Energy vulnerability: a cross national comparative research

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Abstract

A cross national comparison of three EU countries (France, UK, Hungary), three Asian countries (Indonesia, Philippines, China) and two Latin-American countries (Argentina, Brazil) shows that the categories of energy poor groups need to be enriched going beyond the traditional accessibility/affordability/poverty nexus. Based on a comparative work on micro-dimensions of electricity practices relying on desk research, on field research in the EU and on a few research seminars on energy poverty, the comparison will help us elaborate new typologies of energy vulnerable groups based on two hypotheses. The first one tests qualitative criteria to understand the complexity of energy poverty in order to enlarge the definition to a more dynamic approach of energy vulnerability. The second one deals with the variety of social norms and representations of energy needs and practices in the different countries studied leading to question the traditional categories of energy vulnerable groups. The first step of this on-going research underlines the complexity of the issue of electricity access when comparing the social norms, representations and consumption behaviours in different national situations. Based on this short analysis of representations, norms, needs and practices, we suggest that energy vulnerability could be better understood at least if three factors are considered together: affordability, accessibility and reliability. The level of vulnerability for each criterion reflects the success or failure of the redistribution and pricing policy of the central and local authorities for the affordability indicator, of the infrastructure, housing and equipment policy for the accessibility criterion and of the energy and infrastructure policy for the reliability factor. While standardizing the norms and needs, the electrification policy supported by governments also tended to strengthen the social polarisation within the communities distinguishing them by the quantity and quality of infrastructure provided and the financial capacity of the different households to satisfy or not their needs, making energy vulnerable categories more blurred. Moreover the cross national comparison shows that what is considered as deviant behaviour in one context such as the fraud, may be tolerated in some other national situations, using illegal connections as a tool to fight poverty. The quantity, the quality and the affordability of decent housing combined with the quantity, quality and affordability of the energy infrastructure and an appropriate redistribution policy represent determining elements influencing energy vulnerability in all countries. What the study also shows is the multidimensional and context-based nature of the energy vulnerability and its contribution to social fragmentation and hierarchies.

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If switching on the light has become an automatic gesture in the developed world, it is no longer taken for granted by some households because of their difficulties to afford electricity and warmth. This phenomenon is reported to concern around 54 million households across the EU (Pye 2015), around 10% of the American population and almost 1 million Canadian households in the mid 2000s. Although this group of population has physical access to electricity, they can't consume because of the proportion the energy expenses represent for their income. In the developed world, usually affordability appears to be a key issue to understand energy poverty. But the lack of physical access can also affect some particular populations such as the electrically disconnected populations, Roma families, the migrants and the homeless. This general distinction between affordability and accessibility makes the problem of energy poverty in the developed world very different when compared with the situation in the developing world where the physical access to electricity is far from being ensured in all houses. According to the United Nations, 1.3 billion people in the world lack access to electricity, one billion have only intermittent access, and 2.6 billion consume traditional biomass for heating and cooking fuel. 600 million African people and 300 million Indian people are deprived of electricity access. Deprivation of energy tends to reflect the level of development and social cleavages. In Niger for example, 17% of the urban inhabitants consume 99% of electricity produced whereas 83% of the rural inhabitants are totally deprived of it. According to Sovacool et al. (2012, p. 716) "one in three people in the world obtain light from "traditional" fuels and collectively pay 20% of global lighting costs but receive just 0.1% of the world's lighting energy services." The lack of energy services, whether in developed world (when fuel poor are disconnected) or in developing world where the service is not provided can't be fully compared but situations of energy deprivation exist everywhere.

In the end are these statistics sufficient to reflect the diversity of energy vulnerabilities of the population in the world? A cross national comparison of three EU countries (France, UK, Hungary), three Asian countries (Indonesia, Philippines, China) and two Latin-American countries (Argentina, Brazil)[1] shows that the categories of energy poor groups need to be enriched going beyond the traditional accessibility/affordability/poverty nexus. We are aware that such categories are far from being homogeneous across the countries studied. But we aim to analyze the extent to which the representations of electricity needs and uses could impact the typologies of what we would rather call "energy vulnerable groups" differentiating the western societies and the societies of the emerging countries and the urban-rural cleavage. The comparison of micro-dimensions between all the geographic areas considered here shows that energy poverty covers different social realities revealing broader social segmentation.

