



# Social diffusion of energy-related practices and representations: Patterns and policies in Portugal and Belgium

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## ABSTRACT

The social-class dimension of energy consumption has been rather neglected relative to other theoretical approaches to energy use, despite its potential deployment in energy policies. This paper aims at investigating energy policy-related inequalities across social classes with respect to three dimensions highlighted by environmental-justice theories: income distribution, procedures producing unequal distributional outcomes, and cultural and political recognition of vulnerable and marginalised social groups. These inequalities can be exacerbated or reduced by social diffusion processes, both vertical and horizontal. These processes include policy instruments intending to lower energy consumption in the residential sector. To empirically ground the analysis, two countries with contrasting patterns of income inequalities, Portugal and Belgium, are compared on the basis of qualitative data collected in 2009–2011. We discuss the relevance of integrating the social diffusion dimension in energy policies and propose several policy instruments to do so. One of our main contribution is to argue that both vertical and horizontal diffusion across social classes, if adequately translated into policy instruments, can boost the uptake of residential energy retrofits and other energy saving practices.

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## 1. Introduction

Increased energy efficiency could half the growth in global energy demand, according to the 2012 World Energy Outlook report (IEA, 2012). Therefore, the effectiveness of energy-efficiency policies is crucial. It is thus of key importance to understand energy-related practices and representations as well as their social variations within countries. This paper aims at showing the relevance of social class as an analytical category for research and the usefulness of the theories of social diffusion through social classes for developing policy instruments to lower energy consumption or greenhouse gas (GHG) emissions in the residential sector. In shedding light on social diffusion trends observed in two European countries, Belgium and Portugal, this paper also aims at contributing to enhancing the European Union policy on energy and/or GHG emissions reductions in the residential sector. These countries are chosen because they show contrasting patterns of income inequalities: according to Eurostat (2015), among the 27 Member States in 2010, Portugal is among the seven least

egalitarian countries whereas Belgium ranks as the eighth most egalitarian country.<sup>1</sup>

At the same time, energy and climate policies may increase social-class inequalities within countries, as suggested by environmental justice theories. For several observers indeed, “[t]he core injustice of climate change (...) is that those who are least responsible for causing the problem are also those most likely to suffer directly its early impacts” (Timmons Roberts 2009: 185). The distributions of climate-change impacts and mitigation costs are obviously linked with social stratification and social diffusion patterns of climate-change mitigation measures including energy retrofit of dwellings and micro-production of renewable energy, which are topics dealt with in our empirical observations. These observations were realised in the two main cities of Portugal, Lisbon and Porto, and in various places in Wallonia, the Southern and French-speaking Region of Belgium.

The Portuguese main cities and Wallonia also differ in climate: in Wallonia, depending on the sub-region, average winter

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<sup>1</sup> “The ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income.” (Eurostat, 2015). Data are from the EU-SILC surveys (European Union Statistics on Income and Living Conditions). This ratio is equal in 2010 to 5.6 in Portugal and 3.9 in Belgium.

temperatures range between 0 °C and 4 °C in the winter, and between 14.5 °C and 18 °C in the summer, whereas in Porto and Lisbon respectively, the corresponding averages are 10 °C and 13 °C (winter), and 20 °C and 24 °C (summer). Wallonia's building stock is much older and with a higher percentage of single-family houses than in urban Portugal.<sup>2</sup>

The outline of this article is as follows. Firstly, two lines of this study's conceptual framework are presented: environmental-justice theories, and theories on both vertical and horizontal social diffusion. The qualitative data collected is then introduced. The next section compares energy-saving practices and related representations across social classes in the two areas to highlight social-diffusion patterns. The conclusion proposes prospective pathways for translating the results obtained into policy instruments, employing the lenses of both the environmental-justice paradigm and social-diffusion theories.

## 2. Conceptual framework

### 2.1. Energy-related practices

Energy-related practices refer here to various practices such as switching on/off lamps, carrying out energy retrofit, installing solar panels, and so on, whether or not these practices are intended to save energy and/or reduce GHG emissions. By using the concept of “practice”, we have in mind practice theories as formulated by Schatzki (1996) and Reckwitz (2002), synthesized and related to consumption studies by Warde (2005), and presented in a “deliberately slim-line version” by Shove et al. (2012: 82). But as Walker writes (2013: 181), “[o]ne problem is that the literature on sustainability and social practice has so far failed to engage sufficiently with the necessary interaction between questions of consumption, social disparity and inequality”. So instead of practice theories, the chosen framework is presented below.

### 2.2. Theories of environmental justice

#### 2.2.1. Social class

Bourdieu (1986, 1987) defines a social class as follows: “the structure of this space is given by the distribution of the various forms of capital (...) firstly economic capital (...); secondly cultural capital (...); and thirdly two forms of capital that are very strongly correlated, social capital, which consists of resources based on connections and group membership, and symbolic capital, which is the form the different types of capital take once they are perceived and recognized as legitimate” (Bourdieu, 1987: 4). Following Bourdieu in integrating the capitals' volume and structure, and the individual trajectory, Accardo and Corcuff (1986: 200) propose a three-class model (dominant, middle, and lower classes) that is followed here.

Bourdieu (1987: 7–9) underlines that this model is an “analytical construct” that should not be taken as a concrete reality, as Marx did.

