation being a key element. It explores how just outcomes can be reached through local knowledge mobilization, greater information disclosure and better institutional representation; (3) *Recognition justice* which looks into the groups in society that have been ignored or misrepresented in the energy decision processes, claiming that a better representation of these groups would reduce social inequalities. The second framework offers a guide and evaluation tool regarding energy policies based on eight elements (Sovacool et al 2016); (1) availability; (2) affordability; (3) due process; (4) transparency and accountability; (5) sustainability: (6) intra-generational equity; (7) inter-generational equity; and (8) responsibility. These three tenets or eight elements are to be applied to each and every stage of decision-making throughout the whole energy system; from extraction to the infrastructures, to the production, to the operation, pricing, consumption and waste management. This is of upmost relevance regarding the transition to renewable energy with all these elements encountering particularly deep and rapid changes.

This theoretical framework has also shed light on different yet complementary concepts. Starting with energy equity, I have argued that both concepts share a very similar philosophical background although the latter focuses particularly on the fairness of distributive outcomes. Seemingly, issues of equity in access to energy services are the main focus of energy poverty and vulnerability whereas the concepts of energy democracy, community and citizenship, while having

for rationale the normative objective to obtain fairness in distribution of cost and benefits, pay more attention to procedural aspects in energy decision-making processes.

Finally, this theoretical framework presented a short assessment of the existing relationship between energy justice and the fields of economics, business and law. Whereas energy justice has historically been more developed in the social science and humanities literature, such other fields are of certain interest, especially regarding their role in influencing policy-making. We can conclude that economics has a long history of disassociating energy efficiency and utilitarianism maximization from equity and thus social welfare. This is strongly opposed in the energy justice framework which advocates for a more comprehensive approach in decision-making. However, once such concerns started being addressed by politics (globally or nationally), the field of economic has produced insights under the form of energy poverty and vulnerability which are more easily quantifiable. Regarding the business sector, it has failed to take into consideration the many stakeholders that should be involved when thinking of corporate social responsibility. Taking into account the broad energy system and its plurality of actors and interests would overcome such shortcoming while allowing the business sector to take on different marketing strategies that would be beneficial to energy consumption and to some extent equity. Finally, the field of law has provided insights under the restorative justice approach that can provide policy-makers with efficient tools.

III. Mapping empirical research

As seen in the previous sections of this report, many concepts have been used to refer to the different components of energy justice. Hence, I suggest using this more comprehensive and broad framework to structure and assess the different findings made on the issue. Adopting energy justice as a conceptual tool, we will focus on the procedural and distributive aspects of energy systems and policies. This will allow us to assess processes and outcomes, especially at the community level. This report has a particular focus on the energy justices and injustices resulting from the transition to renewable energy although it might make slight references to the current fossil-fuel based energy system. Moreover, as suggested by the InCluESEV report, specific local and national specificities should be taken into account. In this regard, contextualization will be offered, and case studies mapped geographically. This literature review will hence offer a comprehensive assessment of the benefits and resulting barriers of taking an energy justice and equity approach within the energy decision-making sector.

3.1 Procedural findings

As the energy sector stands at a historic crossroad, it brings up the possibility for technological progress but also challenges the existent cultural and political stage (Stirling 2014, 83). The energy sector being particularly complex, the decision-making process quickly became elitist and technocratic, excluding the customers from the deciding structure. Moreover, a more centralized energy system – such as based on fossil-fuels – is predisposed to restrict political and economic power, whereas distributed energy technologies such as solar and wind offer greater flexibility and thus enable its distribution (Stephens and Burke 2018). Consequently, a transition to renewable energy sources can modify this predetermined order since decentralized renewable energy sources can be deployed by different categories of investors - including individuals becoming prosumers, cooperatives and local communities - giving to these new actors the possibility to actively participate in the energy system. The potential of renewable energy thus carries the foundations for a democratic power system (Szulecki 2018, 22-32).

The idea that the transition to renewable energy would allow the democratization of energy is further coupled with the assumption that energy democracy and more broadly energy citizenship would intrinsically enhance and facilitate a change in the energy system, in addition to creating a

more just energy system. As highlighted by MacArthur (2015, 632), new sources of energy have multiple possibilities and high potential for innovative and efficient changes regarding production, transport and consumption but those require policy choices and actors that decide to set and implement them. Xavier et al (2017, 623-624) further argues that renewable energy transition is no longer a technical problem (although highly controversial in academia); what allows or restrain such change is rather leadership in decision-making and good governance processes. This transition to clean energy being both desirable and promising is under way, but its scope and speed depend on a new politics of energy which should, according to Tomain (2015, 1133-1134) be defined by a new political norm being the democratization of energy with citizens playing an active role.

As highlighted by Ryghaug et al (2018, 284-286), such claim competes with the mainstream understanding of the role of citizens in energy transition which is often reduced to the notion of "public acceptance" with their agency being restricted to the accept/reject dichotomy. In regard to the traditional energy system, citizens have long been perceived as passive consumers with top-down policies providing better information and new price signals so as to hence reduce their energy demand. In that perspective they also remain passive technology recipients within a centralized system. In that sense, citizens are usually seen as barrier to progress through their failure in taking up new technologies or by criticizing new developments (e.g. NIMB). Because the relationship between the public and technologies can take many form (including for instance 'Please, in my backyard' - PIMB), this is a misleading and reduction understanding of citizen's potential regarding a transition to renewable energy since their participation can, on the contrary, enhance and facilitate the transition.

These different authors have hence brought to light a dual relationship between energy transition and energy democracy; the energy transition opens up for a potential democratization of energy meanwhile opening up to citizens would favor a change from fossil fuel-based energy to renewable energy sources. By means of both participatory governance and civic ownership, two forms of arguments can be used to support such claim; 1/ from a normative perspective, democratization of energy provide legitimacy and social acceptance to more "just" solution making; 2/ from a pragmatic perspective, public participation increases the likeliness of a socio-technical transition towards renewable energy. I used these two main arguments and to some extent

the MLP on socio-technical transition to structure the different ideas and arguments that can be found in the literature.

3.1.1 Normative perspective

As claimed by Stagl (2006, 53), electric production has far reaching impacts on social, economic and environmental aspects of life and in regard to such importance deserves thorough deliberation and public involvement. This has however not been the case in the past as the energy sector has historically been regulated by elites and experts, which is first and foremost justified through the infrastructural intensity and socioeconomic importance of the energy field (Doern 2007). Indeed, the domination of the sector can be illustrated by the revolving door phenomenon which has become widespread in Europe, making fossil-fuel industry highly influential on the political stage. The representatives of this industry have been given access to climate policy negotiations, forging the limits of our ambition regarding climate change and related energy decisions (Huter et Al. 2018). Moreover, as Uba (2010) has demonstrated for Sweden, the policy-making process has favored older and larger players, the resulting energy policies are not stimulating renewable energy production but rather allows current production system to earn extended benefits. Moreover, when climate programs are actually developed, consumers are usually the ones paying higher bills in order to respond to investment and capital needs; thus, enhancing energy poverty (Kuzemko, Keating and Goldthau 2016, 120).

Other discrimination forms have been highlighted. Wang (2016) has focused on gender inequalities in Taiwan and, drawing from social practice theory, has demonstrated that environmental policies often exacerbate asymmetric power relations and discrimination towards women. Meanwhile *Fraune (2015)* has highlighted the significant gender difference in ownership rate and investment in regarded to RES-E due to current regulations and norms in Germany. Both these authors therefore recommend a greater procedural justice, with women participating in the creation of policies so as to prevent their discrimination and more generally need to include stakeholders whose agency and capabilities are constrained.

In regard to these observations, a democratic renewal through participation in the energy transition would lead to more representative policies (MacArthur 2016, 640) and therefore allow those who have been underrepresented to have a voice in the decisions (Mendonça, Lacey and Hvelplund 2009, 395). Jenkins (2018) supports that claim as she encourages the development of democratic practices to balance marginal interest, redistribute privileges and enable choices for

those who are less powerful. In regard to participation, we can conclude that the normative arguments hence revolve around the imperative of democratic emancipation, equity, equality and social justice, with the associated rationale being the empowerment of excluded and marginal citizens as opposed to ruling elite groups and institutions (Stirling 2005, 220).

Participatory governance therefore contributes to good governance, being the cornerstone of the highly valued democratic process, but also strengthen the outcome of the energy policy itself (Xavier et Al 2017, 622). Whereas legitimacy is an important requirement for good governance, it also leads to more efficiency in policy-making since renewable energy projects can, for instance, be interrupted or hindered by public opposition (Mendonça, Lacey and Hvelplund 2009, 305). Another study led in Australia has shown that "perceptions of fairness do influence how people perceive the legitimacy of the outcome, and that a fairer process will increase acceptance of the outcome" (Gross 2007). This leads us to the second part of this literature review which highlights the instrumental outcomes encompassed within the procedural aspect of energy justice, and to some extent within energy democracy.

Case study 1

"Gender matters: Women, renewable energy, and citizen participation in Germany" By Fraune (2015)

Research question:

How does the larger social, cultural, and political context promote or constrain citizen`s agency to take part in citizen participation regarding RES-E?

→ Identify causal mechanisms between gender regime and participation in RES-E schemes

Methodology:

Review on gender and energy literature → Hypotheses tested quantitatively on data gathered from a pilot study Based on 10 RES-E and 16 RES-E in wind and solar power, respectively, owned by citizen participation schemes

Germany

- Subsidies for citizen participation schemes in RES-E at an early stage (Feed-in Tariff)
- Successful in implementing high installed RES-E capacity (solar and wind)
- Develop citizen participation as a source of funding

Results:

- Participation in citizen association in RES-E: not gender balanced
- Participation in decision-making: investment shares lower for women = less voting and control rights
- Underrepresentation of women in leadership positions

Cultural, social and political factors affecting gender differences in participation of citizens RES-E schemes:

- Tax legislation: Gender gap wealth (men's wealth higher by 30%) and joint income taxation; actual fiscal law doesn't provide incentive to transfer shares of RES-E to the spouse with lower income
- Occupational segregation: Structural gaps with gender segregation of the labor market
- Institutional context: Importance of governmental policies in education, labor regulations, social insurance programs, tax and family law, etc.

3.1.2 Pragmatic perspective

In a more practical approach to *participatory governance* and *civic ownership*, the instrumental perspective of public participation can be used. As opposed to the normative arguments which are based on values and norms, the instrumental perspective focuses on outcomes and thus the approval of strategies is based on efficacy related to the transition to renewable energy. The claim is that social involvement is profitable in the sense that it will enhance and facilitate the transition, and even more so a just and fair one (Stirling 2007, 269-271).

One common theoretical frame used to explain the adoption, use, acceptance, diffusion or rejection of new technology such as required for RES-E transition is the multi-level perspective (MLP) on socio-technical transitions and innovation (Sovacool and Hess 2017, 709). This theory offers a means to explain how technological transition occurs through a complex understanding of the interactions among actors, environments and innovations. The theory advocates that a socio-technical transformation happens as a result of interactions among three levels, being the niche, the regime and the landscape. At the micro level, a niche is a space which grants opportunity for research and learning by way of experiences. Niches are therefore the sites where radical innovations are thought through and developed, potentially threatening the current *system* in place. This current system is referred to as regime and consists in the rule-set of processes, technologies, routines and practices which are embodied in institutions and infrastructures at the meso-level. The overarching macro-level is referred to as the landscape that forms the external context within which actors interact. It includes elements such as the economic context, wars and immigration events, political and cultural beliefs, environmental paradigms, and so on. This level is the slowest to change (Geels, 2002). It is therefore the interplay between these three levels that allow or constrain technological transition, requiring all three levels to be developed (Geels and Verbong 2007), creating mutually reinforcing processes and pressures (Geels et Schot 2017).

Based on literature review, this section demonstrates that participatory governance beneficiates to the development of those three dimensions, therefore setting favorable conditions for a renewable energy transition.

Niche-innovation level

In order to experience a 'socio-technical' transition to renewable energy, niche-innovations are necessary (see socio-technical transition by Geels 2002; Geels and Schot 2007). According to Jensen et Al. (2007), there are two modes of innovation. The first, called STI (Science, Technology

and Innovation) is the predominant model in the understanding of development and policy making, mainly resting on 'Research and Development' in regard to products which eventually trickle down into the market. The issue with such approach is the danger of 'hype-disappointment cycles', referring to the risk of believing in an industry sector which eventually doesn't deliver on its promises. The R&D related to such technological improvement is conducted in return for investments provided by policy-makers which are not able to assess the risk related to such projects and might therefore be unfruitful (Van Lente, Spitter and Peine 2003). In addition, these developments are too slow – in regard to climate change – as it can take decades between R&D and the penetration of technological findings on the market.