Based on a comparative work on micro-dimensions of electricity practices relying on desk research, on field research in the EU and on a few research seminars on energy poverty, the comparison will help us elaborate new typologies of energy vulnerable groups based on two hypotheses:

The first one tests qualitative criteria to understand the complexity of energy poverty in order to enlarge the definition to a more dynamic approach of energy vulnerability.

The second one deals with the variety of social norms and representations of energy needs and practices in the different countries studied leading to question the traditional categories of energy vulnerable groups.

The first step of this study shows in the end that if micro-dimensions of energy practices in the different societies enable to broaden the typology of energy vulnerable groups, it should be completed by a second step leading to study the extent to which macro-dimensions such as the nature of the State and of the market can help further understand the issue of energy vulnerability.

1. From the accessibility / affordability nexus to a broader understanding of energy vulnerability

[1] The countries compared here have been chosen on the basis of studies carried out in the framework of EDF R&D and CERI-Sciences Po Partnership since 2011. They include the results of field research in France, in the UK and in Hungary and desk research as well as seminars carried out on energy access in the Philippines, Indonesia, Brazil and Argentina.

a. Use of broader qualitative indicators

Many studies have highlighted the difficulty to define quantitative indicators of energy poverty (Nussbaumer et al. 2013 among others) Electrification rate, which is the most widespread criterion when examining energy poverty in the world, only shows the level of access to some type of energy. But it hides social and regional disparities among each country. Neither does it give details on the abilities of the population to get connected and to consume. The same applies to the affordability indicator which implies that only the poor population is affected. In the end the reality is more complex than the sole accessibility / affordability nexus. This complexity results from the deficiencies of supply and demand policies as well as of other public policies such as housing or social policies. As Reddy et al. (2000), Fankhauser et al. (2007), Bhanot et al. (2012), Rehman (2012) and Bhattacharyya (2013) stated, complementary qualitative issues have therefore to be considered to understand the reality of energy poverty such as the choice of energy products, accessibility, affordability, reliability, adequacy, safety, sustainability and acceptability of the energy services. Pachauri (2011) argues that measuring deprivation of energy services and basic needs for the daily life should rely on three indicator domains collected at the macro-level, the community and household level. It can refer:

at macro-level to the socio-technico-political system (the production and grid capacity, the reality of the connection to the grid, the reliability and quality of the supply, sustainability of the modes of electricity production, the pricing policy, the urban and housing policy, the redistribution policy);

at the community level to the local resources and infrastructure, organisation and social cohesion and adequacy between the electricity provision and the basic needs of the local populations;

and at the household level to the socio-economic and demographic profile (level of equipment, level of incomes of households, number of family members, consumption habits, expenses patterns).

b. Lessons from the comparison

In this perspective what do we learn from the comparison between Europe and emerging countries?

Of course when the infrastructure is not built, neither connection nor consumption is possible. This reality particularly affects many countries in Asia and some low populated regions in Latin America. This is partly linked to the technology and infrastructure policy developed by the governments and the ability to mobilise the operators to bring electricity through the national grid or through local, mini or off grid solutions.

Even when the grid exists, the distance between the housing and the connection point and the cost of the connection service sometimes prevent households from electricity access. This is particularly true of Asia and Latin America. This links accessibility and affordability issues, thus referring to the equipment policy, pricing policy and social policy of the governments.

But even when the access is provided and consumption is made possible, situations of disconnections may appear in case households can’t afford to pay the bills. This is a reality affecting Europe but also large parts of population in other countries of the world. Of course this is related to an income problem but it is not the sole explanation since inefficient housing, heating and domestic devices contribute to high consumption needs and therefore high electricity bills. The housing policy of governments may favour the rapid construction of low efficient building to meet the housing demand of middle and lower classes to the detriment of the quality of the building, thus influencing in the short term the ability of the households to get adequate thermal comfort and to pay for it. This is particularly true in big metropolis in Latin America and in Asia, showing a lack of coordination between urban planning, housing and infrastructure policy.