<sup>2</sup> Atlas climatique (2015) and Pordata (2015); more information on <http://www.lisbon.climatemps.com/> and

<http://www.porto.climatemps.com/>. In Wallonia, the proportions of dwellings with 2, 3, 4 façades, and apartments are respectively 29, 24, 33, and 14%; only 18.3% of the buildings were built after 1981 (Statistique cadastrale du parc de bâtiments, 2014). In Portugal there was a boom in the construction of new buildings until 2002. Therefore, 71% did not need retrofit in 2011. However, Lisbon and Porto municipalities have the highest indexes of old buildings in the country, which means that most buildings were built before 1960 (INE, 2011; 2012).

#### 2.2.2. Environmental justice

In many countries, social cohesion may be affected by energy policies or climate policies: these issues are referred to by the concept of ‘climate justice’, or more broadly, ‘environmental justice’. As observed by Bickerstaff et al. (2013: 2) very little attention “has been directed at the social and equity implications of low-carbon policy objectives”, a gap this article is intended to address.

Three different but interconnected dimensions of environmental injustice have been recognised (Schlosberg, 2004; Walker, 2012): distributive injustice (following Rawls, 1971), procedural injustice, and injustice in terms of recognition of marginalised social groups (following Young, 1990, and Fraser, 2000). In the first dimension, the unequal repartition of income, and hence of the portion of income devoted to pay for energy services and energy-efficiency improvements, are of special interest here. This dimension also includes inequalities in terms of housing: poorer households are likely to live in less energy-efficient housing, with less efficient heating (or cooling) system (Poortinga et al., 2003) and appliances (Bartiaux et al., 2006: 35).

Procedural justice is concerned with processes, namely those producing unequal distributional outcomes, such as access to information and participation in decision-making. In this research, knowledge about and access to energy-related subsidies, loans, or fiscal facilities refer to procedural justice.

The third dimension refers to injustice in terms of cultural and political respect and recognition of vulnerable and marginalised social groups (see also Honneth (1996), for a psychologically-based view). As Nilsson (2008: 42) comments, “Redistribution and recognition injustices are (...) often interimblicated. The working class is, for example, subjected to both economic and cultural injustices”. Maréchal (2009) gives another example: in the Brussels Region, photovoltaic panels' subsidies were mainly applied for and distributed in the three richest municipalities of that Region. Climate policies may thus increase social inequalities and climate injustice, as less rich citizens contribute by their direct and indirect taxes paying subsidies that will be granted for energy-saving investments that only richer citizens can afford. In Portugal, subsidies for photovoltaic and thermal panels granted from 2009 to 2010 also benefited mainly higher social strata, due to the disposable income required and their greater knowledge about these grants (Schmidt et al., 2011).

These three dimensions of injustice – distribution, procedures, recognition – are also used here to structure the presentation of empirical results.

### 2.3. Social theories of diffusion

Two theories of social diffusion deal with transmission of ideas or practices across different social classes: the vertical diffusion and horizontal diffusion.

#### 2.3.1. Vertical diffusion

Vertical diffusion may be defined as a process of diffusion of practices, tastes or ideas that moves from the upper class to the middle one and later to the lower one. Besnard (1993) speaks of “a cascade of signs of distinction”.

In sociology of consumption, many studies have shown that consumption (of leisure for example) is often an opportunity to display taste and express distinction, after Bourdieu's important work on distinctive consumption (1979) and Veblen's (1902) earlier work on conspicuous leisure. However, the statement made by Shove and Chappells (2001: 45) about utilities generally applies to energy consumption: this is not “an arena in which there is extensive scope for the expression of taste and difference”.

According to Bartiaux (2009), vertical-diffusion theory has sometimes been applied to energy consumption, more so to

explain increased energy use than energy savings. Jensen (2005: 1327) finds that energy saving is rarely associated with “conspicuous, i.e. clearly visible consumption, although it is the essence of being a new house owner.” Bartiaux hypothesised that pressures from friends and social networks for not showing a need or a competence for saving energy are especially effective for families and societies having had a rapid social upward mobility (Bartiaux, 2008: 1178). That is, demonstrably “not saving” may have a positive social value in certain contexts. In her historical account of how technologies entered Scandinavian homes, Gram-Hanssen (2008) shows that their diffusion was always associated with demonstrating status, both in being early adopters and in displaying sufficient income. Similarly, in the UK, McMeekin and Tomlinson (1997) identify a class effect in the adoption of dishwashers and microwaves between 1986 and 1994. This vertical diffusion of symbolic power given by consumption has had few applications when it comes to energy savings at the household level, though it may apply to solar panels (Keirstead, 2007). Similarly, Jensen (2005: 1333) speculates that “energy-saving measures supporting conspicuous consumption will succeed” in being implemented. Carfagna et al. (2014: 160) observe an ‘eco-habitus’ in the USA high-cultural-capital groups, which is diffusing beyond those groups, as with suburban solar installations.

Vertical diffusion is thus related to social visibility, as individuals from lower social classes who wish to ascend to an upper class tend to mimic practices and adopt objects exhibited by members of that upper class, thus obtaining prestige. Energy-saving practices are often not socially visible and would not be expected to vertically diffuse. Horizontal diffusion might then be more effective.

### 2.3.2. Horizontal diffusion

The acknowledgement of opinion leaders’ personal influence has its roots in early sociology (Tarde, 1903, had a strong impact in mass communication effects research through the findings of Lazarsfeld and his colleagues (Lazarsfeld et al., 1944; Katz and Lazarsfeld, 1955), and was accorded a critical role in Rogers’ diffusion of innovations theory (1995). The relevance of interpersonal communication has been highlighted in studies on how to accelerate the diffusion of innovations (Valente and Davis, 1999), stimulate energy conservation (Yavas and Riecken, 1981; Shama, 1983), and recently on catalysing engagement on energy efficiency (Mustafa, 2010; McMichael and Shipworth, 2013) and on installing photovoltaic panels (Islam, 2014).

