Energy equality and energy sufficiency: new policy principles to accelerate the energy transition

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Abstract

Energy equality (EE) is a novel concept, and its tentative definition was recently presented as follows: "Providing all individuals with equal opportunities of using energy services, energy technologies, and consuming energy and embodied energy for satisfying personal needs and holding capabilities" (Pellegrini-Masini, 2018, p. 13). The complexity of the concept and its relation to widely used concepts such as "needs", "capabilities", "energy justice", "environmental justice", "distributional justice" and "energy sufficiency" deserve to be analysed and discussed. Nevertheless, EE appears as a concept that is susceptible to inspire energy policies pursuing higher levels of distributional equity and the reduction of CO_2 emissions. Distributional policies though, are known to be contentious and often raise debates on the opportunity of interfering with the free market allocation of goods in capitalistic economies. Whether EE inspired policies might be considered feasible and implementable depends on their expected social acceptance. In this paper, we discuss the interrelation of EE with other concepts at the core of energy consumption policies and we discuss the profile of social acceptability of the policies that might be informed by EE.

Introduction

In recent years, Energy justice (EJ) has established itself as a guiding concept in reframing social and policy research regarding energy consumption, sustainability and energy poverty (Heffron and McCauley, 2017; Sovacool et al., 2016). Its merit could be the scholarly effort of taking ethical arguments to the core of the academic and policy research on the energy transition. While this effort might be welcomed by those engaged in research on energy poverty and on the ethical aspects of sustainable consumption, it still leaves open a wide scope for debate regarding the exact definition of EJ and its degree of influence on current and future energy policies. It could be argued that EJ, dealing with distributional and procedural injustices, is relevant to fuel poverty and energy poverty (Sovacool, 2015; Walker and Day, 2012), which in turn have been for long tackled through measures, among others, which sought to improve energy efficiency[1] in the building stock and now appear to be addressed by novel concepts like energy sufficiency.

In this paper, I will focus on a further concept that has not yet been sufficiently discussed but that could be considered a specific interpretation of the EJ concept, namely energy equality (EE). I will discuss its relevance in the EJ debate and more importantly, its potential relevance for energy policies, their social acceptability and how EE would fit in an energy policy vision including energy sufficiency.

Equality and Energy Justice

EJ was defined by several authors since its first appearance (Guruswamy, 2010), although two definitions became prevalent. One holds that EJ "… aims to provide all individuals, across all

1. As an example, please see the Warm Front Scheme in England: https://webarchive.nationalarchives.gov.uk/20121204142629/https://www.gov.uk/warm-front-scheme/overview.

areas, with safe, affordable and sustainable energy." (McCauley et al., 2013, p. 1). The authors (McCauley et al., 2013) elaborate further on this, indicating that three tenets define EJ, and namely 'distributional justice', 'procedural justice' and 'recognition justice'. Distributional justice deals with equity in the distribution of goods, while procedural justice advocates for fair participation in processes of energy policymaking and finally recognition justice means recognizing and granting the rights of marginalized social groups (McCauley et al., 2013).

Sovacool and Dworkin (2015, p. 436) instead defined EJ: "… 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." At the same time the authors indicated ten principles that lie at the core of EJ: 'availability', 'affordability', 'due process', 'transparency and accountability', 'sustainability', 'intragenerational equity', 'intergenerational equity', 'responsibility', 'resistance', and 'intersectionality' (Sovacool et al., 2017, p. 687).

It has been argued (Kymlicka, 2002, p. 4) that each theory of justice: "shares the same 'egalitarian plateau … each theory is attempting to define the social, economic, and political conditions under which the members of the community are treated as equals". Pellegrini-Masini et al. (2018) observed that this was precisely the case for EJ and that equality could be considered the root concept of EJ. They observed that both 'formal equality' and 'substantive equality' were two conceptual dimensions that underpinned EJ's tenets and principles outlined by the two major definitions of the concept (McCauley et al., 2013; Sovacool et al., 2017). Pellegrini-Masini et al., (2018) argue that the principles and tenets of EJ would favour not absolute equality but, higher levels of equality that would entail the use of the concepts of formal and substantive equality as benchmarks to gauge the implementation of EJ's fundamental tenets and principles. This view aligns with the opinion of DeMarco (2001) who held that equality was a benchmark concept suitable to value the implementation of other central concepts for modern western societies, such as democracy, freedom, participation etc.