As opposed to this approach, there is the '**Doing, using, interacting' model** (DUI) which seeks to reconfigure systems, such as complete energy or transport systems, on the ground with a **project-based approach**. In such approach, cities and local levels are playing key roles as they are able to involve a wider set of actors, such as firms, policy-makers but also consumers (Jensen et Al. 2007). Bulkeley and Newell (2010) have found that many projects and climate change experiments were led at the local level for the purpose of reconfiguring urban socio-technical system. Doing so, ground projects allow niches-innovations (such as solar PV or district heating) to be developed. Over time, these sequences of projects can build into each other, emerge, deepen or broaden and learning experience from one project can inform another one.

In these case scenarios, public participation is usually under the shape of grassroots niche-innovations, which are defined by Seyfang and Smith (2007, 585) as:

> *"Networks of activists and organizations generating novel bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the community involved. In contrast to mainstream business greening, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovations as well as using greener technologies."*

Whereas some local groups and initiatives intend to solve local problems, others called "strategic" projects aim at scaling up so as to reach policy initiatives, thus having wider impact (Seyfang and Smith 2007).

As previously mentioned, the mainstream scholar approach to energy justice regarding the transition towards RES-E is a top-down one, where communities are recipients of energy justice through a centralized energy system. Using this distinction between the top-down and the bottom-

up approach to energy justice (Sovacool and Dworkin 2014), Forman (2017, 649) claims that community projects might contribute towards an energy just future through a ground-up approach. Indeed, enacting energy justice require to take the context into consideration. She draws on the notion of "enactment" (2017, 651 – Theory from Weick 1974) from the organizational theory which focuses on the process of reflection and action on the environment in order to change it. Hence, enactment recognizes the importance of the decision of certain actors in circumstances which are malleable and multiple rather than monolithic and singular. Consequently, normative ideals of justice should take different forms considering their particular context. Indeed, "equitable distribution of energy services will only be accomplished by the development of a new global energy system that is based on renewable sources and distributed generation" (Sovacool et al 2014, 85) which can be accomplished through energy community as in a local movement promoting small-scale, decentralized and diversely owned models or renewable energy generation. Forman (2017, 651) concludes that energy transition should involve local participation in the project and in the allocation of benefits hence leading to the creation of more locally appropriate development, expressing different set of values which ensure a greater understanding of the local context and acceptability within host communities.

Moreover, MacArthur (2016) argues that providing spaces where people are empowered, across different system and national context, allow the creation of more effective solutions. Studies conducted by Seyfang et al (2014 and 2013, 986) have supported this claim in regard to community energy in the UK. In those energy communities, learning and shared experiences between local community and energy groups and among different community groups have contributed to the gathering and strengthening of knowledge regarding human/organizational (e.g. identifying potential projects and developing project marketing skills), cultural capital (e.g. embedded in an alternative culture or strong movement providing solid basis for community support) and social capital (e.g. creating link with experienced or inspirational individual who provides credibility, resource and advice) required to run energy projects. Through this civil discovery, interpersonal relationship and collaborative learning, citizens are giving the opportunity to test and create social and technical knowledge, highly relevant to resolve shared problems such as those existing in energy transition (Depoe, Delicath and Elsenbeer 2011, 10). Walker et al (2007) accordingly argue that community energy enables citizen to address sustainable energy issue building on local knowledge and locally adapted solutions and local network (Seyfang et al 2013, 979).

Thus, grassroots projects deliver in skills and resources which are highly needed for energy projects. Xavier et al (2017) reached the same conclusion for South Africa, where public participation in decision making for energy infrastructure projects generates a fruitful and enabling environment since involving citizens in the creation of projects leads to conflict resolution, public acceptance and social support. A growing body of literature on energy justice has proven that local communities often oppose energy projects as a result of a lack of fairness in the decision-making process and in the distribution of the project outcome. Citizens are usually informed too late and too little, while rarely being given the opportunity to participate in the creation or assessment of such project. Thus, although renewable energy projects offer benefits such as financial revenues and employment, they also lead to inconveniences (e.g. costs, obstructed view, and disturbed wildlife) which can easily trigger protests if local communities perceive the distribution between such costs and benefits as unfair (Munduca et al. 2018a). As phrased by Ryghaugh et al (2018, 286), a "top-down, centralized planning without local participation and lack of clear local benefits tends to generate opposition, whilst community energy initiatives and shared ownership models are often thought to receive higher level of public support" (Goedkoop and Devine-Wright 2016). Involving communities also provide extended knowledge on local circumstances, leading to wider and more comprehensive sustainability initiatives (Llewellyn et al. 2017; Xavier et al. 2017). Moreover, allowing some degree of control to citizens enabled the creation of trust, a better management of conflict but also a more effective financing (Xavier et Al. 2017, 630) with, for instance, funding granted to execute the project, buy equipment, pay employees, etc. (Seyfang et Al. 2014, 38). As illustrated by a case-study of RES-E project in southeast Germany, distributed generation and local ownership of renewable energy create a positive feedback loop for more investment in renewable energy, thus unlocking economic opportunity (Musall and Kuik, 2011).

This section has provided elements arguing that niche-innovation under the form of socially integrated projects allow a more efficient and socially just development of the renewable technology based on local knowledge, with benefits for social acceptance and financial decisions. As an outcome, through the creation of enabling niche-innovation, successful technology rolls out and can be further expanded through intra and inter-niche networking, once more facilitated by public participation. These different elements in favor of grassroots-led innovation based on local participatory processes are integrated in instrumental policy perspectives which see community projects as "facilitating technological shifts to renewable technologies, promoting behavioral

change and embedding social acceptability for larger sustainable energy technologies" (HM Government 2005 in Seyfang et al 2013, 979).

Case study 2

"A grassroots sustainable energy niche? Reflections on community energy in the UK" By Seyfang et Al. (2014)

Qualitative case study research with local projects → The extent and nature of interactions and resources flows between projects and intermediary actors in order to evaluate the utility of niches theories in the civil society context.

United Kingdom

UK Government's "Low carbon transition plan" (2009) aims at reducing consumption (efficiency and conservation measures), develop low-carbon energy production and create an environment where the innovation and ideas of communities can flourish. Community energy projects (grassroots-led innovation) have been proposed as a new policy tool to help achieve the transition to low-carbon energy system.

- Are community projects contributing to developing a niche?

Sharing learning: Groups shared information within the community energy niche but also beyond such as with farmers, researchers, local government, funds, etc.

Networking: Community energy projects engaged in networking activities in a variety of ways, with a diverse set of partners in order to gain support, information and share their experiences

Gain of resources: human/organizational factors, cultural capital, social capital, resources flow

Created or reinforced shared expectations, vital for robust niche

- Are intermediary actors contributing to project development?

This refers to energy intermediaries such as policy actors (local and national agents,…) and private sector organizations (energy utilities, consultant,…) as well as NGOs.

Consolidated knowledge shared through documents reports, handbooks, tool kits, etc. which have been beneficial. Highly involved as they offered advice and support, shared information and established network and provided some of the resources necessary (social, human/organizational, cultural and financial)

Regime level

The regime level refers to the current institutional dominant system which contains the established practices and associated rules, thus enabling and constraining the different actors related to that existing system. To reach a socio-technical transition towards renewable energy, the niche-innovations should be able to break out into this regime. This should be facilitated by a pressuring landscape, and by the weakening of the regime itself. To understand what was sustaining the current energy system, Geels (2014) has conceptualized the stability of such regime as a result of the active resistance of beneficiating actors and further discussed the instruments used by those in order to keep their regime as predominant. As we will further see, public participation through participatory governance could be used to overcome the existent supremacy, hence destabilize current regime and allow a transition to occur.

The mutually dependent relationship between States and fossil fuel industries has been given several denominations, such as 'mineral-energy complex' which highlights the capital accumulation made by fossil fuel industries with the support of policymakers, or 'carbon lock-in',

referring to the self-prevailingness economic, technical and institutional features of the fossil fuel-based energy system. The common feature of the several often-used terms to describe the relation between the oil and gas sector and the political system is close partnerships and dependencies. While oil and gas industries depend on governments to establish property rights, rules of exchange, legal rules for corporate behavior and economic support that suit them, States count on the industries to bring growth, employment and taxes (Geels 2014, 26). This dependency results in close networking and contact between business representatives and policymakers, with governments taking into considerations the interests of the lobbies when policies are created (Paterson and Newell 1998, 684). Data-driven research has shown that solution provided by pure mainstream economics aiming at efficient and low-cost alternatives has been at the center of energy policy-making processes and has reinforced the continued reliance on fossil fuels (Global Studies Initiative 2010).

Allowing the civil society to play a role in the economic transformation and in energy policies would, as opposed to the current system, lead to a green economy. Because the civil society stands outside of the political dynamics or commercial sectors, they are free from any advantages or corruption threat, and thus put them in a better position to modify the regime. They can offer neutral and hence better insights on code of conduct, economic and commercial decisions (Xavier et Al. 2017, 624). Previous research on public participation and energy projects have demonstrated that participants usually give priority to shared practices of deep green values at the expense of any concrete economic or material benefits (Seyfang et Al. 2014).

In conclusion, it would appear that the current regime is being actively preserved by the actors which are beneficiating from the status quo, by use of the many strategies and resources they have at their dispositions. While strong and sufficiently developed niche-innovations are necessary to overthrow dominant regime, the regime itself should also be weakened through institutional changes for the balance of power within the current system to be modified. In order to do so, policy-makers should actively decide to give less importance to those guided by their own interests while giving a voice to those who have been excluded from the decisional institutions (Mendonça, Lacey and Hvelplund 2009, 395).

Case study 3

"Stability, participation and transparency energy policy: Lessons from Denmark (and the United States)"

By Mendonça, Lacey and Hvelplund (2009)

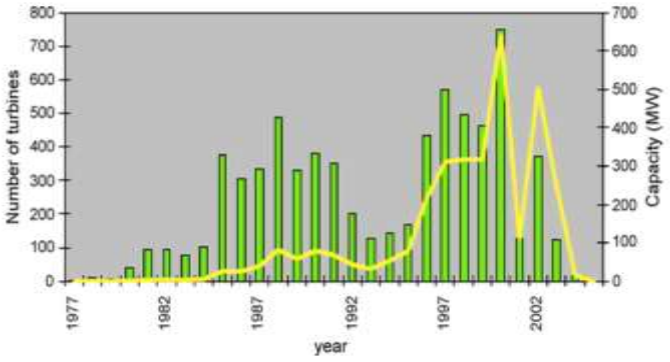
United States:

Exclusive with non-refundable tax credits as incentives → only large corporate entities and rich individuals participate in solar and wind market (more centralized utility-scale installations) → Need new policies to offer citizens greater access to the market. If limits to who can participate, the range of benefits won't be distributed equitably (enriching local economies, encouraging greater interactivity with energy, diminishing social frictions, enhancing security of supply).

Denmark:

- Original pioneer in wind energy; started in the 70's until mid-to-late 90's with cooperatives and local farmers as critical form of ownership and thus distributed benefits. Bottom-up with enthusiast political power supporting local-ownership (green majority and strong and well-organized grassroots energy movements): subsidy (FIT), important information-sharing activities, etc.
- Late 1990, change in government and different political paradigm: Abandon of FIT for Tradable Green Certificates with quotas (spot market price and price of selling certificate)
  → market-oriented support system + policies to allow distant ownership
  → drastic decline in wind sites and weakened public support

Neoclassical Approach	*Concrete institutional economy* *Innovative democracy approach*
• In this approach, the role of the parliament is to keep the free market institutions in order, establish research program and internalize the external climate cost in the market price → economic optimum • Based upon the belief that an energy company is an energy company; present fossil fuel companies will be willing and able to make the transition as they have the financial power to do it. • Approach Dominating approach especially since 2001 → development of RES-E to a halt thereafter	• Economy is embedded in a human-concrete institutional market design and has been in its history been influenced by large actors so that it benefits energy companies. This produces an economic world and outcome far from optimum (path dependency) • Imbalances and non-optimized economy → neoclassical policy reforms insufficient • Need for new and independent actors in energy scene i. Need for political balance between fossil-fuel companies and NGOs and small firms ii. Funding for new research groups iii. Feed-in support scheme which opens up market opportunities for local and new actors iv. Create infrastructure that support renewable flexible energy source v. Internalize external environmental coat but reject model such as quotas for GHG



Relevant actors and their "political economy" paradigm.

	Ministry of Finance	Ministry of environment and energy	Established fossil fuel energy companies	Newcomer green energy firms	Green energy NGOs	Right wing parties	Left wing parties
Neoclassical approach	XXX	X	XXX	X		XX	
"Innovative democracy" approach		XX		XX	XXX	X	XXX

"Political economy" paradigm from 1974 to 2008.