Opinion leaders have been often conceptualised as being a minority of individuals capable of inducing changes among many of their peers. These individuals would be the “influentials” (Weimann, 1994), and much research has been put into finding out who they are and what characteristics distinguish them from non-leaders. Yet, as Watts and Dodds (2007: 442) have shown, “most social change is driven not by influentials but by easily influenced individuals influencing other easily influenced individuals”. Thus, they state, “opinion leaders are not ‘leaders’ in the usual sense”. Rather the transfer of ideas typically occurs between similar individuals connected in the same network (Rogers, 1995) through casual contact and conversation, due to the trust people put in their personal contacts (Lazarsfeld et al., 1944) as these connections tend to reduce uncertainty.

Valorisation and recognition, or not, of specific social groups are related to vertical diffusion by Bourdieu’s (1986) concept of “symbolic capital”, or capital of legitimation linked to power. Distributional and procedural aspects are directly related to vertical diffusion and, to some extent, to horizontal diffusion as well, if special benefits (or increase thereof) targeting lower-income households are devised to accelerate too slow a vertical diffusion.

## 3. Methods

### 3.1. Data production

Two qualitative techniques were used: group interviews in Portugal and in-depth individual (or couple) interviews in Wallonia. Qualitative techniques are the best adapted to our objectives because focus groups and individual interviews allow exploring practices and opinions in detail that could never be obtained by a questionnaire survey. Both techniques deepen the answers given, through the interactions either between participants (focus groups) or with the interviewer (individual in-depth interviews). In both cases interviewees are seen as bringing first-hand knowledge to the research and are therefore called “informants”.

In Portugal, data collection took place during June 2011 using a semi-structured guide. The interviews were conducted by trained and experienced interviewers. Each focus group lasted between 2h30 and 3 h. For Wallonia, 23 in-depth interviews were conducted in 2009–2010 by working students having received specific training. Interviews’ duration ranged between 45 min and 2 h.

### 3.2. Sample characterisation

All participants, Belgian and Portuguese, own and live in their dwelling: primarily apartments in urban Portugal and only houses in Wallonia.

Portuguese informants participated in six focus groups, three in Lisbon (22 participants) and three in Porto (21 participants), one for each social class in each city. Participants were recruited by a specialised company according to three criteria: social class, age and gender. They were aged between 28 and 60, with equal representation by gender. Three types of families were considered: “singles”; “small families” (two or three persons with at least one child), and “larger families” (four or more members including at least two children). Based on education, income, profession and habitat, we defined three different socio-economic statuses. The first group is comprised of individuals without a university degree, with low financial resources, lower-skilled jobs (e.g. security guard, shop assistant), and living in suburban areas. In the second group, most participants had higher education and higher financial resources (e.g. bank or administrative employees, secondary school teachers). In the last group participants had economic and/or culturally prestigious professions and were living in the city centre or in areas associated with higher social classes (e.g. doctors, architects, university professors, or business men/women).

In Wallonia, the 23 interviews were distributed in two subsamples. In the first, 11 informants voluntarily acquired an energy certificate for their homes in 2007, before doing so was mandatory. They were identified via an energy-certificate database of the Walloon Region. The second subsample involves 12 participants who purchased their homes between two and five years before the interview, thus again before the energy certificate was mandatory. They were recruited thanks to numerous contacts, nearly always with a different intermediary per participant to minimise the possibility of selection bias. These latter informants are generally (much) less well-off than those who acquired an energy certificate. In both subsamples, each respondent was assigned to a socio-economic group (lower class, middle class, elite) according to his/her level of education, income, profession and the characteristics of the house. Participants were between 30 and 65 years old and located in different areas: main cities (three), small towns (seven) and residential or rural areas (13). Four were living alone, four were divorced/widowed with children, four were couples without children and eleven were couples with children.

In the quotes presented below, the informant’s social class is



indicated along with his/her gender, age, profession and living arrangements that all contribute to define his/her social position (e.g. social and economic capitals are usually more important for adults living in pair, an upward social mobility requires a higher age; see also [Accardo and Corcuff \(1986: 201\)](#)).

#### 4. Results and discussion

Empirical results are presented in three sections, one for each dimension of environmental justice.

##### 4.1. Practices related to distributional injustices

Distributional injustices are observed in both urban Portugal and Wallonia regarding daily energy-related practices, and energy retrofits.

###### 4.1.1. Daily practices and associated representations

Portugal exhibits differences by social class in how citizens try to reduce energy consumption. Lower classes try to save more in everyday life but apart from changing lamps and turning off unnecessary lights, heating and other appliances, they do not seem aware of other low-cost measures they could take.

*To use energy saving light bulbs, to turn off the lights (...), to open the refrigerator less often, to switch off the television and turn off the electric heaters* (Man, 46, security guard, lower class, living with spouse and two children).

*Energy efficiency is me scolding my kids to turn off the lights* (Woman, 33, shop assistant, lower class, living with husband and three children).

In 2010 a programme to promote the replacement of conventional light bulbs by compact fluorescent lamps (CFLs) allowed people to exchange their old bulbs in supermarkets for CFLs. This programme had a significant impact in disseminating CFLs, especially among middle and lower-classes households, perhaps because it was easy for people to do and because of the programme's wide diffusion in the media.

In contrast, the upper classes with more economic power take more expensive and effective measures.