However, even if we accept that equality could be a root concept of EJ, what are the policy implications? Even if we affirm that EJ is aimed at establishing higher levels of formal and substantive equality of citizens in several processes, this being regulatory processes, or processes of production or consumption, which together establish an energy system, what are the desirable levels of equality that the energy system should attain? Moreover, should we argue explicitly for Energy Equality? A recent attempt defined EE as follows: "Providing all individuals with equal opportunities of using energy services, energy technologies, and consuming energy and embodied energy for satisfying personal needs and nurturing capabilities" (Pellegrini-Masini, 2018, p. 13). This definition provides some indication of the level of equality that would be desirable to be attained so that an energy system can be considered equal: in fact, equality per se is a generic term, which could be referred for example to procedural equality, equality of consumption or equal satisfaction of basic needs only, while using the terms "equality of opportunity" makes explicit reference to a level of equality implying distributional justice without discounting personal preferences. The cited definition establishes a direct link to "needs" and "capabilities", two concepts that already have an established record of empirical research. Theories of needs arose principally as theories of human motivation (Maslow, 1987) while the capabilities approach (CA) was developed in relation to moral philosophy and economy studies (Nussbaum, 2003; Sen, 1992, 1979). Sen (1979, p. 217) who pioneered this approach argues for the moral desirability of "basic capability equality", which he distinguishes from utilitarian equality, based on the equality of marginal utility for each individual, which holds equality of treatment of everyone's interests, and from total utility equality, i.e. essentially absolute equality, and finally Rawlsian equality, which is based on a theoretical level of equality that could be agreed on by whoever wasn't aware beforehand of his relative position in a distribution. He argues that while total utility equality (absolute equality) might address problems of unequal distribution, it does not address the problem of unequal capabilities unless it is assumed that all human beings are the same in their abilities and inclinations, which is not the case. Sen (1979) appears to be mindful of the difficulties entailed in defining and measuring basic capabilities, still, he advocates to focus on this approach because in his opinion what matters for assessing individual utilities is not so much goods but what goods do on human beings (Sen, 1979, p. 219). Sen argues that needs can be interpreted as capabilities: "I believe what is at issue is the interpretation of needs in the form of basic capabilities. This interpretation of needs and interests is often implicit in the demand for equality. This type of equality I shall call 'basic capability equality'." (Sen, 1979, p. 218). Certainly, focusing on capabilities instead of needs might create a shift of focus from motivations driving individual actions (needs) to the ability to act to satisfy those motivations, which would appear to be two related but different things. Satisfaction of needs seems to be mainly a matter of achieving a purpose, being capable of satisfying a need appears instead as a condition that holds the potential of achieving a purpose (need's satisfaction), nevertheless without considering this achievement as inevitable. In this respect, capabilities seem to be more difficult to capture through indicators which in many cases build on data registering outcomes rather than abilities and potentials.

If we go back to the definition of EE introduced earlier (Pellegrini-Masini, 2018), we can see that it points to equal opportunities of using services, technologies and of consuming energy and embodied energy in order to satisfy personal needs and developing and holding capabilities. The proposed definition, therefore, distinguishes between needs and capabilities. The idea underneath is that a core of essential needs should be met independently from making individuals capable of satisfying certain basic needs such as food, safety, acceptable housing. Other needs, however, such as achieving career goals, or establishing significant social ties, appear to be more easily facilitated fostering capabilities than in any other way. The reason for this is that basic needs attain the survival of individuals and assuming that we live in a society that wants to ensure that each of its members would meet his basic needs, we might have to resort to providing direction to those subjects that cannot develop capabilities for meeting them or that would face anyway extreme environmental obstacles in acting towards meeting them.

In energy terms, the definition differentiates between pursuing equality with respect to energy consumption only and extending this pursuit to embodied energy, too (i.e. the energy consumed to produce goods). In the first case, EE would not go much further than ensuring that basic levels of energy

consumption are warranted for everybody, in order to provide necessary comforts to all individuals in buildings. At most, this could be stretched to include access to public transport or any form of transport necessary for working and socialising. In the second case, having a minimum degree of equality in relation to embodied energy consumption might allow all citizens to achieve, for example, adequate standards of education in order to limit unequal career prospects.