If the ability to get connected, to consume and to pay for the service varies according to the infrastructure, equipment and income available, it also depends on the capacity of the electric system to supply electricity in a reliable, safe and efficient way, with as few shortages and interruptions of supply as possible. Therefore even the connected households who are able to pay may suffer a kind of energy vulnerability when the technical system is not up to the tasks causing damage to electrical appliances, hamper business activities and require consumers to switch to costly alternative solutions. The technical system and the lack of consumer protection system against such practices contribute to a

kind of energy vulnerability. Such a situation leads to strong social discontent against the energy policy of the government and against the unreliability of the suppliers.

In Asia or Latin America, rural migrants, and, in Europe, isolated and disconnected populations as well as Roma populations (especially in Hungary) and migrants (in France) living in run down dwellings, rarely have any official connections. Different practices of illegal connections may therefore develop in order to get some basic access to electricity. But such behaviours can in turn have negative consequences on the reliability and safety of the grid, on the economic balance of the electric companies and can create domestic accidents. The way local urban planning is managed and social integration of such populations organised is questioned here.

Finally consumer protection regulation and tariff pricing vary across countries, regions and groups of populations. Consumers don't have the same level of electricity access guaranteed everywhere in the world and don't have the same kind of rights to claim for it. This is for example the case of minority and ethnic groups in Asia and Latin America and socially marginalised categories of population in the EU. This refers to the ability of the institutions to guarantee a procedural and redistribution policy (Walker, Day 2012).

c. From energy poverty to energy vulnerability

This non exhaustive list of factors explaining the difficulties in electricity access shows that the problem goes beyond the sole energy policy and beyond the sole category of the "poor" even though the situation of poverty makes the electric situation worse. That is why we would favour the notion of "energy vulnerability" rather than "energy poverty". Indeed, energy vulnerability to energy services refers to situations in which households across the world experience "inadequate energy services in the home" (Bouzarovski et al. 2014, 2015). According to Bradbrook et al. (2008) "It is not a particular source of energy or energy in itself that society requires, as energy has no intrinsic value, but rather the access to the products and lifestyle changes that the availability of adequate modern energy services provides (ie, 'services')". Therefore it is not the energy in itself which is needed but the benefits it creates in terms of accessible and affordable services for the fulfilment of the needs of human beings that enable them to get some kind of comfort in the home (lighting, water, sanitation, warmth, refrigeration etc.), to maintain good health, to access to education and to take part in social and professional life (Sen, Day). The inadequacy between the services delivered or the lack of service and the level of the needs of the population becomes a key to understand energy vulnerabilities and the way they contribute to increasing social inequalities among the society. Universal access to electricity is therefore closely linked to country-based social norms, representations and needs.

2. Social norms, representations and needs

After accepting the fact that the accessibility/affordability nexus is insufficient to describe a more complex reality of energy vulnerability, let's now examine the social representations and consumption practices. Rural-urban cleavages represent one factor distinguishing the level of energy vulnerability. However a universal understanding of energy vulnerability seems all the more difficult since the type and levels of needs are determined by the geography, climate, social norms, habits and representations prevailing in each country. Energy vulnerability is closely linked to the level of well being a society is looking for for its members. But who is defining this normative level? Is it to be considered at individual or collective level? How is it considered over time and space? If some 60 years ago having a telephone and a washing machine was considered exceptional in Europe, today it belongs to the basic elements of the well being. Having access to mobile phone and internet is now a new social requirement which is no longer considered as a luxury (Simcock, Walker 2015). What is the acceptable norm of well being in the developing world? How does electricity access change the behaviours? Electricity might be essential at collective level, in order to enable better equipment of clinics, hospitals and schools to improve health standards or to install street lighting to reduce the risks of insecurity and violence at night. But individual needs can't be overlooked: improved lighting in the home is essential for the education of children who can study after nightfall, electricity enables to have access to clean drinking water contributing to better health, the feeling of comfort is enhanced with access to small equipment like a fan, a radio or a fridge, depending on the power available and

affordable. Therefore new needs and practices as well as new vulnerabilities emerge because of electrification policy.