*I always choose appliances with A++ label (...) I have already installed double-glazed windows, thermal window shades, wall insulation* (Man, 55, lawyer, elite, living with spouse and three teenagers).

Social representations associated with energy efficiency have also been changing with the economic crisis bringing the need to save, as also shown by [Schmidt et al. \(2014\)](#).

*We used to have the electric heaters on. Not anymore. We put on more clothes... more and more clothes. It is much less comfortable to be at home like this (...) I never thought I'd get back to this.* (Female, 40, school attendant, lower class, living with husband and two children).

In Wallonia, energy-saving practices are more numerous the higher the social class – although this could also demonstrate differing abilities to quickly enumerate such practices – but attention to switching off lamps and appliances that are not being used is widespread among all adults (but not among children). Middle-class respondents add closing the doors (all have a central heating, which is not the case in the lower class) and most of them avoid stand-by consumption. This increase of energy-related practices, awareness and knowledge is illustrated below with quotes of interviewees from the three social classes:

*Here it is possible to heat with electricity but then, I won not tell you [how big is] the bill! (...) One asks the children to switch off the light when they leave a room, thus to be careful though not to use electricity for nothing actually. Like here, they left the DVD on... (Laughs) (Woman, 35, on a social security allowance, lower class, living with spouse and three children).*

*"Switch off the light, close the doors"* says a mother (41, employee, middle class, living with spouse and four children) to her children

– Mr: *I think I suppr... I made all reasonable reductions: the following ones would really start to impact on comfort*

– Interviewer: *Yes? For example?*

– Mr: *E.g. remove the TV. Well ... I already had trouble getting the idea of dropping the electric dryer. So we still have it ... but it is used very little. (...) But all other renovations related to the reduction of power consumption, no, I think there is no impact on comfort, e.g. to replace the electric hot water by solar hot water: this is perhaps most spectacular of course. Another point where I have invested a lot is lighting: so we removed all incandescent and halogen lamps of the house, well almost all. (Man, 35, engineer, elite, living with his spouse and three children, acquired an energy certificate).*

Qualitative interviews realised in Wallonia since 2009 suggest that energy-saving practices to save money are increasingly seen as 'normal' and socially acceptable:

*I often try to be a little below the comfortable temperature because of an economical concern and for a health concern.* (Female psychologist, 48, elite, living with three teenagers).

This was less the case in 2004–5 ([Bartiaux et al., 2006: 46](#)). Thus, economical reasons for saving energy appear to be diffusing horizontally.

###### 4.1.2. Energy retrofits

In Portugal, energy retrofits are seen as expensive and without guarantee of rapid return on investment. Indeed, most households (73%) bought their houses and 43% of them had to take on heavy mortgages ([INE, 2012](#)). Therefore their financial availability to make energy-efficiency investments is very slim. In a context of economic downturn:

*The priority is to pay our loan to the bank; then, we do not have any leftover, even if I'd like to change the windows: I must [then to cut on other things]* (Male, 50, state engineer, with spouse and two teenagers).

Thus, despite dissatisfaction with some aspects of the house, especially with discomfort during the winter, many participants gave up after realising the difficulty of carrying out the necessary work. In the lower classes, neither solar panels nor the possibility of making energy-efficiency renovations (such as installing double-glazed windows) were spontaneously referred to in the focus groups. If prompted to this topic, lower and middle class participants gave answers such as these:

*Have you seen what is [required] to put double glazing throughout the house? It's cheaper to use a heater.* (Man, 46, plumber, lower class, living with spouse and two children).

*I would like to put double-glazed windows to avoid heat escape in the winter and keep out the heat in summer ... but it's a bummer and I have to do calculations [with money]* (Man, 48, computer expert, middle class, living with spouse and three teenagers).

Furthermore there is no relevant tradition of do-it-yourself renovation, sometimes revealing a sort of inertia even regarding

small and inexpensive changes:

*I have been for a long time to caulk the windows, but I am always postponing it (Man, 40, plumber, lower class, living with spouse and one child).*

In Wallonia, do-it-yourself is widespread in all social classes as a necessity or as a hobby. So most people are not afraid of pursuing renovations, whether they carry them out by themselves or by contractors:

*My idea was to destroy everything inside. So I wanted to make a new interior masonry. Completely. There were wooden floors, I did not want wooden floors. I wanted concrete floors. Rearrange the rooms as I wanted to do. (Man, 40, self-employed in informatics, middle class, living alone, acquired an energy certificate).*

*I like to renovate [houses], thus I needed an old house, not too expensive (...) where there is potential, where I could do things that I liked, and then I saw the stone facade that I liked. (Woman, 47, financial analyst, elite, living alone, acquired an energy certificate).*

Vertical diffusion of energy-saving material and techniques is rather often hindered by a lack of knowledge and practical experience of the contractors who usually belong to the lower class, are self-employed and lack time to upgrade their knowledge: Belgian interviewees spoke about one window frame installer who found triple-glazed windows “exaggerated” and “not worthwhile” (and they followed his advice); another one interested in new technologies chose “by elimination” after discussing with her neighbour, a heating installer:

*[A] low-condensing boiler, an old thing (laughs), not as one does now” [because for the other solutions she thought of] “it was by far too complicated and he did not want to go into that. (Woman, 47, financial analyst, elite, living alone, acquired an energy certificate).*

The same phenomenon appears also with much less complicated technologies, such as roof-insulation material:

*There are still many who do not know [insulation with cellulose] and the others who came were specialists of this type of insulation, so cellulose, and then, the issue was on the number of centimetres (...) [to get] the subsidy from the Walloon Region (Woman, 35, teacher, middle-class, living in couple).*

However we also interviewed a young heating installer (whose father and father-in-law “are both manual workers”) who did a comprehensive renovation of his old house with special attention to energy savings. Maybe as a potential advertisement for his business – and perhaps also to signal his upward social mobility – he also installed thermal solar panels, and now:

*I try to encourage everyone to install solar panels. (Man, 24, heating installer, middle class, living in couple).*

A Walloon family living in energy poverty and interviewed in 2010 had asked a loan for photovoltaic panels: does this suggest that solar panels become an asset demonstrating inclusion in a consumption society?