	1974–1979	1980–1983	1984–1989	1990–1991	1992–2001	2002–2008
Government		Left/social democrat	Right/green	Right	Left/social democrat	Right
Neoclassical approach	XX	X	X	XX	X	XXX
"Innovative democracy" approach	X	XX	XX	X	XX	

Landscape level

Drawing from the MLP on socio-technical theory, the previous sections attempted to show that the niches and the regimes would gain from being socially inclusive, as their resulting intrinsic characteristics will favor a socio-technical transition to renewable energy. The landscape level is also playing a tremendous role in creating external pressure, increasing the likelihood of a deep and structural change through the destabilization of the current system and thus facilitation of the breakthrough of niche-innovations (Geels et Al. 2017). Contextual pressure relates to both the presence of actors who have lost faith in the existing political system and the rise of new overarching principles, beliefs and practices (Burke and Stephens 2017). This section intends to shed light on the pressure that could be put on the current system through larger cultural shifts and changes that could occur based on democratic processes such as participatory governance or energy citizenship. Including social inclusiveness through public participation could bring a change to the landscape as it would modify our reappraisal of energy choices and lead to a broader cultural shift characterized by different moral criteria and practices whereas energy citizenship through for instance material participation would change mundane and domestic energy patterns and habits.

This claim is first based on the idea that participatory processes will enhance the involvement of a broader set of actors and will consequently immerse them into social learning processes. Trust, identity and solidarity-based social learning is highly beneficial as it forms a ground for a change in values, moral beliefs and energy practices (Stagl 2006, 54). According to MacArthur (2016), individuals are more likely to be aware of energy issues, hence modify their energy consumption and energy expectations if information is shared through a social network such as those created by participatory governance. Tomain (2015, 1135) further argues that democratic actions play a central role in the development of energy and environmental ethics. He highlights the importance of the community and solidarity feelings to develop a better conception of the 'right action', irrespectively of the outcomes and indicates that a proactive involvement in the energy system would result in a change of behavioral practices. Hielscher et al (2013) highlights that by bringing together groups of people with common purpose (such as in community energy), they will be able to defeat limitations of individualistic measures and collectively change their social, economic and technical context so as to promote a more sustainable way of life and ideologies of sustainability.

Second, based on Ryghaug et al (2018, 287), energy citizenship in the form of material participation (PV panels, electric cars, and smart meters) might create new and different forms of engagement. The concept of material participation here refers to "the way material things enable the configuration of issues, concerns and public around things, thereby potentially producing new ways of representing diverse interests and voices around such concerns" (Ryghaugh et al 2018, 289 based on Marres 2012). With a focus on the role of technologies and material objects in citizen participation, we notice that simple everyday life practices such as turning off lights and doing laundry might change once energy is made visible by certain technologies (2018, 89). Literature on the issue has shown that participation leads to the enhancement of environmental and energy literacy in addition to improving energy performance in terms of everyday material practices (Ryghaug et al 2018, 290; Marres 2012).

Case study 4

"Creating energy citizenship through material participation" By Ryghaug et al (2018)

Methodology: Empirical qualitative (interviews) and quantitative data to understand how technologies (Electric vehicles (EV), domestic smart energy technologies (SETS) and rooftop photovoltaic solar cells (PV)) to understand how technologies become part of new domestic collectives.

Norway

Particular context: Electricity consumption: similar to western Europe but 100% renewable energy production through hydropower. Energy historically cheap → comfort-oriented culture
Generous incentive structures and low-electricity prices for electric vehicles → one of the largest EV market

Electric vehicle (P291-292)
It could simply duplicate its fossil fuel counterpart but on the contrary, human-EV interaction facilitate a more political and practical engagement from the drivers → "EV open up issues around mobility patterns, climate change, air pollution and energy scarcity": consciousness about energy use, battery limitation, charging infrastructures, etc. → materialize issues of energy scarcity. P291
Among EV owner, there is an increase of interest regarding the transition to renewable energy, with willingness to own micro-production of electricity. Owner also often see driving an EV as a political choice in regard to Climate Change, demonstrating others that it could be a choice for them, too. Although the car is often bought as part of conspicuous consumption, some become active proponents of environmental arguments following their acquisition. P292
Smart energy technologies (P293-294)
They transform how, why and when electricity is used within households through direct communication between electricity producers and consumers. When energy is made visible and tangible → mundane routine such as showering, laundry and cooking challenged. Highlight of energy efficiency with the replacement of inefficient household appliances and awareness of "peak load".
Photovoltaic solar panels (P294-295)
Prosumers, or a new kind of actors who sells electricity to the grid and/or produces electricity for own consumption. When resource shift from centralized to local, resources have a different meaning.
Prosumer practices give another sort of agency to collectives (neighborhoods and households). The local management of solar power can reconfigure practices involving energy use → strong incentives to change consumption patterns (extra references of studies in article). Also, it establishes explicit political actions and dialogues in two ways: when managed collectively, requires dialogues and communication and visibility on the roof provide engagement regarding climate change and transition.

To sum up, this section has drawn on the MLP theory which claims that a change in the overarching landscape would be beneficial to the transition to renewable energy. To spur individuals to modify their values, beliefs, preferences and behavioral practices, thus weakening the current regime, participatory governance and energy citizenship is a key strategy as it allows social learning processes through community practices and change in behavioral patterns through material participation.

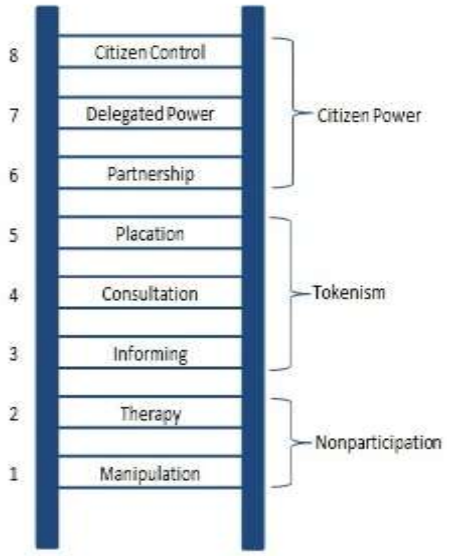
3.1.3 Challenges and recommendations

Burke and Stephens (2017) have assessed the different policy instruments proposed among energy democracy. They have highlighted already-existing core policy instruments such as information sharing (e.g. community-based collaboration, forum discussion, citizen review panels) and a set of economic and institutional instruments (e.g. renewable energy cooperatives, remunicipalization, democratized grid management, etc.) before concluding that such measures need overall strengthening and to be combined with new, more ambitious policy instruments (Burke and Stephens 2017, 44).

Accordingly, Mundaca et al (2018b) claim that citizens too often feel unconsidered in RES-E projects, whereas when their opinions are heard they feel frustrated if their input is not taken into consideration seriously. The same conclusion was reached by Depoe, Delicath and Elsenbeer (2011, 2) as they highlight that current participatory processes have so far consisted in technocratic model of rationality where policy-makers seek legitimacy by convincing the public about their already-taken decision. In this sense, public participation as of now is weak and late, and might create conflicting response to policy measures who have already been decided upon by experts and administrative forces. In that situation, public participation can have negative outcome, creating additional opposition.

MacArthur (2016, 632) suggests a spectrum of participatory interventions based on three elements in order to assess the quality of public participation. First, she questions the key actors involved in the participatory process. Who is involved and is their participation broad or narrow? Second, she focuses on the shape taken by the process (consultative, informational or devolution) and third, she evaluates the policy power of such participation (limited or strong). Arnstein's ladder of participation (1969) can be used to analyze the level of citizen participation. In an assessment of the potential of participatory processes, MacArthur concluded that thin and consultative acts of participatory governance might have unexpected effects such as participatory exhaustion or

backlash. On the contrary, in order to provide positive effects, public participation needs to be deep so as to empower the citizens and thus provide effective and transformative policies. Consequently, an efficient public participation within energy democracy relies on one that leads to trust building and some degree of citizen control (Xavier et Al. 2017, 630).



These deep changes require an extended amount of resources to be provided by the government. As argued previously, this empowering and ongoing public participation is vital for a sound public policy but doing so require citizens to be informed (Depoe, Delicath and Elsenbeer 2011, 3). The presumption that everybody is entitled to make judgments and participate in decision making is based on the idea of "enlightened understanding", which, and especially in regard to the complexity of the technological energy system, requires procedural criteria of transparency and access to information (Szulecki 2018, 29). Moreover, the possibility to overcome persistent structural exclusion such as unfavorable tax system and incentives, the lack of investment in marginalized communities, inadequate and undemocratic systems of financing is vital in regard to energy democracy. The establishment of diverse and flexible ownership structures for resources generations is central to energy democratization, which requires the State to act so at to promote large-scale coordination, redistribution and investment (Burke and Stephens 2018; IRENA 2018, 4), once more giving it a predominant role. Indeed, regulatory policies can challenge community projects as they might restrict access to the energy market or discriminate small investors. The global energy market has been going towards auction systems which tend to favor larger investors since "they increase the planning risk to a degree that only investors with large project portfolio and a strong balance sheet can tackle. This is the case in particular with regard to financial risks. Larger companies and utilities normally have more diversified project portfolios, making it more acceptable for them not to succeed with one or more projects without immediately becoming bankrupt. In addition, they have more expertise in dealing with the rising complexity of planning and auction processes". Moreover, community energy projects are vulnerable to regulatory changes such as those related to tariff structure (IRENA 2018, 4; WWEA

2016; WWEA 2018). The main challenge regarding the procedural aspect of energy justice is thus the extended amount of willingness and resources (information but also financial as RES-E is extremely capital-intensive) required from the States.

In addition, although community energy projects are often best-intentioned, they do not necessarily guarantee that benefits and ills will be distributed equally within the host community. This phenomenon can create tensions and lessen the positive impacts and acceptance of the community energy projects (WWEA 2017 in IRENA 2018). Inherent issues of democracy hence complicate matters; local communities are characterized by disagreements about the overall projects and distribution of such costs and benefits. As seen during community project in Denmark (Mundaca et al 2018a – See case study 5) participatory governance under the form of community participation and collective consultation can overcome such conflicts but this requires generous timeframe and welcoming discussion platforms. This suggests that fair, just and community inclusive renewable energy transition is possible but needs to be rolled slowly, creating an intricate challenge in regard to the very tight time-frame given to overcome climate change.

We can conclude that what is needed is public and community-based empowerment and ownership of RES-E systems (including land, generation facilities, micro-grids, storage technologies, etc.) in addition to supporting policies which build on the energy capacity at the community and regional level (Burke and Stephens 2018). The internal and external success of such community energy projects vary highly. Seyfang et al (2013, 980), based on an extensive literature review - and accordingly to the different point presented here-above -, have highlighted five elements that are critical to their success. First of all, the future of the project is dependent of the key committed individuals that drive a project forward. An "effective organizing group capable of maintaining momentum and overcoming setbacks are necessary" as their absence will lead to "a lack of clear direction or management". Second, the project itself necessitates time, information, skills, money and material resources. Financial viability (when necessary) is thus an important matter. Third, the project shall be designed so as to fulfill the needs of the community, hence "engaging with and developing trust with the community". Fourth, there should "supportive partnership and information-sharing networks" within and between groups. Finally, the national policy context should be supportive since "a lack of policy support, inconsistent and hard-to-access grant funding, difficulties with planning and other legal issues" would undermine or challenge energy community projects.

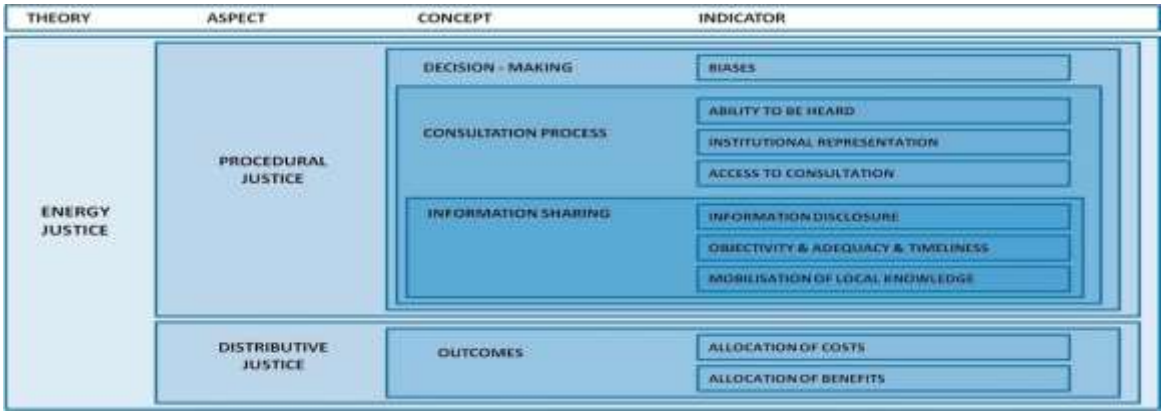
In regard to this last point, Irena (2018, 5-6) based on several WWEA reports and a small literature review has provided suggestions regarding actions to be undertaken to promote community energy. These suggestions include that policies should create equal market access for all market participant and avoid discrimination against smaller investors such as community-based investors. To do so, auction are not the preferred instruments and should rather be replaced by instruments that incentivize decentralize and integrated community-based projects such as feed-in-tariffs which are more adjustable to specific needs and carry less risks for this type of investors. Governments could also encourage the creation of alternative business models (e.g. through public guarantees) and thus encourage financial institutions to provide loans. Moreover, States should aim at achieving higher level of community participation by, for instance, "setting up specific targets and regulations for community projects by reserving a reasonably high capacity for community projects". Community energy authorities could also be established, with the aim to provide advisory services and funding opportunities, facilitate stakeholder engagement and increase public awareness and thus significantly empower and accelerate the development of such projects. These authorities could be initiated at several levels such as local, regional, national or international or be consolidating already existing institutions. Such authorities already exist in Scotland (Community Energy Scotland) and Australia (Community Power Agency in Australia). Finally, in regard to the importance of networking in fostering open innovations, creating a space for networking or exchanging knowledge is highly recommended.