a. The representations of energy vulnerability in Europe

In Europe, energy vulnerability is structurally linked with poverty and / or with specific handicaps. Age is a criterion, disability another one, family with young children a third one, inactivity a fourth one etc. Based on the fuel poverty definition in England[2] and in France[3], England is reported to have 2.35 million fuel poor, ie 10% of all English households (DECC 2015), France 3.8 millions fuel poor, in Hungary[4], 21% (800 thousands) of households are fuel poor. In the three countries it is admitted that fuel poverty is provoked by a combination of three factors: energy prices, low income and bad housing quality. However it is a too simplistic and static representation. The reality is more complex and energy vulnerability more dynamic.

First of all energy vulnerability concerns also people who are above the poverty threshold and therefore not entitled to financial support and who are not part of the recognized category of the "poor".

Secondly, they usually live in badly insulated and hard to heat housing. It is particularly true in rural areas where most energy vulnerable are owner of a detached house, badly insulated and hard to heat which makes them very sensitive to electricity and gas price increases.

Thirdly, part of the energy vulnerable category is unknown to the social services and energy providers because they restrict their own consumption in order to pay their bills. They are invisible and not integrated into any statistics. The result is that they suffer from inadequate electricity services in the home with consequences on their mental and physical health, on their housing, on their social interactions and on their professional life and employment opportunities as well.

Fourthly, the extreme situation of energy vulnerability concerns particular groups of populations who are either not connected or disconnected. It is therefore closely linked to the way housing and the services linked to it are made available by the political decision makers and to the way energy providers manage such cases.

Finally the level of vulnerability can go from total disconnection, to high indebtedness, or to pre-meter option, each option leading to considerable costs, increasing precariousness. These situations are widespread in the UK and in some suburban and rural areas in Hungary.

Vulnerability also presents some dynamic process: a person can be vulnerable at one period of the life due to personal situation (life's accident) or the difficulties can be more structural but may evolve if one factor changes (family, work, housing, health etc.).

As a consequence categories of energy vulnerable groups in Europe depend on multiple criteria beyond the sole "poverty" factor: socio-demographic, economic, housing, rural/urban, ability of the system to single them out, the social policy regime and the evolution of one's personal situation.

b. A blurred representation of energy vulnerability in emerging countries

According to Rehman et al. (2012), the electricity access difficulties result from a combination of several factors, such as the level of electricity expenses, the access to useful and efficiency electricity, the existence of a choice, access to clean sources, physical access to energy services etc. which makes the vulnerable energy groups more blurred. Two main criteria of distinction of consumption behaviours are common to all the countries studied. The first one concerns the territorial

[2] "Under the Low Income High Costs definition, a household is considered to be fuel poor if: they have required fuel costs that are above average (the national median level) and were they to spend that amount, they would be left with a residual income below the official poverty line" (Boardman 1991, DECC 2015, p. 8, Hills 2012)

[3] Law N°2010-788, 12 July 2010 « Any households who face particular difficulties in their home to get enough energy to satisfy their basic needs because of inadequacy of their incomes or because of their housing situation are considered fuel poor. » According to the indicators used, the number of fuel poor in France may vary between 3.4 million and 4 million (ONPE, 2015).

[4] The definitions used in Western Europe can't be applied to Central and Eastern European countries because the income levels are lower. Households spending over 15% of their income to heat their dwelling AND who fall below the poverty line after the payment of their bills are considered fuel poor.

differentiation between the urban and rural areas, the second one concerns the social differentiation among income groups.

In the urban areas:

- Urban social polarisations

Modernity attracts rural migrants who in turn exacerbate the urbanisation issue and the increased demand for electricity services that providers are not always able to satisfy (Lin et al. 2011). So not only does this phenomenon create urban-rural inequalities but it also contributes to urban social polarisations with the new migrants often living in unofficial dwellings in the city outskirts. There are urban spaces where electricity is not distributed, mainly in shanty townships and in some decayed townships (old centre), like in Buenos Aires. This reflects how the urban treatment of the energy inequalities reflects the social hierarchies among the populations (Botton 2004). Even if a physical access to the grid is made available, the lack of reliability of the electric system translates into recurrent (un)intentional cuts to relieve the electric system to the benefits of the industry, the business or the districts where the government and the upper class are located.