- Interviewer: Have you done energy-related renovations?
- Mrs: Well no, not yet (...)
- Mr: we did ask for a loan, well a cost estimate, and it was expensive, it's 11000 € to install solar panels
- Mrs: yes, exactly, we did ask for the panels but at the Housing Fund they told us that it [this amount] exceeded ... [the limits of our loan] (couple with three children, lower class: Mrs is 35 and on a

social security allowance, Mr is 42 and worker).

In both Wallonia and Portugal, the main reason for carrying out an energy retrofit is to increase comfort (as also mentioned by Pellegrini Masini, 2007: 5). And in both places, comfort is a poly-semantic concept associated with heat, light, silence and space (Bartiaux, 2011b: 59; Schmidt et al., 2011). A recent study in Portugal suggests that comfort is also related to physical and financial security, well-being and affection for the family (Schmidt et al., 2012).

In Portugal, some representations remain from an epoch, not very long ago, when the country was mainly rural, and seem to explain that the concept of thermal comfort is more focused on the body than on space heat; it is thus still uncommon to value central heating at home. The interviews conducted in Belgium show that thermal comfort, as well as the will to reduce energy consumption and slow climate change, are the main reasons to proceed with energy refurbishment of the home. Increasing the floor area of the dwelling is an important reason for insulating the roof and for not insulating the external walls. These factors work in combination (as noted earlier by Bartiaux et al., 2006: 139):

- Mr: Security for electricity; issues of economy and ecology for the [roof] insulation.
- Mrs: And for comfort. (Belgian couple with two small children, middle class: Mrs is 33 and secretary, Mr is 34 and statistician).

In Portugal, the reduction of noise from outside (mainly traffic) is often mentioned as the first reason to consider replacing normal windows with double-glazed windows, as further confirmed by participants who already had double-glazed windows. So results show that social representations of comfort play an important role on energy-savings issues especially regarding renovation works.

#### 4.1.3. Summary and types of social diffusion

Both areas show several examples of distributional injustices caused by unequal income distributions. They are mainly visible in carrying out (or not) energy retrofits. In Portugal, energy-saving diffusion processes usually seem to be potentially mainly vertical because they are unequally distributed by social class but hindered by the economic crisis. In this difficult context, poor families with energy-inefficient houses had no access to the subsidies in place in 2009–2010 for solar panels: they were thus led to adopt curtailment measures with negative impacts on their health, well-being and comfort. The programme in place in 2010 to promote the replacement of conventional light bulbs by CFLs illustrates, in contrast, a successful policy supporting a horizontal diffusion among households of all social classes.

In Wallonia, in general, energy-saving practices are being vertically diffused. Lower-class respondents tend to have some delay in adopting these new practices and seem still influenced by the ‘trente glorieuses’ (the 30-year boom after the Second World War) when having lights always switched on was a sign of inclusion in a consumption society. On the contrary, the economic justification of energy-saving practices is now more normalised after what seems to be a horizontal diffusion. Energy retrofits are made by homeowners of all social classes, but at various degrees. Solar panels appear to be an asset for displaying higher economic and symbolic capital. But as suggested by the data presented above, vertical diffusion can be seriously hampered when the mediation of contractors – who usually are self-employed from the lower class – is needed to install products such as insulation material, energy-efficient windows or more advanced technologies such as heat pumps.

## 4.2. Procedural injustices

Several informants denounced procedural injustices linked either to energy-related subsidies or to energy-performance certificates.

### 4.2.1. Knowledge, experience, and opinion about energy-related subsidies

A few respondents in both areas perceive a social discrimination affecting misinformed individuals in accessing subsidies – what social-justice theorists call a ‘procedural injustice’. In Wallonia, the poorest family interviewed “*knew only the rehabilitation subsidy, that’s it*” among more than a dozen subsidies (Woman, 35, on a social security allowance, lower class). Even for informants from the elite – an engineer with a PhD finds himself “powerless” when comparing cost estimates – and the middle class:

*Both of us have a university degree [a Master’s] and we already had [problems] to sort out the papers. So for someone who does not have such a background, I do not know how he does it. So, I tell myself, it’s stupid because these subsidies are normally accessible to everyone: are they really accessible? (Woman, 27, teacher, middle class, living with her husband and a baby).*

In Wallonia, in the subsample of informants who did not pay for an energy assessment of their house, several had a free ‘light’ assessment as part of the application procedure for either a special loan (from the Housing Fund) or for a subsidy (‘for the rehabilitation’ of old houses). A list of customised but mandatory energy-related renovations is provided to these homeowners. For low-income families who have a low-rate loan from the Housing Fund, each energy-related renovation comes with a corresponding amount that the beneficiary of the loan is not allowed to exceed. The poorest family told the following story, where procedural and distributional injustices converge (through lack of income and access only to an unreliable contractor):

- Mrs: *As compared to the amount they [the Housing Fund] had offered us, we did not have much choice, we took the cheapest. (...) They have done nice work except that they have forgotten some little things, as there, below the door: you see that there is some air passing though.*
- Interviewer: *Indeed! [He was quite surprised by a two-cm difference between the floor and the front door.]*
- Mrs: *And the door handle, you open the door a little too abruptly, and you get the door handle in your hands. So we have contacted them. They have already come to fix it two or four times, but according to what we just heard, they are bankrupt. (Woman, 35, on a social security allowance, lower class, living with her husband and three children).*

In Portugal there was no rehabilitation programme like the one run by the Walloon Region. In 2009–2010, there were subsidies for photovoltaic and thermal panels. However, these programmes hardly reached the middle class and even less the lower class. Several factors contributed to this, such as the cost of installing photovoltaic panels, and for thermal panels, lack of information, inefficient dissemination, subsidy complexity and the fact that mediators were banks and specialised companies.