Case Study 5

"'Successful' low-carbon energy transitions at the community level? An energy justice perspective" By Mundaca et al (2018a)

Use of the energy justice framework to assess two successful local energy transition projects (energy self-sufficient)

Methodology: Qualitative process tracing with semi-structured interviews and administrative material analysis



Samsø (Denmark) and Feldheim (Germany)

Context: Both communities experienced economic, social and environmental instability (closure of important economic activity)

Procedural justice

I. Decision-making:

Samsø – First top-down with announcement of the competition. Then bottom-up process when implementation started, and tensions emerged. Multi-level governance process with different institutions (SEK, SEMK, County, etc.) No apparent biases towards decision maker + most financially powerful farmers couldn't secure important share.

Feldheim – Important actors were project developer, the community and municipality. The municipality quickly decided to let the community take the decisions. This was helped by well-organized internal, inclusive and participatory decision-making (collective decision-making process established by the villagers).

➔ Conflicts and tensions existed but formal and informal mechanisms overcame interests to increase fairness

II. Consultation process:

Samsø - Strong local engagement: Meaningful participation through community meetings and institutional representation of citizens. Working groups and district heating board set up to lead active consultation and questioning of key actors. Large time frame to discuss in order to create confidence in the project. Important role of energy advisor of SEMK who provided information on RES-E + Samsø Energy company founded for implementation.

Previous inherent disagreements were overcome thanks to platforms of consultation (trade-off between cost-efficient areas and social and environmental concerns).

Feldheim - Previous issues in the area = farmers who would take all benefits whereas view obstructed for everyone.

The developer of the project perceived trust as important: consultation developed to establish open and transparent dialogue with inhabitants (open and direct flow of information) with time given to inhabitants to create feelings of trust, internal practices and common voice to continue negotiation with developer.

➔ Tensions and conflicts but formal and informal platforms to discuss and deliberate, importance of local agents to facilitate consultation processes, show concerns and integrate transition into community without discrimination

II. Information Sharing:

Samsø – Full disclosure of information from the start. Masterplan available at public library + letters + local newspaper + written petition to oppose controversial proposals. Problems: information available but subject to multiple interpretations. This was solved through intensive consultation process which forced stakeholders to find consensus.

Feldheim – Village meetings were the most important channel. Some citizens with specific knowledge (economic, engineer) having 'community legitimacy' had the duty to translate information. These sessions enabled the community to speak with one voice.

➔ Good to have different communication channels to reduce/prevent opposition. Community meetings playing an important role in sharing information between stakeholders/whole community. Importance of trusted sources.

Distributive justice

Outcome:

Samsø – Long-term economic benefits. Supported by subsidies for wind energy, resulting in short- and long-term employment possibilities and improved economic prospects. In regard to ownership: scheme to reserve shares for general public to allow low-income citizen to benefit from the transition (increased social acceptance).

Feldheim – Supported by regional and national policies (FIT, direct subsidies, tailor-made legislation). In addition to energy independency advantages and environmental benefits (CO2 -), tourism, financial advantages and employment, energy security, less market volatility in regard to energy, local tax income, increased social cohesion, etc.

Distribution:

Samsø – Certain groups (farmers) benefited more than others with more tax reduction, bigger voice since land-owners, own larger share, providing capital provided advantages. Some argue that it would have been better if owned 100% by cooperatives.

Feldheim – Each household contributed equally (collectively owned heat and electricity grid) but burden of wind energy could not be distributed equally (view, noise) with affected households compensated. A big part of the project was to ensure that the benefits of the project wouldn't be in the hand of a few people.

➔ Distribution of costs and benefits complicated, and winners and losers emerge. Need mechanisms consistent with procedural justice, distribution and legitimacy which include creation of shared community benefits.

3.2 Distributive findings

As thoroughly described in the conceptualization of the energy justice, the distributional tenet focuses on the unequal distribution of benefits and ills. This encompasses physical and financial aspects of energy in a social context. To provide a relatively comprehensive and structured review of quantitative and qualitative findings of such distributive patterns, I suggest dividing the literature in two different sections. Whereas the first will briefly look at the overall changes of availability and affordability resulting from a renewable energy transition - referring to some extent to the concepts of energy poverty and vulnerability at the national or supranational (EU) level, the second will more thoroughly highlight the distribution of ills and benefits from a local perspective (looking at fairness of the outcomes resulting from energy transition projects). The second section will be given most attention as it refers to local administrative, community levels and the private sector.

3.2.1 National scale

When climate programs are actually developed, its correspondent short-term cost is usually paid directly by the consumers. As fossil-fuel companies and heavy industries are preserved and supported by political power, household consumers are paying in an unbalanced and unfair manner for the cost of energy transition, hence enhancing energy poverty (Kuzemko, Keating and Goldthau 2016, 120).

Energy poverty, which is commonly understood as the inability or difficulties for households to have access to socially and materially needed level of energy services, seems to have increased since 2007 as energy transitions (broad meaning) have been undergone. Indeed, within climate change mitigation processes, there have been trade-offs between environmental and social objective such as energy security with, for instance, carbon pricing and feed-in-tariffs adding additional burden to Member States suffering from high level of deprivation (Bouzarovski and Herrero 2017, 70). Further down this line, Bouzarovski et al (2017, 21) have also warned from the social vulnerabilities created by the on-going transition towards low-carbon forms of energy provision since this energy transition has led to far-reaching material, economic and institutional reconfigurations at the global, State and individual household levels, consequently narrowing the access of energy services for some. Accordingly, “there is evidence to suggest that energy transitions may adversely affect the well-being of social groups susceptible to energy poverty,

even if such changes lead to long-term decarbonization of the economy, thus allowing for more efficient and affordable energy use" (Ibidem).

Accordingly, Neuhoff et al (2013) argues that the distributional impact resulting from energy transition has particularly affected poor households which are allocating a growing percentage of their expenditure for energy. The public is sensitive to social imbalances caused by rising power prices. Looking into Germany, they have demonstrated that German consumers will have rising energy bills resulting from the investments needed for the development of renewable energy projects (hydropower). They show that households will allocate a superior amount of consumption expenditure to electricity, with a particularly stronger increase for poor households. Another illustration of the impact of the transition to renewable energy on the consumer bills can be found looking at Southern Belgium (Wallonia) as the green certificate schemes created an economic bubble leading to higher energy prices. An imbalance was created between the offer (Green certificates owned by households with solar panels) and demand (from the energy providers) since there were more green certificates on the market than what the energy providers had to purchase. These energy companies had to pay these certificates at the minimum price of 65€ which forced the energy companies to increase the price of electricity in 2012 and 2013. The price of green certificate in the transportation bills has, for instance, increased from 1euros to 13,8€ per MWh (FGTB 2013).

Recommendations

Drawing from all these observation, one most obvious recommendation is for policy-makers to pay attention to and have consideration for future inequalities that could result from a transition to renewable energy. Indeed, the capital required to develop infrastructures or subsidy renewable energy projects being extremely high, it is likely to pass on citizen and most likely further impact the already-vulnerable consumers, thus impacting their capabilities. It is the responsibility of policy-makers to take such consequences into considerations and promote more just and accessible access to energy services. Another way to counteract such counterproductive effects of a transition to renewable energy is to adopt different procedural patterns. Involving citizens in the decision-making process or creating community projects in spite of top-down and inconsiderate policies would result in a fairer transition. This leads us, once again, on to the procedural aspect of the energy justice concept. In this regard, community energy can offer many benefits in regard to fairness and justice such as sustainable income, fuel poverty alleviation, skills development,

promoting social cohesion, addressing inequalities, enhancing equity community regeneration and building autonomy (Forman 2017, 651). This leads us to the next section which will look into the distributional outcomes of local renewable energy projects.

Case study 6
EUROPEAN UNION

"Energy poverty in Europe: Policies and Recent initiatives" By Build Up (2017)

- In Europe, 'energy poverty' started gaining public's attention following the 2008 economic crisis.
- The EU responded with legislation which encourage Member States to shape national plans to boost renovation and energy efficiency as an indirect measure to fight energy poverty.
- The European Commission has recently strengthened their fight against energy poverty within the Clean Energy Package and has ordered studies to assess low-cost energy efficiency measures to help low-income households.
- Energy poverty started being quantified and mapped through report and the recent creation of the European Poverty Observatory (EPOV) https://www.energypoverty.eu.
- EU-funded project (ACHIEVE, EC-LINC, REEPWB, REACH, SAVES2, Social innovation to Tackle Fuel Poverty, etc.) contributed to practical and structural solutions to reduce energy poverty in Europe and provided information ad consultation to assist low-income families to save energy.

"Clean energy for all Europeans" By European Commission (2016)

In 2016, the European Commission also presented a new package of measures aiming at facilitating the clean energy transition. This Package has three main goals:

1) Putting energy efficiency first
2) Achieving global leadership in renewable energies
3) **Providing a fair deal for consumers:** "Under the new market rules electricity prices should become increasingly market-based. The package suggests tackling energy poverty at the root through targeted social policy and energy efficiency measures such as insulation of social housing"
   → *TYPICAL LIBERAL and B-a-U EU PERSPECTIVE, quite in contradiction with the findings of this report.*

3.2.2 Local scale

According to Sovacool and Dworkin (2014, 13) an energy-just world "would be one that ensures that access to energy systems and services is equitable" and this can only be accomplished by the development of a new global energy system that is based… on renewable sources … and distributed generation" (Sovacool et al. 2014, 85 in Forman 2017, 651). This could be under the form of locally-owned renewable energy generation, community hall refurbishment to increase efficiency and collective behavior change programs (Seyfang et al 2013, 977). More specifically, according to Van Veelen and Haggett (2016), community energy is regarded as "(a) exhibiting a scalar character consistent with meso-level development, (b) involving local participation in the project and in the allocation of the benefits, and (c) a model more locally appropriate development,

expressing diverse sets of values, that ensures greater sensitivity to local context and improved acceptability within host communities" (Forman 2016, 651). Energy justice enactment at the local scale infers for government to create policies which facilitate renewable, distributed or community energy generation. The private sector should embed the overall system to their approach to corporate social responsibility meanwhile the public expend energy citizenship or create grassroots sustainable energy innovations (Forman 2017, 650-651).

These authors normatively argue for a decentralization of energy ownership and production through different forms of local/community energy projects which they define. Whereas the previous section (3.1 Procedural findings) has presented arguments in favor of these energy democratic forms and procedures at the local level, it is now interesting to review the qualitative and quantitative findings related to such process.

Distribution of ills

Contestations over energy projects have been a reality for many years, with fossil-fuel extraction often being considered as unjust (Rash and Köhne 2017, 607). Rasch and Köhne (2017, 613), through an ethnographic study in the Noordoostpolder project (the Netherlands), have demonstrated that contestations over shale gas developments in that area were due to inter-generational inequity issues burden such as environmental degradation which are perceived by the citizens as unevenly distributed over time. Past as well as future generation thus have importance in the process of energy production; and in response to such concerns the inhabitants favored the development of renewable energy. As put by Jenkins et al (2017, 632), "each energy source is inevitably imbued with its own justice challenges – nuclear power's creation of radioactive waste … coal's high worker death toll and CO2 production, for example", yet renewable energy sources are also concerned with distributional issues since different forms of energy raise different concerns. Yenneti and Day (2016, 37) have highlighted that "given that renewable energy projects contribute to achieving economic development and climate change targets, it is often argued that the environmental and energy benefits of renewable energy (and low-carbon technologies) accrue largely at regional, national and international level, while it is perceived that environmental and social impacts, such as noise, visual impacts, and land and habitat loss, occur mostly at the local level where projects are hosted". Indeed, renewable energy production has its own disadvantages such as the need for large-scale storage capacity which entails high costs (Jenkins et al 2017, 632), solar park development leading to loss of access to land (Yenneti and Day 2016, 40), onshore wind

parks leading to aesthetic (although very controversial) and noise pollution with opposition often attributed to 'nimbyism' (van der Horst and Toke 2010, 218; Delicado et al 2016), waste, the fate of disused material and animal welfare (Delicado et al 2016) and more particularly risks for nature such as bird-strikes (Zoellner et al 2008, 4136), and so on. According to Delicado et al (2016) who studied RES-E projects in Portugual and Smart et al (2014) who focused on Scotland, these concerns are seldom addressed as there is a policy gap in this matter. Hence, these findings demonstrate "the need to take into consideration community concerns that may be overlooked by planners, policy-makers and promoters" (Delicado et al 2016, 91).