- Official and illegal consumption behaviours

The consumption behaviours of populations living in poor townships may also differ a lot. Electricity use can be used either officially or unofficially. In the first case, households have either connection to the grid or to an off grid system to get electricity and have an individual (Brazil) or collective meter (Argentina). A big problem for this group of population lies in the over-consumption of electricity due to the bad quality of housing and equipment. In Brazil, the electricity expenses represent more than 10% of the revenues. In most cases the poor population pays for the electricity consumed when they are billed, even if payment might be delayed. Some of them may refuse to pay as an act of protest against the bad quantity and quality of the electricity distributed. In many cases a fraud system can also be organised by the non connected or disconnected population at an individual or collective level. In some cases bypassing the official system can be more or less tolerated and even supported by the authorities and the service providers unable to ensure electricity access and provision to all. Doing so is a way for local authorities to achieve some kind of financial redistribution, to maintain social peace, to compensate for the state and market failures and the inefficiency of infrastructure and of social policy to cover the needs. As Sarah Botton puts it, in Buenos Aires for example the tolerance of fraud becomes a tool to contain poverty, even though it might time-limited. Illegal connexions can also result in creating private activities like little workshops and businesses in the townships, which means that illegal electricity consumption is not only for individual uses but also commercial uses. But in a lot of cases, the frauds are not accepted because it raises financial difficulties and exert pressure on the reliability, quality and security of the system to the detriment of the officially connected population. Repressive actions can be implemented by the local authorities and the suppliers like in Manila in order to reduce the non technical losses, the rate of decreasing from 10.39% in 2001 to 7.43% in 2001 (Mouton 2015). They can rely on technical solutions to limit the theft of electricity, on increased control over the meters. But what makes these interventions more difficult is the fact that some townships are under the control of mafia groups like in the city of Vitoria in Brazil (Zanotelli et al. 2011).

- The impacts of shortages on social segmentation

In addition to such groups of population, even the middle and upper class is facing a form of energy vulnerability in the sense that they suffer from shortages, (un)planned interruptions and rationing because of unreliable system of electricity provision. For instance, in Indonesia forced or planned outages cause daily blackouts (on average 6 hours a day in 2014 but territorial differences are important with Bali suffering 3 hours of blackout and West Kalimantan 14 hours), in Brazil supply interruptions amount on average to 18.65 hours a year. In that case, the issue of energy vulnerability reaches beyond the accessibility – affordability nexus and includes reliability, quality and efficiency of

the system. The main difference with the disconnected population is the disposable income that enables them, and especially the upper class, to forge alternative solutions more easily. One of them is to resort to diesel generators, even though it is more costly and more carbon emitter. Another one is to have multiple connections, like the connection to a neighbour or to collective solutions organised by the community, or to get access directly to the electric post in a rather unofficial way. Or they might even resort to corrupting the providers in order to get privileges. Since in the countries studied chronic electricity shortages or unplanned interruptions lead to social discontent from a social group central for the election of the elite, such behaviours are accepted by the authorities. This is in some way encouraged by clientelist policies of the authorities, whether central or local, that favour their supportive group.
In the end such behaviours tend to widen the social gap. While the well-off population has the social, financial and political resource to negotiate privileges in terms of supply, poorer populations may be left behind by the providers and the political decision makers, thus maintaining or even reinforcing the social fragmentation between communities. In the end as Sylvy Jaglin (2004) puts it, the persisting inequalities among the urban population brings about practices and some kind of "sociability of adaptation" when people are faced with service access deficiencies.

In the rural areas:

The comparison of the Philippines, Indonesia, China, Brazil and Argentina shows that the physical lack of electricity access is mainly a rural problem. But electricity situations in rural areas can be very varied. Most electricity supply systems rely mainly on centralised production and grid system thus favouring urban and business centers. Considering the geography of the countries studied and the low density of populations in some remote areas (China, Brazil, Argentina), communities leaving on islands (Indonesia, Philippines) or in the mountains are deprived of the grid. They depend on candles or kerosene or diesel lanterns which are less effective, more costly and more polluting than modern electricity services.