*Even with tax incentives, people need to make resources available ... most people are already struggling to pay ordinary energy at the end of the month, let alone buying a solar panel (Man, 51, bank employee, middle class, living with spouse and three children).*

In both countries, the existence of programmes encouraging energy-saving improvements is neither rejected nor fully

appreciated by the informants. Bureaucracy, and the lack of time and skills necessary to apply for subsidies, are considered the main obstacles: in Portugal as in Wallonia, several respondents are quite critical about these issues.

Some Belgian informants disapprove of the fact that households need to supply the initial capital to carry out energy-saving renovations. However, low-income families with at least two children have access to other facilities with the Housing Fund, while low or even middle-income households with fewer than two children do not. Owners who do the energy-related renovations themselves cannot apply for subsidies, which is another source of criticism. These restrictions<sup>3</sup> lead to a social representation shared by several Portuguese and Belgian informants that “subsidies are for the rich”:

*I bought [the house] four years ago. I have no money and at the same time, I have in reality no access to the subsidies (...) because to be able to invest is needed. (Woman, 42, social worker, lower class, living alone, Wallonia.)*

- Interviewer: *What is your opinion on the premiums and subsidies granted by the Walloon Region?*
- Mrs: *(Hesitation) Well, that’s great. For those who receive them! (Laughs) (Hesitation) (...) [W]ell, you must first have money to do the work. (Hesitation)... So again, it is only for some people... somehow. (Woman, 35, teacher, middle class, living in pair, Wallonia).*

In Portugal, participants also criticised the fact that an A/A+ in the dwelling classification was required to obtain tax benefits, since it is considered very difficult to obtain this score, short of buying a new house or making major investments in remodelling or in equipment such as photovoltaic panels.

*For the IMI [Portuguese tax on housing] it is good if [the certificate has an] A+, as it gives a discount. But I will not do [the Energy Certificate] to my house because I’d have to pay for it and I know that probably it should be a B. (Man, 30, high school teacher, middle class, living alone)*

*One has to spend more money on refurbishments to be able to spend less on electricity... I can not (Man, 50, university professor, elite, living with spouse and two children).*

Portuguese interviewees also pointed out, several times, the overall lack of information regarding everything that concerns electricity – from the aforementioned subsidies to simple measures of energy saving and efficiency.

### 4.2.2. Social representations on the energy-performance certificate

Many Portuguese respondents are unaware of the energy-certification process. Most informants state that they have heard about it, have vague ideas on it, and know that currently the energy certificate is required by law for any housing transaction. Some are completely unaware of the term and concept. Others reveal confused notions.

*I’ve read something about it: anyone who thinks of buying a house has to deal with it. But I do not know... (Woman, 30, teacher, middle class, living in pair).*

Only a few have some (minor) knowledge about what it is and who is responsible for certifying the buildings. These respondents are high-income Lisboans, mainly professionals connected to construction and housing transactions (e.g. engineering, architecture or banking) and those who bought their house recently

<sup>3</sup> These restrictions were suppressed when the Walloon system of subsidies was reframed and simplified in 2011, and again in 2015.



and faced the necessity of getting an energy certificate. The Portuguese informants agreed that the energy certification is one more “bureaucratic barrier” and raised questions about the purpose and process transparency of the energy certification. Most of them do not intend to make renovations after obtaining the certificate. First, they fear not having money to invest, and second they do not believe that the intervention will bring great energy efficiency:

*This certificate is more a new business (...) it's a way to make money. (...) It makes our lives more difficult. (...) I think it does not add anything.* (Woman, 41, bank employee, middle class, living with husband and two children).

Although half of the Belgian participants acquired the energy certificate when it was not yet compulsory, several are reluctant to recognise its impact on their decisions and present themselves as having (sole) responsibility for their choices:

*So I think that I have now done nearly all of what was to be done. The only thing that one could possibly still do, (hesitation) – because I had a... an energy assessment of the house done, that is how I learned that what was interesting was the insulation of the walls, (hesitation) and the boiler – is to possibly insulate the... the ceiling of the cellar.* (Man, 66, retired lawyer, elite, living with his adult son).

This reluctance is often found among male informants and does not seem related to social class. It is also seen in another Portuguese study realised in the Coimbra region (Bartiaux, 2011a: 3).

In Wallonia, all informants who did not acquire an energy certificate knew what it is, but none wanted to buy one, either because they claimed knowing enough about their home's energy performance or because they preferred not knowing more. This was true for both middle and upper classes. For example, a Walloon teacher answers the question whether she knows about energy assessment:

*Yes, but we have not done it. No... No... No! (...) [Because the energy advisor] will find many small things, many small holes everywhere and we will have to make further renovation work, so... We do not see... we do not really see the necessity because we do not plan to carry out further work.* (Woman, 35, teacher, middle class, living in pair).