Policies favouring Energy Equality

Scholars have attempted to list and rank capabilities. Particularly known is Nussbaum's list of "central human capabilities", which includes the following ten capabilities (Nussbaum, 2003, pp. 41–42): 1 life, 2 bodily health, 3 bodily integrity, 4 senses imagination and thought, 5 emotions, 6 practical reason, 7 affiliation, 8 other species, 9 play, 10 control over one's environment. Sen (2005) heavily criticizes the drawing of a hierarchical list of capabilities, because he considers this against democratic scrutiny and public reasoning and, incapable of capturing the specific social reality of a given context. Perhaps because of the aversion by Sen, the founder of the capabilities approach (CA), there is a lack of empirical studies that aim at validating a universal list of capabilities. The same cannot be said of theories of needs and particularly those that were conceived in empirically driven disciplines, like psychology. In this area, the most famous is the theory of motivation of Maslow (1987), which was conceived in the 1940s. Maslow's humanistic approach has been criticized but it has withstood several empirical tests (Oishi et al., 1999; Sheldon et al., 2001; Taormina and Gao, 2013). There is no easy objection to complement the CA by Sen with the Maslow's theory of needs, as Sen (1979) himself indicated that capabilities are themselves an interpretation of needs, emphasizing choice and possibilities over goods' actual distribution. Maslow's (1987, pp. 35–47) hierarchy of needs, which arguably could correspond to an equivalent hierarchical list of capabilities, comprises the following needs: 1 physiological needs, 2 safety needs, 3 belongingness and love needs, 4 esteem needs and 5 the need for self-actualization. It was objected that this list is culture, and context-dependent but research suggests otherwise (Taormina and Gao, 2013).

In a CA perspective, what might appear of fundamental importance is whether citizens have the capabilities necessary to satisfy the listed needs. This reasoning might translate to the energy policy area: it makes sense to think whether and how it is desirable to grant that all citizens have access to energy services and technologies in order to be capable of satisfying all or at least as many as possible of the needs listed.

It is not possible here to discuss thoroughly whether equality or at least some levelling is desirable, something that has always attracted a vast amount of theoretical and empirical research (Okun, 2015), which has recently bent towards giving merit to equality for creating better societies (Wilkinson and Pickett, 2010a). Assuming that some degree of equality is desirable it could be argued that policies favouring energy equality would need to intervene in order to favour the possibility of satisfying Maslow's list of needs (or any improved version that might be supported by empirical tests).

For policy-making, Maslow's needs could be organized in two clusters as follows: A (basic needs) physiological and safety, B (higher needs) belongingness, esteem, self-actualization. This distinction is supported by some empirical evidence (Sheldon et al., 2001). Cluster A would mean ensuring that individuals are capable of meeting their physiological and safety needs. Clearly, in terms of energy policy, these needs invoke interventions that attain the provision of warm, safe living environments. There is a vast literature regarding fuel poverty and, more broadly, energy poverty, which is impossible to review here. What is evident though is that energy poverty is an issue that has far-reaching effects (Walker and Day, 2012), confirming Maslow's theory that if basic needs are not sufficiently met individuals will find it difficult or impossible to satisfy higher needs. Therefore, the capabilities of individuals to satisfy those basic needs should be prioritized over further policy interventions.

In Table 1 an essential range of policy interventions aimed at increasing energy equality is presented. These are by no means exhaustive, but they provide an initial indication of what type of policies could address basic and higher needs. Not all of these policies are strictly energy policies, particularly when embodied energy is considered. Embodied energy is already used as a term to account specifically for the energy necessary to produce buildings, mostly, but also manufactured goods (Kara et al., 2010). More recently, the term has been used in the social sciences and rephrased as "embodied energy injustices" (Healy et al., 2019) in order to highlight global environmental injustices related with indirect energy consumption through the production and use of goods. A broad discussion of energy equality should not exclude embodied energy, because this accounts for a large part of the energy consumed worldwide and within countries. For example, in the EU, only 25 % of final energy consumption is consumed by households (European Energy Agency, 2018).