The costs and ills which are inherent to renewable energy production are usually neutralized by project developers through what is called "distribution compensatory schemes". These can be seen as 'benefits' in a sense, but they intrinsically are compensation for ills that are resulting from local RES-E project that are not led by or aimed at beneficiating the local citizens in the first place. Indeed, distributive justice has long considered the fair distribution of benefits to and within communities to prevent conflict and find legitimacy (Forman 2017, 652). Those benefits have historically more predominantly taken the form of compensation scheme which aim at easing locally impacted communities. Jørgensen (2017) and Jørgensen and Anker (2015, 24-29) has looked further into such form of benefits using Denmark as a case study. She has highlighted three compensations schemes being (a) the value-loss scheme; (b) the co-ownership scheme; and (c) the green scheme. The value-loss scheme offers compensation of loss of property value of dwellings. Hence the developers of the project pay, usually 500€ payment fee for dwellings located more than 6x turbine height away. If appeal to court, there is a tendency to increase level of compensation (due process). In the case of co-ownership scheme (option to purchase shares), the developer shall offer 20% of ownership shares at cost price to local citizens. As for the green scheme (community benefit), local projects receive grants in order to enhance the local landscape and recreational values. This is paid by energy consumers through energy tax.

The rationale of compensation is based on the idea than monetary compensation and benefits will redress the imbalance between distribution of benefits and burdens, thus lead to distributive fairness and increase local acceptance. In this sense, distributive fairness is "an individual judgment on the equitable distribution of the outcome, which are both benefits, and burdens related to a wind energy project" (Jørgensen 2017, 10). In practice however, the role of scheme is highly dependent of the intertwined contextual factors influencing people's perception of the schemes.

Impacted individuals might, for instance, have a different perception of the schemes in regard to their pre-existing trust or lack of trust in the authorities and developer or have an impression of bribery which has a counterproductive effect on acceptance. Moreover, these benefits might be unable to cover the actual adverse impacts such as loss of property value, disturbed nature values, physical and mental well-being (e.g. noise, disturbance) while developer and landowners earn huge profits from the project. Cass et al (2010, 272) are joining such conclusion as compensation will often be perceived as bribery in the UK. There is a strong feeling among local people that they should get a share of benefits and hence some forms of provision might be more welcome than others. This could include, for instance, cheaper electricity to local people. Another typology of compensation schemes is offered by Kerr et al (2017, 209) who draw from three case studies in the UK. Although they do not offer a comprehensive review of the different schemes, they demonstrate their plurality and reach the conclusion that communities should be able to exercise power regarding the scheme chosen and its extent in order for compensatory schemes to have the effect attended. As of today, "payments are ad hoc et largely discretionary, as it the case with offshore wind in the UK. Guaranteeing, or increasing, community payments in this sphere might require direct intervention with government using condign (statutory powers) on behalf of the communities" (such as in Denmark).

A Typology of Community Benefit Arrangements.

	[1] CSR Benefits Package	[2] Benefits Schemes	[3] Fair Shares
What is the balance of power?	Developer has power to decide.	An intermediary acts, with tacit/assumed support of community.	Community can demand payment.
What is level of compulsion?	None.	No legal obligation. *De facto* requirement.	High. Legal obligations
What is the motivation?	Maintaining a "*social licence to operate*".	Removing obstacles to consent	Agreement essential for development to proceed
What is the role of property and property rights?	Irrelevant. Separate from any payment decisions.	Quasi-property rights provide leverage.	Critical. Property rights are exchanged.
What is the nature of the institutional framework?	Social norms.	Sectoral norms & stakeholder expectations.	Legal.
What is the basis of the calculation?	Internal budget allocation.	Standardised payments.	Directly linked to the profitability of the development.

To conclude, it seems that these schemes are not fulfilling their purpose which is to lead to a fairer distribution of costs and benefits and therefore to gain legitimacy (Jørgensen 2017, 20). And as Yenneti and Day (2016, 37 based on Munday et al 2011 and Warren and McFadyen 2010) go on to argue, "whilst such community benefit packages can be a tool for managing conflicts and

increasing local acceptance, they have generally been found to do less to address scalar inequities or garner local support than have alternative arrangements such as community ownership".

Distribution of benefits

Although usually considered as 'benefits' to citizens when it comes to RES-E local projects, these simple transfer compensatory schemes are not comprehensively understanding the benefits potential embedded in community energy according to Forman et al 2017 (651-652). Those projects can include benefits such as local skills and employment, fuel poverty alleviation, local autonomy, social cohesion but also more cultural and contextual elements that relate to particular identities (such as the reaffirmation of language in the Welsh context). A report from the British National Trust (2012), based on numerous interviews, attempted to identify the different social benefits that can be delivered by community renewables and how they can be measured and multiplied. It first highlights that "community renewable schemes can deliver a range of social and economic benefits including increased autonomy, empowerment and resilience by providing a long-term income and local control over finances, often in areas where there are few options for generating wealth. Other benefits include opportunities for education, a strengthened sense of place and an increase in visitors in the area". Looking into these different benefits; first, interviewees tend to focus on the **economic benefits** of community energy generation where they often use the income created by RES-E projects to fund further energy efficiency measures and micro RES-E production so as to reduce their carbon footprint or become carbon neutral. A second benefit is an increased '**autonomy'** which entails a "long term income and control over finances in areas where there are a few options for generating sustainable wealth". The size of such income will be depending of the size and profitability of the scheme. An example is one of the Talybont on Usk Hydro Scheme which delivers about 25000£ a year, used to provide funds to other projects in the villages. In regard to profitability and as highlighted by Local Energy Scotland (2018, 5), support scheme payments such as feed-in-tariffs encouraged the generation of energy that could be sold to the grid and thus generate income for communities, bringing benefits. However, this pattern has decreased as scheme payments have fallen. Third, such projects increase **'resilience'** since income coming from the projects "can be used to increase energy efficiency of local houses and community building, protecting against the impact of fluctuating prices". For instance, a community in Abergwyngregyn, Wales (British National Trust 2012) uses the income resulting from the energy scheme to improve the local economy through the establishment of pubs or shops.

They also attempt to lower fuel bills and hence fuel poverty through the "*sleeving"* of energy produced to local consumers. Sleeving is a pricing mechanism which seeks to match the energy use of a defined consumer group to the output of a specific generative group which hence "provide consumers with a more direct relationship with the source of at least some of their energy, and by reducing marketing and administrative costs enables the supplier to offer consumers a reduced rate for their energy supply". This process is used by the British National Trust as opposed to the fact that community energy generation often does not lead to lower local energy prices since, in the absence of local or smart grid, the energy is sold to the national grid instead of going towards the individual households. Fourth, the **community is empowered** since such long-term project development entails the involvement of local people in a wide range of activities, thus improving skills and confidence. Through the collective decision-making processes about the distribution of benefits, "communities also develop greater self-determination through the direct control of local resources". Fifth, these energy schemes promote '**education**' as "they provide direct experience of the application of science and technology" to schools, college/university visits and student projects. Sixth, a '**sense of place'** is developed since community control ensures that the size and type of technology being installed correspond to the landscape and needs of the local community. Moreover, self-sufficiency has the potential to contribute to the protection of local culture and language while the collective endeavor of developing and managing such projects increase social cohesion, create new networks and connections between individuals. Seventh, it improves '**local economy**' through the creation of employment opportunities resulting from the planning, survey and engineering parts of the projects, in addition to increasing the tourism prospects of the area.

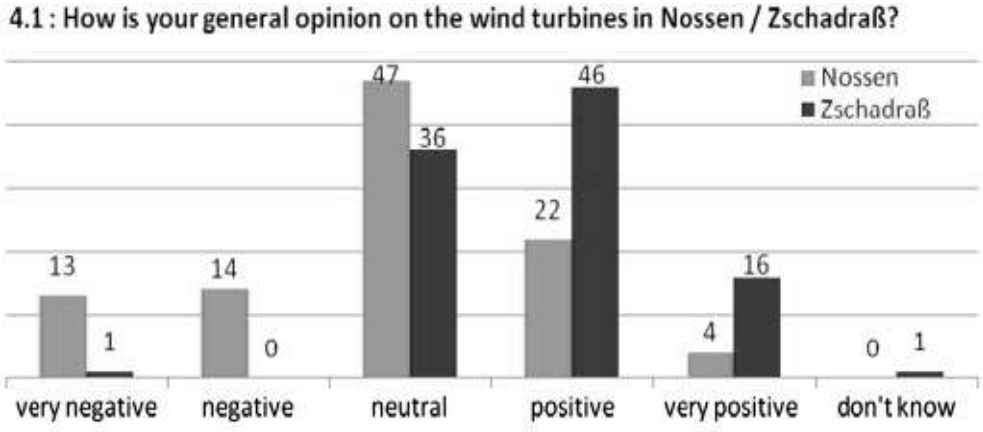
Another typology of benefits is offered in a report by the Local Energy Scotland report (2018, 5) where they mention 'direct benefits', according to which such "generation of electricity or heat for local use displace more expensive imported grid supplied electricity or fossil fuel"; 'economic benefits' with employment opportunities and enhance efficiency; 'indirect benefits' with improved air quality; 'social benefits' with the production of energy that counteract fuel poverty and reduce stress for citizens; and 'strategic benefits' with energy storage mechanisms enhancing outputs from community owned generators.

In regard to socioeconomic impacts, Delicado et al (2016) who focused on four cases of standard renewable energy projects (not communit-owned) have highlighted ambivalent contributions to local development. Whereas there is a perception of some positive social and

economic impact on local development (and particularly the creation of jobs and revenues for the municipality), these impacts are limited and unequal. Stakeholders at the municipal level for instance tend to value more this aspect whereas local populations seen those benefits are much scarcer. Other benefits might come from the direct exploitation of renewable energies but once again these benefits are modest. This ambivalence is mainly explained by the difference between the benefits going towards the owners (mainly private) land where the infrastructures are implemented and the general local populations. They reach the conclusion that "*the scarce positive impacts perceived might be compromised by the fact that in all cases the main promoters of the energy infrastructures are large national or international companies. They are generally seen, at the local level, as the main beneficiaries of renewable energy exploitation. This circumstance, together with the absence of links between energy production and local economies and activities, as well as with the perception of a substantial unbalance in the distribution of benefits, leads to the consideration that the production of renewables in Portugal did not provide, up to now, a significant contribution to sustainable local development*" (Delicado et al 2017, 91-92). This is further demonstrated by Munday et al (2011) who have led an analysis of the economic development opportunities surrounding wind energy development in rural Wales. The deployment of renewable energy technologies can bring localized economic and environmental changes; however, in these case studies the flow of the economic benefits advantages in terms of incomes and jobs have been questionable. As a matter of fact, the developers of wind farms have provided diverse forms of community benefits to the affected communities, but these have not yet evolved to significant tools for economic development. They conclude by stating that "*increasing the ownership of wind energy projects might improve the level and quality of economic development outcomes in rural economies of Wales, with the specific nature of the link between local ownership and rural economic benefits warranting further research. We suggest that amounts placed in community benefit funds are fairly low compared to the potential returns associated with community-owned schemes. Diverse ownership may also lead to economic and social benefits with community social capital and skills developed by the activity necessary to promote projects*". (Munday et al 2011, 10).

A case-study led in the Netherlands (Rasch and Köhne 2017, 613) in the Noordoostpolder shows that the involvement of inhabitants in the distribution of economic benefits and their access to the 'goods' of the project influence the way they perceive the project. Indeed, this area was first

characterized by the development of shale gas production which didn't provide benefits to local inhabitants nor involved them in the decision-making process. As locals fought for their rights to participate in the energy projects (through the use of academic arguments and thorough socio-economic assessments, prerequisite so as to be taken seriously), they eventually were allowed to take part in RES-E projects and hence beneficiated from the goods of the projects (for those who started up a wind farm, for instance). This same conclusion was also reached by the Institute for Self-Reliance (2011) which has noted that citizens find frustrating that widely available resources such as sun and wind were developed under the old, centralized owned scheme. They argued that "people want to avoid environmental personal harm" and want to "share in the economic benefits of their local renewable energy sources". People are not opposed to renewable energy project, they are rather opposed to seeing the economic benefits of their local wind and sun leaving their community. This is further legitimized by the fact that investments in RES-E can be quite lucrative as private owners and equity partners look forwards to 10% or more return on investment. When opposition occur in regard to a decentralized energy projects (such as for wind power projects), local ownership has the potential to unlock local support. As shown in this case-study in southeast Germany (Musall and Kuik, 2011), when there was forms of local ownership of the wind project, 45% of the residents had a positive view regarding the wind energy (Zschadrass) while 16% of residents only had a positive view when absentee-owned project (Nossen).