So, despite some social-class difference in Portugal in the knowledge of energy certification, the resistance to this procedure – or even its rejection in Portugal – is perceptible and is apparently irrespective of social classes in both areas.

Another procedural injustice of the energy-performance certificate is introduced by a Belgian mother belonging to the elite. When the interviewer asks her to rank her house on a scale ranging from 1 (bad energy performance) to 5 (excellent):

*It would be rather bad, a '2', because there is no basement, thus no insulation from the ground, the roof is insulated, I think with rock wool, there are draughts through the walls, and in addition the house is very large and it is not the same as a house where everything is assembled on one or two floors; on the contrary, this house is very spread out, so I imagine there is lots of [heat loss].* (Woman, 48, psychologist, elite, living with three teenagers).

This quote raises the question of the method of calculating the label in the energy-performance certificate – either per square metre (which favours larger dwellings) or for the whole dwelling (which favours smaller dwellings). The Walloon energy-performance certificate shows both figures for the total primary energy consumption per year, thus in kWh/year and in kWh/m<sup>2</sup>.year. However, the label and the first smiley, which evaluates the

dwelling's envelope, are both calculated by dividing the net energy requirements for heating per year by the number of usable square metres in the dwelling. This calculation favours larger dwellings, usually owned by better-off persons. A distributional injustice is thus consolidated into a procedural one.

#### 4.2.3. Summary and types of social diffusion

In both Portugal and in Wallonia, there are procedural injustices in accessing information about energy-related subsidies and filling out forms. This leads some informants to say that “subsidies are for the rich”.

In Portugal, the situation is aggravated by low levels of information, insufficient support, no institutional mediation, and consequently a lack of credibility of officials. In Wallonia, additional measures target low-income households, such as loans with reduced rates and technical support as provided by the Housing Fund. The calculation method in the energy-performance certificate may be another procedural injustice. At the time of both surveys, access to subsidies for solar panels, in both Portugal and Wallonia, and also for energy retrofits in Wallonia, was related to financial ability to pay upfront costs. Procedural and distributional injustices thus reinforced each other. More generally, the Energy Performance Certificate as a procedure did not and will not reduce distributional inequalities by itself, though this was not its objective. Its objective, instead, was to encourage energy retrofits and investments in renewable energy.

The procedures in place (subsidies for solar panels and scarce information) did not favour vertical diffusion in Portugal, as almost only the upper class benefited from this programme. In Wallonia, additional procedures (a kind of ‘light’ energy assessment for the beneficiaries of the rehabilitation subsidy, loans with low interest rates and technical support by the Housing Fund) have initiated, although slowly, a horizontal diffusion of procedures related to energy retrofits: this makes up for, to some extent, the lack of vertical diffusion.

### 4.3. Injustices related to recognition

#### 4.3.1. Social valorisation

According to Walker (2012: 10), this third dimension of environmental justice refers to “who is given respect and who is and isn't valued”. In energy matters like in other ones, persons with money are given prestige and recognition.

In Portugal, neither energy retrofit nor thermal panels are now a significant source of prestige or social recognition. This situation hinders any vertical diffusion process. Moreover, the interruption of these programmes and subsidies since 2011 contributed to diverting this issue from the public agenda. Even those having installed photovoltaic panels are not very confident:

*In five years, when it pays off, the technology will be obsolete* (Man, 45, entrepreneur, elite, living with spouse and two children).

In Wallonia, as suggested above by the poorest family interviewed, photovoltaic panels seem to also capture symbolic power related to the inclusion in a consumption society. And after having made quick financial calculations during the interview, the retired lawyer earlier quoted proudly says about his photovoltaic panels that they yield “a 23% return annually” and adds: “if you know other [so fruitful investments], I am quite interested!” Thus recognition and procedural inequalities noted above converge to exacerbate distributional inequalities.

This said, many energy-related renovations do not appear to bring higher social valorisation and some could decrease it:

*And for the front façade, even Mr [name of the energy advisor] has told: “Come on, you have a nice façade, we will not destroy it.” So we have a façade on which we may not really touch and our next*

*project is the back façade.* (Woman, 50, teacher, middle class, living with her spouse and three adult children, acquired an energy certificate).

- Interviewer: *And do you sometimes talk amongst you about energy consumption?*
- Mr: *Well, it happens from time to time ... but I am trying to detect if the audience is favourable or not, because there is a large majority of people who have little interest... Well, in such cases I think it useless to ... because to pass for an original is rather pointless.* (Man, 35, engineer, elite, living with his spouse and three children, acquired an energy certificate).

#### 4.3.2. Special groups' recognition

In Portugal, only the poor persons benefiting of social allowances have a social tariff for electricity and gas.

Social tariffs also exist in Belgium. In Wallonia, energy policy recognises two special groups: families and low-income households. For example in 2015, for the lowest-income households, subsidies are multiplied by three for roof, walls, or floor insulation, or for an energy efficient or solar boiler. The reference income is diminished for each child living in the household. In addition, low-income families with at least two children may benefit from low-interest loans and advice from the Housing Fund, as previously explained.

Finally, homeowners engaged in a comprehensive retrofit with at least two energy-related renovations may be considered as a third recognised group as the subsidy total amount is increased by 10–30% according to the reference-income category.

#### 4.3.3. Summary and types of social diffusion

The analysis of recognition injustices has confirmed the state of the art: energy-saving practices and energy retrofits are often invisible and do not bring more prestige or social recognition, except for solar panels in Wallonia. In Portugal, in contrast, solar panels are seen as smart gadgets and as a source of prestige only among small groups of well-informed people.