The current levels of energy consumption inequality appear very high, as research indicates that the poorest half of the global population is responsible for only 10 % of the global total lifestyle carbon emissions and that the wealthiest 10% of the global population is responsible for 50 % of emissions (Oxfam, 2015). Similarly, even within nations, the differences between low income and high-income individuals are very large (Oxfam, 2015). Somebody could object that *still*, this inequality warrants the satisfaction of basic needs to the vast majority of the world population, but, even if that was the case, energy equality is about advocating for equality of opportunities of energy consumption in relation to the satisfaction of all needs, not only the basic ones The urgency of considering embodied emissions has been pointed out in recent research about energy justice (Sovacool et al., 2017), and, in analogy, the same could be said for embodied energy. Social acceptability of energy equality policies

Energy equality policies might have significant political and economic implications. A substantial increase in redistributive policies would be needed in order to support currently disadvantaged individuals and for reducing the gap between wealthier individuals, who are responsible for the largest direct and indirect energy consumption, and the rest of the population. A system of personal energy allowance, or carbon energy allowance, if the policy focus was directly on reducing carbon emissions, could be considered. This could be justified on the grounds of reducing carbon emissions per capita but would

Table 1. Needs and energy policy interventions towards energy equality.

Needs	Policies affecting direct energy consumption	Policies affecting embodied energy consumption
Physiological Safety (basic needs)	• Energy poverty (fuel poverty) policies – Satisfaction of basic heating, cooling, cooking and warm sanitary water needs • Ubiquitous and sufficient street lighting in all neighbourhoods	• Income support policies • Provision of public housing schemes
Belongingness Esteem Self-actualization (higher needs)	• Measures warranting sufficient mobility for family, social and work activities • Provision of adequately warm and lighted public buildings	• Progressive taxation • Personal energy (carbon) allowance schemes • Education services and school facilities freely accessible for all and at all levels.

also have the benefit of rising general environmental awareness and weakening the resistance of some sectors of society towards redistributive measures based on higher progressive taxation. While a reduction of general economic incentives could dampen to some extent individual economic initiative and productivity, the so-called trade-off between equality and efficiency (Okun, 2015), a further socioeconomic development towards more egalitarian societies is seen as a necessity to create sustainable development (Mészáros, 2001; Pereira, 2014; Wilkinson et al., 2010; Wilkinson and Pickett, 2010b).

While the range of variables influencing social acceptability of policies might be multiple and varied in nature, it is possible to attempt a grouping of the variables that most likely have influence. The main division in categories is drawn from a similar categorization developed for research about acceptability of wind farms in planning phase (Pellegrini-Masini, 2017, n.d.) but is supported by another very similar categorization, albeit worded differently, that was developed for variables affecting support for climate policies specifically, and which emerged from an extensive literature review (Drews and van den Bergh, 2016). Therefore, support is hypothesized to be influenced by 1 'resources' like income, education, information, 2 'contextual variables' like trust toward proponents, transparency and fairness of the decision-making process, and 3 'psychological variables' like the perception of collective and subjective benefits and costs, pro-environmental attitudes, political values. This is by no means a definitive list, but these variables have been empirically tested for their effect on acceptability of environmental policies, which has been shown to be, to various degrees, significant (Drews and van den Bergh, 2016; Dreyer and Walker, 2013; Harring et al., 2018; Kallbekken and Sælen, 2011; Ziegler, 2019).

Energy equality and energy sufficiency

Energy sufficiency (ES) is a relatively novel concept, Darby (2007, p. 114) wrote arguably the first author to discuss energy sufficiency wrote: "sufficiency of energy services is complex and involves normative decisions on how much is enough, whether these are based on scientific or intuitive judgements." Later, more definitions were presented, like Brischke et al. (2015, p. 1574) who wrote that ES is "… a strategy that aims to limit and reduce the input of technically supplied energy by a quantitative or qualitative change of utility demanded and/or technical service delivered", while more recently ES was defined as "… a state in which people's basic needs for energy services are met equitably and ecological limits are respected." (Fawcett et al., 2018, p. 8).

While the first (Darby, 2007) and the third definition (Fawcett et al., 2018) stress the importance of valuing how much energy is enough through reference to other research or concepts ('basic needs', 'equitably', 'ecological limits') the second (Brischke et al., 2015) merely describes the process of sufficiency.

Interestingly the definition presented earlier of EE (Pellegrini-Masini, 2018) bears some overlapping and some differences with the concept of ES, particularly in both the definitions of ES (Fawcett et al., 2018) and EE there is a mention of satisfying needs and a reference in one case to equality and in the other to equity.