Looking at renewable energy projects in Germany (grid-connected larger PV ground-installed systems, biomass plants and wind turbines), Zoellner et al (2008) have proven through quantitative analysis that "economic consideration of the respective renewable energy system, understood as a positive cost-benefit calculation made by the individual, is the strongest predictor for a reported acceptance". Hence, the economical estimation of the technology seems to be the most important

predictor for a project acceptance, especially regarding wind and solar projects (2008, 4139). Moreover, and as described within the procedural section of this report, there is a strong connection between acceptance of the project and procedural justice criteria such as transparency, early and accurate information and possibilities to participate in the project in the planning and installation phases (Zoellner et al 2008; Jobert et al 2007; and many more on 'social acceptance'). Other elements influencing the acceptability of RES-E projects by local citizens include how well-informed residents are, the quality of communication with the public, and so on (Jobert et al 2007).

According to Energy city (2017, 23), "*The economic potential of the energy transition in terms of growth, added value and jobs is now well established. Energy transition projects can therefore be important drivers for the local and regional economy. In addition to these general economic effects, the benefit of local ownership can also be appreciated by the impact of various project development models on the share of added value that remains within the local area. This share may vary by a factor of 8 to 10 depending on whether the project is entirely financed and controlled by local operators or by an external developer, leading to the "flight" of related financial flows*".

In regard to the importance of fair distributional outcome (once more in a normative and instrumental perspective) and through the use of additional case studies, the following part of this section will attempt to provide insights on the creation and distribution of benefits, keeping in mind that the extent to which these social benefits are realized and distributed vary accordingly to the process of decision-making, participation, implementation and the chosen model of ownership (Walker 2008). The aim of this section is hence to gain a better understanding of the relationship between the degree of control of the citizens in regard to the project (business-owned or actual community energy project), the consideration given to the well-being of the people and the actual distribution of benefits resulting.

Case study 7

"Local energy Ownership in Europe" By energy city 2017

GERMANY

Hanover's innovative energy transition tool P23

Hanover's municipal utility developed ProKlima fund in 1998 so as to finance measure aimed at reducing GHG. The fund has 5,5 million euros of annual budget (financed by city's gas tariff, part of enercity's profit and contributions from authorities). The fund is used for energy efficiency measures in buildings, development of RES-E (wind and solar) and heating networks and educational activities.

Between 1998 and 2015, 60million € of subsidies were paid out → in 2010 a euro injected triggered 12,7 euros of investment (due to cross-cutting dimension of the measures supported and innovative financing) → 2,6 million invested in 2010 → generated 33 million euros of investments → created 47 million euros of added value of which 42% directly benefitted the Hanover area.

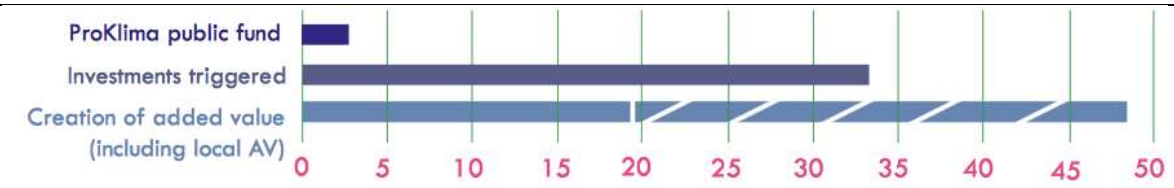


Figure: Economic leverage of the ProKlima fund in 2010 (in millions of Euros)

Maximizing the local added value of renewable energy projects P24

Study conducted by the Institute for Decentralised Energy Technologies (IDE, 2016) in Germany.

Assess the influence of wind farm development models on the distribution of added value, including the added value which remains in the host area using actual economic data. Comparison of two scenarios:

1) External Model: Investment and operation in the hands of developers → local added value limited to the small investments made locally and to local taxes → 7 million euros over lifetime of the project
2) SUN model: Project run by local municipal company with direct financial contribution from citizen and co-financing from local banks. Tax revenues and most investments and profits are reinjected with multiplier effect on local economy → between 58 to 68 million euros over 20 years (8 to 10 times more added value) with each euro invested generating 1,54€ of local added value thanks to the multiplier effect on local economy.

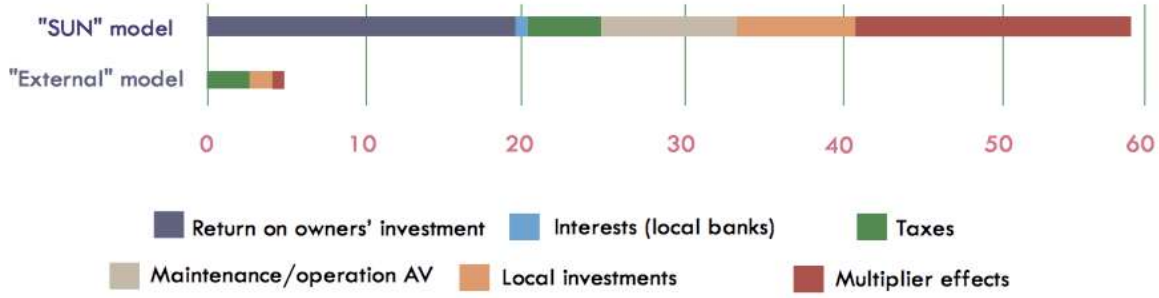


Figure: Local added value in millions of euros generated over the lifetime of the project according to the model

Energy re-municipalisation process in Hamburg P25

- In 1999, the privatization of the former utility HEW was vividly contested by the opposition and citizens.
- In 2009, the city council decided to re-establish a public energy supplier (Hamburg Energie), fully owned by the municipal water company, experienced rapid growth (100000 customers and positive financial results after 5 years).
- In 2010, local environmental and charity organizations launched a citizen's initiative to demand a referendum on the public takeover of all energy networks (Our Hamburg – Our Network) → Yes at 50,9% → encouraged community cooperative (Energienetz Hamburg) and raised 50 million euros from the community to help finance the takeover of the networks and develop RES-E projects.
- In 2014 city council arranged for the new operator Stromnetz Hamburg GmbH to take over the power grid and to become the new concessionaire for the next 20 years + City has stake (25%) in the private companies managing gas and heat networks but full takeover is planned in 2018 and 2019.

→ "In 2014 the public operator generated 35 million euros profit from managing the electricity distribution network (excluding production and supply activities), in addition to the 60 million euros paid directly to the city as concession rights. Management of the gas and heat distribution networks also generated profits in 2014, 25 and 62 million euros respectively".

Case Study 8

"Energy justice at the end of the wire: Enacting community energy and equity in Wales" By Alister Forman (2017)

Methodology: Extensive qualitative studies with semi-structured interviews with project actors (3 projects).

WALES

Assessment of the community energy sector in Wales to understand energy equity (as in affordability and availability)

Context (P652): "Ynni'r Fro" policy program by Welsh Government (2015) that emphasize the role of community-owned energy generation as a tool to achieve a large array of social, economic and environmental goals with as overall objective to support the well-being of people and communities. Ynni'r Fro didn't provide requirements on how the revenues from local energy project should be spent → many local actors involved whilst aiming at broader integrated objectives in regard to the well-being of Welsh present and future generation.

At the beginning, grants offered under this program BUT

Conflict with "***European State Aid regulations***" which structured how grants could be spent (preventing public authorities from distorting competition and trade within EU through the use of tax-payer funded resources to bodies in receipt of funding - *typical EU neoliberal approach*) and thus halted greater financial support by welsh government for the community energy sector → communities had to raise capital with just advisory and informal support.

Results

Distributive aspects with social, economic and cultural rationales:

- Projects were welcomed as a response to the declining of local services → projects contribute towards meeting local needs in an austerity context e.g. energy needs and services = availability and affordability, employment, etc. Benefits should stay local to compensate the offset financial benefits transferred through shared ownership. Problem: hard to extend availability and affordability due to ongoing policy and regulatory issues (*not further developed*)
- Cultural benefits as for the welsh language which should be used to some extent in community project

Procedural aspect:

- Due process, transparency and accountability undermined: non-clarity of how information is used and assessed in decision-making (problem of interpretation, scientific language in assessment), inequality and non-respect for non-traditional business model such as in community energy
- "Disrupted by concurrent moves to extend entitlements on behalf of incumbent large-scale, centralized developers…"

"*It feels important to … empower the community … to give people an option to own the company … but in a strategic sense it feels like perhaps it ought to be driven a bit more by the project*" (By project organizer, Swansea)

Case study 9

"Green upgrade: How California is pioneering 'Energy Justice'" By Patricia Leigh Brown for Yale E360 (2018)

CALIFORNIA

California has passed a set of laws that require 35% of California's cap and trade auction to be spent on clean energy projects in disadvantaged communities and low-income neighborhoods and thus address energy inequalities. There is also a coalition of 9 eastern US States supporting programs that aims at helping low-income residents with their energy bills through the "Regional Greenhouse Gas Initiative".

Highly motivated politicians such as Californian Governor Jerry Brown who wants to **address the interwoven issues of poverty, pollution and sustainability** by using cap-and-trade benefits to:

- Bring free renewable energy
- Provide energy efficiency upgrade: "Low-income Weatherization Program" (LIWP) which reduced energy use of poor people by 44% since their participation in 2016. Particularly important since the 'American Council for an Energy-Efficient Economy' found that low-income households pay more per utilities per square foot than the average household (sometimes by 3x).
- Offer technical assistance to vulnerable citizens

Without these forms of help, it is hard for those communities to invest in such technologies or improvements mainly because of **structural barriers**:

- Low home ownership rates
- Limited disposable income
- Energy inefficient housing conditions

Different **advantages**:

- Reducing monthly bills (sometimes up to 75%) hence allowing income to be spent differently (e.g. education)
- Health benefits since usually exposed to a variety of negative health impacts (moisture, mildew, mold, sensitive to heat waves, etc.) due to improper ventilation heating and cooling

Challenge: Gaining the trust of the population which are afraid of the cost → use of the cap-and-trade for financing

Recommendations

Three recommendations from Rash and Khöne (2017, 613) is that what is just and unjust in energy production depends on the local context (history, value, ideologies) which should be taken into consideration by policy-makers. Second, new projects should build on 'local practices of energy justice' which include opposition to energy infrastructures and local energy initiatives. Third, procedural justice and recognition of the involved groups is important. In regard to this last point, Liljenfeldt and Pettersson (2017, 656) who looked at the possible relationship between the distribution of windmills in Sweden and the socio-economic characteristics of the people living in these areas, have highlighted the need to "pay attention to and work to prevent the kind of imbalanced development evidenced as it can contribute or add on the marginalization of people, as well as general contestations…". They further advise additional "research on the distribution of benefits and burdens on different geographical scales of changes in the energy systems" (Ibid, 657).

Because there were only a few attempts to measure social benefits in the case of local energy projects, the National Trust Report (UK - 2012) encourages effective measurements of such

benefits so as to support more favorable policy and funding for community owned renewables. Indeed, there needs to be interest and support from the policy-makers to overcome the different barriers faced by such projects, being (a) a lack of access to the land when communities do not owned land where the resource are suitable for energy generation; (b) capital needs regarding the costs that comes as soon as the beginning of the project with feasibility study, support applications for planning, licenses and loan finance; (c) hardly obtainable planning permission; (d) lack of clarity and consistency in national governments with uncertainty regarding the future price of energy, dependency on power purchase agreements with larger commercial firms, the connection to the grid, the feed-in-tariff and the possible support available for such projects; (d) lack of knowledge, experience, skills; (e) and lack of confidence which can prevent people from getting involved in such projects since they may appear complex and unfamiliar; (f) the fear of a long-term commitment within these project is also present; (g) the prospects of opposition within the community (with for instance controversial wind projects) necessitates a high level of engagement to promote understanding, awareness and support for the project.

In order to overcome such barriers, it is believed that effective measurements of social benefits would provide arguments in favor of the creation of supporting policy and funds for community-owned RES-E projects. For this reason, the National Trust Report (2012) highly encourages the measurements of social benefits, and for policy-makers to consider these benefits. Although not fully comprehensive nor sufficient, this was accomplished by the New Economics Foundation (2012) which developed a set of metrics drawing on "Social Return on Investment" (SROI) with the aim of demonstrating the effectiveness of small-scale, localized, community energy projects through the quantification of social, environmental and economic outcomes. They do so using quantitative data but also interviews regarding the Ashton Hayes (England) zero carbon project (AHGCN).

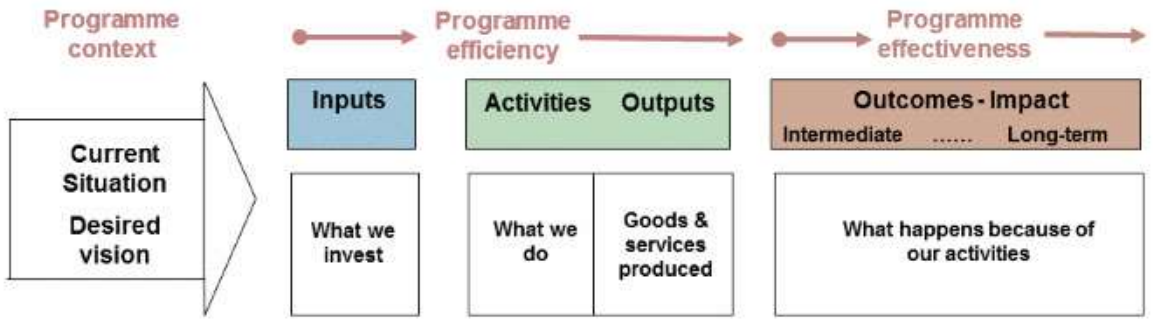
The four phases of SROI

Phase 1. Setting parameters and impact map

Boundaries: Create the framework of the analysis – what part of the organization or individual project is to be measured – and prepare background information.