- Distinction between majority and minority groups

In rural areas a first distinction exists between the majority group and ethnic or minority groups. In China for example, the majority group is composed of the Han who are privileged in the access to electricity compared to other minority groups. But such an unequal treatment doesn't apply for all the minority groups. When a risk of political and social instability and of energy security emerges then electrification becomes a tool used by the Chinese government to bring social peace. That was the case for example with the Uighur minorities who live in the North-Eastern part of China and who claim for their independence but where gas pipelines are built. Therefore the Chinese government has some direct interest to calm the protests. On the contrary most minority groups, mainly living in remote areas still lack access to electricity. 3 million Chinese in 2011 still lacked access to electricity (IEA 2013) and 930,000 Amazonian inhabitants in Brazil. An additional 550,000 people in this area depend on off grid systems mainly diesel generators or other alternative local sources (Gomez et al. 2015).

- A rural – rural divide

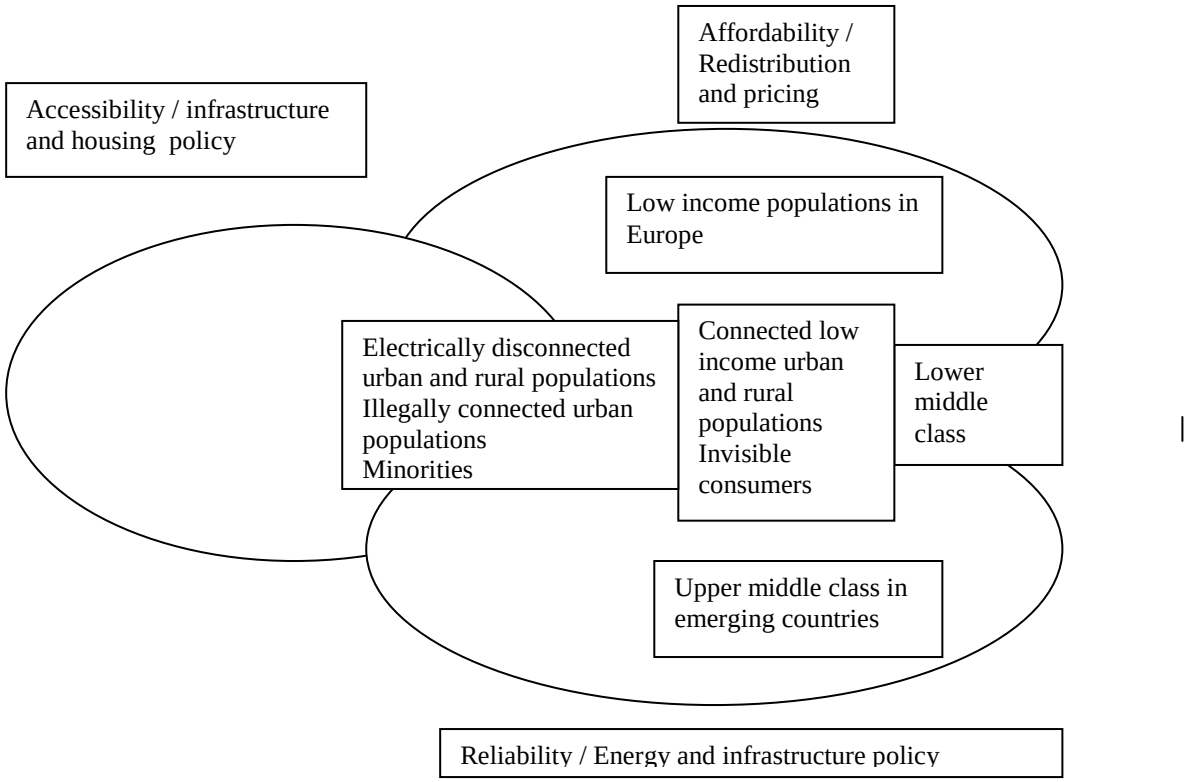
Another distinction needs to be made between rich and poor rural population. Indeed, wealthier groups of rural populations tend to develop their own solutions relying mainly on diesel generators and increasingly on renewable energies such as solar house system or micro-hydro or micro-wind turbines. Big farmers in China for example can use the biogas subsidies financed by the government to develop their own biogas system. Individual or community renewable solutions are often considered as an alternative to the central grid system when the communities are too hard to reach and disperse. Or, it can also be considered as pre-electrification model in the perspective of their integration into the grid in the mid or long term. But such decentralised solutions can also be considered as a form of energy vulnerability because communities only have access to electricity for a reduced level of power, for a limited use (mainly lighting) and for a limited period of time and often for higher tariffs. Such a situation exacerbates the feeling of discrimination between urban and rural populations. This can lead