While equity and equality are related they are also different, in fact, equity is often maintained as a means of achieving or restoring distributive equality (Beder, 2010; Ikeme, 2003) but this is not always the case, in fact, the perhaps oldest definition of equity, attributed to Aristotle (Ikeme, 2003) is that of an action aimed at correcting a law that is deficient in terms of its rationale or universality. Further, Fawcett et al. (2018) refrain from defining what they mean for "equitably" and they appear to use interchangeably inequity and inequality. So, while energy equality appears more defined in its content, in its latest formulation ES seems to be more ambiguous.

Another difference is in the reference to needs, the definition of ES mentions "meeting basic needs" while the definition of EE that was presented earlier talks of satisfying personal needs and nurturing capabilities. Clearly, the focus of energy sufficiency is more on a limited set of basic needs while "personal needs" mentioned in the EE definition would imply both the wider consideration of basic and higher needs.

A further difference is related to the mention of "energy services" in the ES definition and that of energy services, technologies and consumption of embodied energy in the EE definition. Again, the EE definition has a broader take on what should be relevant in terms of energy consumption.

Despite this considerations the ES definition has a solid merit in deliberately mentioning "ecologic limits", which could be argued are implicit in the concept of sufficiency, since its early appearance (Darby, 2007); the reason being that sufficiency literally means the quality of being sufficient, i.e. enough or adequate, (Oxford Dictionaries, 2019), therefore it refers to an assessment of economy of a presumably scarce resource.

Therefore, EE and ES could be seen as synergic and compatible concepts whose utility in inspiring energy policies could be seen as complementary: on one side EE would inspire policies to act towards distributive justice of energy services, technology and embodied energy consumption, which is arguably more environmentally friendly than accumulation and unequal distribution and certainly is more socially sustainable, while ES would lead energy policy towards an approach of limiting overall consumption in order to generate an environmentally sustainable energy system.

Conclusions

While the academic debate around energy justice appears mature, so far it has had limited resonance in policymaking. Perhaps a reason might lie in the limited immediate understanding of what constitutes energy justice in its essence. It has been argued that equality could be considered the root concept for energy justice and that energy equality might, therefore, be a concept that can facilitate the formation of energy just policies.

Even if energy equality itself lends to a degree of indeterminateness, it nevertheless points clearly towards an explicit aim of reducing all sorts of inequalities, including distributional inequality. This appears as an aim that is advocated by several authors affirming that sustainable development should or is best achieved through policies aiming at reducing distributional inequalities. At the same time, inequality appears to be incompatible with energy policies inspired by the concept of energy sufficiency, in fact, meeting widely diffused energy needs while economizing on energy consumption cannot happen in situations of high concentration of resource appropriation. Energy sufficiency and energy equality appear therefore synergic and complementary, most likely capable of producing better energy policies when used in combination as guiding policy principles.

Therefore, ambitious policies aimed at delivering energy equality and energy sufficiency might be needed for facilitating the energy transition, but they will not be designed and implemented if they are thought to be strongly opposed by the public. Citizens' opposition should not be taken for granted, especially in consideration of research highlighting how climate policies might be supported under the influence of diffused pro-environmental attitudes and the perceived collective benefits that they could deliver. While the urgency of implementing energy just policies is advocated by many academics, research should focus more on policy implementation and policy acceptance, in a sustained attempt of clarifying what variables influence the most acceptance of radical energy policies, which appear ever more necessary to accelerate an otherwise dangerously slow energy transition. Particularly, new energy just policies could be investigated that attempt to accelerate the energy transition through relatively unexplored policy instruments, these directly inspired by EE and ES concepts could be for example systems of non-tradable personal carbon allowances in conjunction with welfare measures to provide more widely affordable or even no-cost energy services for disadvantaged individuals.

Such policies should be studied, not only in their acceptance tout court but how there are communicated to the public and how salient features of this policy like "fairness" and their pro-environmental character are made explicit and understood. Further, personal values and attitudes leading to acceptance or rejection should be understood to comprehend which specific subgroups of the population, if any, might require specific efforts in delivering policy communication and/or preliminary processes of consultation.

Climate change is a looming threat whose urgency and magnitude are increasingly evident, governments will have to act quickly to avert the worst consequences and more radical policies than those so far implemented will be needed, communicating and introducing such policies in order to minimize opposition will be a key aspect in the wider strategy for accelerating the energy transition.

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