Stakeholders: Identify the stakeholders whose costs and benefits are to be measured.

Impact map: demonstrates how organizations input are connected to its output and might thus affect stakeholders' outcomes. They use the "Theory of Change" where output = tells you an activity has taken place and is usually quantitative (e.g. number of house insulated) and outcome = the change that occurs as a result of an activity (e.g. improved well-being households) (See annex 4 for application on AHGCN).



Phase 2. Data Collection

Indicators: identify appropriate indicators to capture outcomes. (See annex 5 for indicators suggestion)

Valuation: Use findings from stakeholder engagement and existing research to generate proxis to put financial values on outcomes.

Data collection: Use tried and tested sources to gather the data for accurate measurements of identified costs and benefits. Decide on an appropriate benefit period for each outcome and the extent to which those outcomes drop off over time.

Phase 3. Model and calculate

Create a cost-benefit model using gathered data and projections. Calculate the present value of benefits and investment, and the SROI ratio. Account for the displacement, attribution and deadweight of the organization/investment under review.

Phase 4. Report

Consider and present SROI produced by the organization/investment. Identify how the benefits are divided between stakeholders Identify the key factors that affect the SROI ratio.

This method is only one out of the different possible methodologies available to measure the impact of renewable energy projects of local communities. The rationale behind is that once the benefits are recognized and measured (normative benefits with fairness and equity and instrumental with social approval of the projects - which has received far more attention in the literature), governments would be inclined to support community energy projects. Many more reports, policy briefs and articles (see for instance Roberts et al 2014) have been written on what strategies are best to adopt once the political power is willing to enhance community energy. They have more often than not taken the example of Germany and Denmark which have respectively developed numerous solar and wind community projects. The community energy sector has however experienced challenges as these two countries have experienced a shift in policies from feed-in tariffs to tenders (REN21 2018, 41-42). This, again, reflects the debate between subsidiaries schemes such as FITs (often seen as highly permissive schemes in regard to community energy projects) and auctions or tenders which have historically beneficiating private and relatively important energy companies.

Case study 10

"Local energy Ownership in Europe: Energy remunicipalization in Germany" By energy city 2017

- Historically, the provision of local public services such as the distribution and supply of electricity, gas and heat, drinking water and waste management was the mission of municipal utilities (Stadtwerke). They had the monopoly of local distribution network management and supply to end users.
- As privatization started in the 1980s and in order to diminish their financial difficulties, the market share of these municipal utilities declined. This phenomenon was deepened by the liberalization of the market in the 1990s. The four main energy companies in Germany (RWE, E.ON, EnBW, Vattenfall) won most of the concession contracts for electricity and gas distribution network.
- However, more recently there was a window of opportunity for the remunicipalization of the energy services as 20000 concessions contracts for managing electricity were made available (a large number of concessions contract were reaching expiry date), there was a strong political and citizen mobilization to bring energy production and delivery under control as well as an increasing dissatisfaction with private operator management and the will to better coordinate and boost energy transition. Moreover, local authorities had access to long-term and inexpensive financing.
- This led to "70 new municipalities as well as 200 cases where the electricity grid concession contract was awarded to municipal utilities already in operation in 2005.

3.3 Summary

In this part of the report, different empirical findings that are relevant to the procedural and distributional aspects of energy justice have been approached. First, normative arguments were offered in order to support a fair and just procedural approach to energy justice. Indeed, energy policies so far have been conducted without real consideration for everyone, thus leading to the discrimination based on gender, socio-economic characteristics, and so on. Further, I provide a review of the instrumental findings. Those are answering to the questions "Why and how a fair and just procedural processes are contributing to the energy transition, and even more so a fair and just one?". To do so, I use the multi-level perspective on socio-technical transition to renewable energy. First, in regard to the niche, I highlight that a bottom-up approach to energy transition, hence one that is based on a decentralized system such as through community energy, beneficiates a transition to renewable energy since it is more adapted to a particular context, lead to a fairer distribution of benefits hence to extended legitimacy and less opposition, allow networking, resources sharing, etc. which are beneficial to the development of projects. Moreover, the regime which has been particularly stable due (carbon lock-in) could be challenged with the extended participation of citizens, which consequently would favor a transition to renewable energy. Finally, the landscape which entails the values, behavioral patterns and habits would also benefit from an extended participation since community projects allow, for instance, the sharing of green values and the change of behavior and habits.

I then go on to shed light on different distributional findings through the assessment of the outputs resulting from a transition to renewable energy on a larger, national scale where the cost of the transition often impacts energy poverty and energy vulnerability. I then more thoroughly look into the local scale and provide an overview of the distribution of ills and benefits related to the local development of renewable energy projects, might them be community-owned or conventional projects. These ills relate to the negative impacts resulting from renewable energy transition projects while the benefits refer to the different advantages that might be created by the transition to renewable energy but could be distributed unfairly depending on the ownership forms of such project. I find that even a transition to cleaner energy can results in public bads which are usually paid off by bigger energy project developers through compensatory schemes. These compensatory schemes seem however inappropriate and don't suffice to offset the different benefits energy projects would bring locally if it was community owned. Those benefits include

economic advantages, resilience, autonomy, local empowerment but also more locally contextualized elements such as sense of community or sense of place, and so on. Through different case studies, this report has shown that these advantages were more important and varied when a renewable energy project is community-owned. This is particularly the case with local economic benefits with funds and investments providing much more advantages for the local economy.

Both these sections are concluded by recommendations which reflects the needs for political power to be willing to concede power and importance to citizen through, for instance, enhancing subsidiary schemes, creating facilitative financial and investments processes and institutional regulations. In regard to academia, it is suggested to deepen the knowledge on the benefits of community-owned energy projects. As a matter of fact, an extensive part of the literature focuses on demonstrating that citizens who perceive additional advantages are more likely to support energy projects, thus bringing legitimacy and facilitating projects. However, there seems to be a lack of findings regarding the actual local benefits of community-owned projects. Once these will be made available, it will be the responsibility of the political power, once more, to facilitate the creation of such projects.

I. Norwegian context

As previously mentioned, most community energy projects have been taking place in Germany, Denmark and the UK where the political powers have encouraged such development, in addition to fairly motivated individuals. Such development rested principally on wind (for Denmark and the UK) and solar (for Germany). Looking more particularly at Norway, most of the potential for renewable energy production lay in hydropower. As a matter of fact, 98% of the electricity production in Norway come from renewable energy sources, most of which come from hydropower (Ministry of Petroleum and Energy 2016).

Source	Amount (TWh)
Hydropower	129 TWh
Wind power	1,9 TWh
Thermal power	3,3 TWh
Total	134 TWh

There are 183 production companies in Norway, among which the 10 largest companies own 70% of the Norwegian hydropower system (Energy Facts Norway 2018). This raises questions on the distributive fairness of the Norwegian energy system and further down that path interrogations on how to transform such energy production into community projects or how to involve the public (through the different forms of public participation mentioned) so as to reach fair and just procedural and distributional justice in Norway.

In addition to the distributional and procedural outcomes of the already produced renewable energy of Norway (hydropower), questions can be asked on newer form of energy production. Indeed, there is an incredible potential for wind power in Norway, both offshore and onshore (Svendsen Harald 2015; Undeland in Ekra 2014). In regard to such potential, the energy minister Terje Søviknes (2018) claim that "a lot of new power is being developed in Norway at the moment", with a level of activity at its highest for the past 25 years (since the Norwegian Energy Act in 1991) with 3,6 Terawatt hours of wind currently developed, 5,5 under way and an prospective of 10 terawatt hours developed in the country by 2020. Whereas the Energy Minister claim that such development can create values and jobs locally, Professor Enders Skonhoft (in Ekra 2014) from the Department of Economics (NTNU) highlights the social costs (need for subsidies leading to higher bills for consumers and environmental costs). Hence, in regard to such energy potential and the importance of the role of citizens in its development, conducting studies in the Norwegian context seems particularly relevant.

II. Brief summary and recommendations

In regard to the necessity of the decarbonization of our society, the provision of energy to all and everyone and in respect to energy security (referred to as the energy trilemma), our current energy system ought to change in a close future. While this transition can take many forms, a new paradigm in academia has started to argue for one that takes the people rather that sole economic concerns into consideration. This paradigm is reflected in the energy justice concept and theoretical framework. This report hence starts by providing a literature review on "energy justice" and on closely related terms and concepts. Using its two core elements - being the distributional and procedural tenets, I map the existing empirical research made on the issue of a just and fair energy transition. In regard to the procedural aspect, I claim and demonstrate that a more participative form of energy transition, under the form of public participation of community ownership, could enhance the transition to renewable energy and more so a just and fair one. To do so I use normative and instrumental arguments which I structure according to the multi-level perspective of socio-technical transition. I hence argue that such participatory processes would lead to a niche, regime and landscape that would favor a transition to renewable energy. I then focus on the distributional findings available in the academic literature and reports and show that benefits and ills regarding the transition to renewable energy are and would be better distributed in a transition characterized by an extended participation of the citizens, hence taking into consideration local contexts and needs.

Although there has been an extensive growth in the amount of literature produced on the issues of energy justice and equity, there seems to be space for more and better oriented research. Indeed, the different concepts introduced and developed in this report are used within different academic fields and schools and hence the literature is rather disordered. Because there is a need for a paradigm shift in the way energy system and energy transition is perceived, we need more inter-disciplinary research that shed light on broader aspects of energy transition. As of now, the literature bases itself extensively on a top-down approach to energy transition with social acceptance of projects (so as to avoid opposition that could lead to slowing down technical improvements) being the main focus of most of the literature. Based on my findings, I argue that focusing to a bigger extent on the different benefits that could be created through community-owned projects would be extremely beneficial to the literature and hence to policy-makers.

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Annexes

Annex 1: Energy justice applied to energy problems

Energy justice analytical applications to energy problems.

Topic	Concept(s)	Major philosophical influence(s)	Applications to energy	Injustices	Solutions
Energy efficiency	Virtue	Plato and Aristotle	Energy efficiency: high penetration of efficient service	Inefficiencies involved in energy supply, conversion, distribution, and end-use	Fuel economy standards, energy efficiency labeling, industrial retrofits, utility-scale demand-side management, ascending block rate pricing, advanced metering and smart grids, training and capacity building, consumer education and awareness
Energy externalities	Utility	Jeremy Bentham, John Stuart Mill, Henry Sidgwick	Wellbeing: less suffering, pain, externalities, and disasters associated with energy production and use	The imposition of negative social and environmental costs on society such as traffic congestion, the extractive industries affiliated with energy production, the resource curse, nuclear waste, air pollution, greenhouse gas emissions, and water consumption	Passage of a carbon tax, accurate price signals and tax shifting, and environmental bonds
Human rights and social conflict	Human rights	Immanuel Kant	Universal human rights: an obligation to protect human rights in the production and use of energy	The violation of civil liberties—in some extreme cases death and civil war—undertaken in pursuit of energy fuels and technology, as well as the contribution of energy production to military conflict	Extractive industries transparency initiatives, energy truth commissions and inspection panels, improved social/environmental impact assessments for energy projects, availability of legal aid to vulnerable groups
Energy and due process	Procedural justice	Edward Coke, Thomas Jefferson, Jürgen Habermas	Due process: free prior informed consent for the siting of energy projects; fair representation in energy decision-making	Approaches to energy siting that ignore or contravene free, fair, and informed consent, and/or do not conduct adequate social and environmental impact assessments	Better information disclosure, broader community involvement and participation
Energy poverty	Welfare and happiness	John Rawls, Amartya Sen, Martha Nussbaum	Accessibility and subsistence: an energy system that gives people an equal shot of getting the energy they need, energy systems that generate income and enrich lives	Lack of access to electricity and technology, dependence on traditional solid fuels for cooking, and time-intensive fuelwood and water collection and processing of food in emerging economies, borne mostly by women and children	Social pricing and assistance programs as well as pro-poor public private partnerships for microhydro units, solar home systems, improved cookstoves, biogas digesters, and small-scale wind turbines, mechanical energy for pumping, irrigation, and agricultural processing
Energy subsidies	Freedom	Robert Nozick, Milton Friedman	Libertarianism: energy decisions not unduly restricted by government intervention	Gross subsidies that involve an involuntary wealth transfer to recipients, essentially raiding the pocket books of the unwilling	Elimination of inappropriate subsidies, subsidy impact assessments, sunset clauses, and adjustment packages for those dependent on subsidies
Energy resources	Posterity	Ronald Dworkin, Brian Barry, Edith Brown Weiss	Resource egalitarianism: an obligation to minimize resource consumption and ensure adequate reserves for future generations	Exhaustion of depletable energy reserves and fuels	Improved energy efficiency, establishment of national resource funds, commercial-scale deployment of renewable electricity and biofuels
Climate change	Fairness, responsibility, and capacity	Peter Singer, Henry Shue, Paul Baer, Stephen M. Gardiner, Dale Jamieson, Simon Caney	Intergenerational equity: an obligation to protect future generations from energy-related harms	A daunting suite of negative impacts from climate change including ocean acidification, food insecurity, climate refugees, and the increased frequency and severity of natural and humanitarian disasters	Greenhouse Development Rights, community-based adaptation, mitigation through stabilization wedges

Source: Sovacool and Dworkin 2015

Annex 2: Energy justice's eight main principles

Energy justice decision-making tool.