to a sense of “isolation and inferiority” even though the central grid fails to provide any supply at all. But this inferior feeling may limit the take up and the acceptability of off grid renewable solutions (Bhattacharyya et al. 2013). It is even less likely to be successful when households are considering the new system with distrust whereas they are used to other alternative sources, which they estimate corresponding to their needs and habits. As Kathryn Chelminski (2016) mentioned it for Indonesia, the transition to modern and clean electricity requires a kind of “socialisation and knowledge transfer” to make the off grid solution sustainable and used in the community. On the contrary many rich land owners in the Argentinian pampa estimate that this model save them from the unreliability of the central system and from changes in the electricity cost (Carrizo 2014). Their energy independence appears more important than being connected to the central grid. Some owners of generators may even become informal service provider for neighbours as a complementary activity to one’s activity (farming or shop owner) which transforms the relationships between the inhabitants of the same community into a commercial and technical one like in Myanmar (Sovacool 2013).
While standardizing the norms and needs, the electrification policy tends to strengthen the social polarisation between and within the communities distinguishing the different households by their ability to find out alternatives to satisfy their needs.

3. The construction of a broader qualitative typology

Based on this short analysis of representations, norms, needs and practices, we suggest that energy vulnerability could be better understood at least if three factors are considered together: affordability, accessibility and reliability. The level of vulnerability for each criterion reflects the success or failure of the redistribution and pricing policy of the central and local authorities for the affordability indicator, of the infrastructure, housing and equipment policy for the accessibility criterion and of the energy and infrastructure policy for the reliability factor. But they all affect social groups of population in a differentiated way.

Typology of energy vulnerable groups at the cross road between accessibility, affordability and reliability based on EU/Asia/Latin America comparison



Conclusion

The first step of this on-going research underlines the complexity of the issue of electricity access when comparing the social norms, representations and consumption behaviours in different national situations. While standardizing the norms and needs, the electrification policy supported by the government also tended to strengthen the social polarisation within the communities distinguishing them by the quantity and quality of infrastructure provided and the financial capacity of the different households to satisfy or not their needs. Moreover the cross national comparison shows that what is considered as deviant behaviour in one context such as the fraud, may be tolerated in some other national situations, using illegal connections as a tool to fight poverty. The quantity, the quality and the affordability of decent housing combined with the quantity, quality and affordability of the energy infrastructure and an appropriate redistribution policy represent determining elements influencing energy vulnerability in all countries. What the study also shows is the multidimensional and context-based nature of the energy vulnerability and its contribution to social fragmentation. For instance populist policies of certain European governments use these questions for vote-catching reasons without helping the poorest, thus widening the social cleavages. It also shows that electricity needs are heterogeneous and require tailor-made solutions rather than "a one size fits all" recipe.

At the end of the first step of the present research, we can suggest that if using micro-dimensions to compare the electricity practices in the different societies studied is necessary, we need to put them into perspective referring to macro-dimensions. We should question the extent to which the nature of the state, of the market and of the societies helps understand the issue of energy vulnerability. We can also wonder the extent to which energy vulnerability reflects the failures of the State and of the state-market relationships. Indeed the impacts of the legacies of the socio-technical system as well as the of political and sectorial governance on the choices made at state level in matter of infrastructure, redistribution and urban policy may result in different development patterns in terms of electricity access for all. And this should to be analysed and cross-analysed with the micro-dimensions. This will represent the second phase of our comparative work.

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