Principle	Explanation
Availability	People deserve sufficient energy resources of high quality
Affordability	All people, including the poor, should pay no more than 10 percent of their income for energy services
Due process	Countries should respect due process and human rights in their production and use of energy
Good governance	All people should have access to high quality information about energy and the environment and fair, transparent, and accountable forms of energy decision-making
Sustainability	Energy resources should not be depleted too quickly
Intragenerational equity	All people have a right to fairly access energy services
Intergenerational equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today
Responsibility	All nations have a responsibility to protect the natural environment and minimize energy-related environmental threats

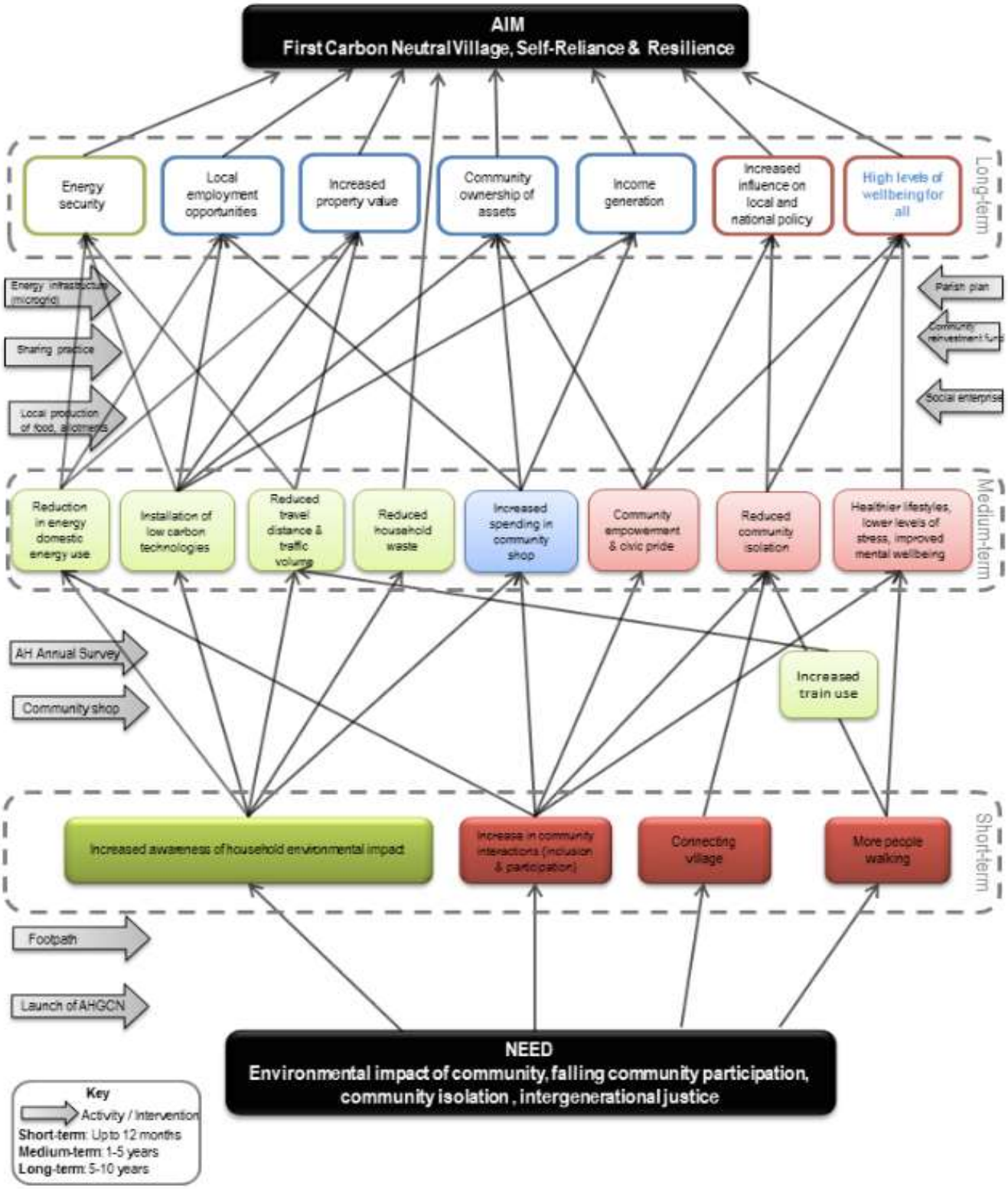
Source: Sovacool and Dworkin 2015

Annex 3: Dimensions and indicators of energy democracy

Main dimensions	Components	Indicators
Popular sovereignty	Citizens as recipients of energy policy	Welfare and energy access as key benchmarks
	Citizens as stakeholders (producers and consumers)	Consumer prices and quality of service
	Citizens as accountholders	Prosumer legislation and grid access
		Prosumer support schemes
		Public accountability of energy decision-makers
Participatory governance	Inclusiveness	Incorporation of public consultations at all levels
	Transparency	Citizen interest/opinion on par with expert agenda
	Access to information	Due process and clear procedures
	Energy education and awareness raising	Regulated lobbying
		Reporting on legislation and deliberation
		Independent research possible and available
		Existence of dedicated educational programmes
Civic ownership	Civic ownership of power generation	Renewable energy deployment, dispersed energy capacity
	Civic ownership of transmission/ distribution infrastructure	Share of energy from private, cooperative and communal sources
		Ownership structure and power in the political economy of energy
		Share of grid infrastructure co-owned by municipalities/communal

Source: Szulecki 2018

Annex 4: Ashton Hayes going carbon neutral, Schematic of described theory of change



Source: nef 2012

Annex 5: Evaluation framework for AHGCN project (possible indicators for locally owned RES-E projects benefits)

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
Household	Environmental	Increase awareness of household environmental impact	Longevity of behavioural change		▪ Energy conserving behaviour; ▪ Reduced travel distance; ▪ Increased train use; ▪ Reuse, reduction and recycling of materials; ▪ Baseline and temporal data on average annual energy consumption (gas and electricity), and by house type; and ▪ Reduced expenditure on energy (£). ▪ The 'Green Grin-o-Meter' (specifically children and young adults)	▪ Ashton Hayes Annual Survey (2010). ▪ Potential for primary school to participate in data collection through home or online surveys such as an adapted version of the '*Green-Grin-o-meter*' originally developed for Caerphilly County Borough Council[21]
		-	Reduced household waste		▪ Reuse, reduction and recycling of materials.	▪ Ashton Hayes Annual Survey (2010)

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
		Increase awareness of low carbon technologies: generation & efficiency measures			▪ Installed/ consider/ not consider for multiple low carbon technologies; ▪ Number of households using a "green energy" tariff or local / domestic generation.	▪ Ashton Hayes Annual Survey (2010)
		-	Increase in domestic energy production	Energy security (household)	▪ Domestic generation in kWhe (electricity), kWht (heat); ▪ Energy dependence factor (ratio of energy consumed to energy generated)	▪ Currently unreported. Additional question could be added to the Ashton Hayes Annual Survey.
		-	Increased installation of low carbon technologies		▪ Installed/ consider/ not consider for multiple low carbon technologies	▪ Baseline data from Ilieva (2010) and Ashton Hayes Annual Survey
	Social	Increase in community (social) interaction/ friends/ acquaintances.			▪ % participation in village activities ▪ Buckner Neighbourhood Cohesion Scale[22]; ▪ Density of neighbourhood acquaintances (% of persons acquainted with other residents).	▪ Edwards (2007) surveyed participation in village activities. ▪ Baseline data held on % participation of village in project launch. ▪ Additional indicators could be captured through the Ashton Hayes Annual Survey.
		-	Increase in healthy lifestyles		▪ Active transport (trips by bike/ walking); ▪ Number of homes with indoor temperature raised to 21 °C above baseline;	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey. ▪ Potential for school to participate in data collection, specifically related to transport

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
					▪ Self-reported health. ▪ The Green-Grin-o-meter (specifically for children and young adults)	surveys ▪ Adapted version of the *'Green-Grin-o-meter'* online survey
		-	Lower levels of stress, improved mental wellbeing	High levels of wellbeing for all	▪ Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS)[23]; ▪ The Green-Grin-o-meter (specifically for children and young adults)	▪ Currently unreported. Additional data could be collected from from Ashton Hayes Annual Survey. ▪ Adapted version of the *'Green-Grin-o-meter'* online survey
		Reduction in fuel poverty			▪ Annual spend on main heating fuel as a percentage of household income (includes: Housing Benefit, Income Support for Mortgage Interest, and Council Tax Benefit.); ▪ Average annual spend on electricity; ▪ Number of households that went without heating last winter because of cost of heating; ▪ Number of respondents worried about the cost of heating a lot.	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey.
	Economic	Reduced expenditure on energy			▪ Average energy use – electricity (adjusted for degree days); ▪ Average energy use – gas (adjusted for degree days);	▪ Ashton Hayes Annual Survey
					▪ Cost effectiveness (cost of electricity and heat below grid	▪ Currently unreported. Additional data collection from Ashton

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
					level / conventional boiler cost)	Hayes Annual Survey.
		-	-	Increase value in property	▪ Average value of property compared to counterfactual (£)	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey.
		-	-	Income from domestic generation	▪ Net £ per household	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey.
		-	Increased spending in community shop		▪ Expenditure in the community shop (£)	▪ Baseline data collected from Ashton Hayes Annual Survey (2010)
Community	Environmental		Increase in local food production		▪ Number of community members who grow their food; ▪ Ownership of allotments	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey.
		20 % reduction in carbon emissions			▪ Baseline and temporal data on carbon emissions (kWh emissions; carbon footprint)	▪ Ashton Hayes Annual Survey
		-	Less traffic		▪ Annual village traffic survey, e.g. roadside interviews, automatic traffic count, number plate recognition survey, manual classified count.	▪ Annual survey – data on public transport use since 2008/2009; ▪ Baseline data from Local Area Transport Strategy if available; ▪ Potential collaboration with University of Chester or Ashton Hayes Primary School
		-	Increase in local renewable energy generation		▪ Community generation in kWhe (electricity), kWht (heat)	▪ Ashton Hayes Annual Survey
		-	-	Energy security (community)	▪ Energy independence factor: amount of energy produced in the local area, compared to the overall	▪ Baseline data from Ashton Hayes Annual Survey

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
					▪ energy used per household	
	Social	Increase in community inclusion			▪ Buckner Neighbourhood Cohesion Scale	▪ One off measurement in Edwards (2007)
		Increase in community participation			▪ Percentage community participating in AHGCN	▪ Ashton Hayes Annual Survey
		-	Increased empowerment of the community and civic pride		▪ Civic engagement/ participation; ▪ Voting in local/ national elections; ▪ Awareness of local parish council issues; ▪ % of people who feel that they can influence decisions in their locality; ▪ Buckner Neighbourhood Cohesion Scale.	▪ Empowerment of community in its dealing with various external agencies (Alexander et al., 2007), but anecdotal. Therefore, reported as currently unreported. Additional data collection from Ashton Hayes Annual Survey.
		-	Reduced sense of community isolation		▪ Buckner Neighbourhood Cohesion Scale	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey
		-	-	Increased influence on local and national policy	This has been left blank for further discussion with the community. (see section *Next Steps*)	▪ Currently unreported.
		-	-	Intergenerational justice/ sustainability of the village for future generations	This has been left blank for further discussion with the community. (see section *Next Steps*)	▪ Currently unreported.
	Economic	-	-	Income generation, sustainable funding	▪ Temporal trends of funding generation, type of funding: private, public (central/local government), community generated (£)	▪ AHCE - Funding for AHGCN since start of project.

Stakeholder	Type of outcome	Short-term outcome (≤12 months)	Medium-term outcome (1-5 years)	Long-term outcome (5-10 years)	Potential indicators that could be used to measure identified outcomes	Data availability
		-	-	Increase in community owned assets	▪ Value of community owned assets (£)	▪ AHCE
		-	-	Local employment opportunities	▪ No of jobs created in full time equivalent (FTE)	▪ Currently unreported. Additional data collection from Ashton Hayes Annual Survey
		-	-	Opportunities for local suppliers	▪ £ spent with local suppliers	▪ Alexander et al (2007) used results from household survey on capacity to increase insulation and install local carbon technologies as a proxy for potential local suppliers

Source: nef 2012