A vertical diffusion of solar panels thus seems more likely in Wallonia, especially for thermal panels, for which a subsidy is available. Wallonia recognises the specificity of families and low-income households owning their dwelling by offering increased energy-related subsidies and/or by Housing Funds' facilities. These policy instruments modestly help speed an otherwise slow vertical diffusion.

## 5. Conclusion and policy implications

Portugal and Belgium show climatic, architectural and socio-cultural differences. They also differ with respect to income distribution, Belgium being more egalitarian than Portugal. Our comparison of energy policies in Portugal and Wallonia suggests that these policies are generally in line with the orientation, more or less egalitarian, of the country. Furthermore the comparison between homeowners' energy-related practices and representations in Wallonia and Portugal shows evidence that an analysis in terms of socio-economic inequalities is useful in terms of policy implications. The three dimensions of environmental-justice theories provided a relevant analytical framework. Several of our empirical findings illustrate how they are often not only inter-imblicated but also reinforce each other.

This conclusion summarises the diffusion patterns observed and suggests policy instruments to promote the social diffusion of energy-saving practices and energy retrofits: indeed, if European countries take seriously the need to cut their CO<sub>2</sub> emissions, social diffusion of emissions-reducing techniques should be enhanced

rather than ignored.

Thus far, however, our analysis has shown that public subsidies for solar panels (an instrument of climate policy) have increased social inequalities in both Portugal and Wallonia, since they are paid for by direct and indirect taxes that are also raised on less-rich citizens, whereas only more affluent ones can afford these solar panels. In addition, these subsidies contribute to reinforcing the social valorisation and recognition of the upper class or the affluent in the middle class.

In Portugal, energy retrofits appear to be mainly carried out by the upper class because of their costs and/or unequal access to information and subsidies, whereas the lower class is reduced to curtailment measures to reduce energy use. In Wallonia, energy-saving practices seem more numerous the higher the socio-economic status, while there are a few policy instruments that favour energy retrofits for lower-income families as well.

Social diffusion theories appear to be useful for designing energy policies. Our empirical comparison suggests that in Wallonia, a 'vertical diffusion' (from the upper class to the middle and lower ones) of solar panels, both thermal and photovoltaic, could be encouraged as they appear as 'signs of distinction' (see Bourdieu, 1979): solar panels also capture symbolic capital. In Portugal, it seems more appropriate to put on the agenda a policy triggering horizontal diffusion of solar panels in all social classes simultaneously, either by regulations (in 2015, thermal panels are mandatory in all new buildings), or through everyday contact and casual talk within interpersonal networks. A vertical-diffusion policy could be triggered by subsidies accessible only to lower-income households whereas horizontal-diffusion policy instruments could include subsidised installation in neighbourhoods of any socio-economic status, which would also achieve economies of scale. The same holds true for energy retrofits.

Vertical diffusion of knowledge on and use of insulation, energy-efficient windows or more advanced technologies such as heat pumps has been shown to be hampered in Wallonia when the mediation of contractors, who usually belong to the lower class, is needed to install such products. This calls for innovative training and sensitising policies targeting the contractors, and maybe also for special incentives (not only financial) to help them retrofit their own dwellings or to install renewable energy and become advocates of these products and technologies: in this way, both horizontal (by word of mouth) and vertical diffusion could be favoured.

The Portuguese programme which ran in 2010 to promote compact fluorescent lamps is a good example of successful horizontal diffusion, as it reached many lower and middle class households. Along the same lines, to boost energy retrofits and their horizontal diffusion, policy instruments could include the following: zero-interest loans, subsidies for roof insulation (even for do-it-yourself projects), easy and geographically-distributed access to energy-related information and advice, and even progressive tariffs on electricity and gas with a baseline level set according to household size (and possibly beneficiaries of social allowance), below which energy would be free.

To conclude, policy instruments to favour both vertical and horizontal diffusion of energy-saving practices and techniques do exist, and they could be further developed to promote overall diffusion and reduce environmental injustices. Their full implementation is unlikely, however, given the economic and political context as of 2015, both in Portugal and in Wallonia.

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## References

- Accardo, A., Corcuff, P., 1986. La sociologie de Bourdieu. Textes choisis et commentés, Le Mascaret, Bordeaux.
- Atlas climatique, 2015. Available from: <http://www.meteo.be/meteo/view/fr/16788784-Atlas+Climatique.html> (Accessed 11.08.2015).
- Bartiaux, F., 2008. Does environmental information overcome practice compartmentalisation and change consumers' behaviours? *J. Clean. 16* (11), 1170–1180.
- Bartiaux, F., 2009. Changing energy-related practices and behaviours in the residential sector: Sociological approaches. EFONET Paper WS72, 12, Available from: [https://www.researchgate.net/publication/269873974\\_Changing\\_energy-related\\_practices\\_and\\_behaviours\\_in\\_the\\_residential\\_sector\\_Sociological\\_approaches](https://www.researchgate.net/publication/269873974_Changing_energy-related_practices_and_behaviours_in_the_residential_sector_Sociological_approaches) (Accessed 24.03.2015).
- Bartiaux, F., (Ed.), 2011a. A qualitative study on home energy-related renovation in five European countries: homeowners' practices and opinions. IDEAL-EPBD Project, Available from: [https://www.researchgate.net/publication/269994052\\_A\\_qualitative\\_study\\_on\\_home\\_energy-related\\_renovation\\_in\\_five\\_European\\_countries\\_homeowners\\_practices\\_and\\_opinions](https://www.researchgate.net/publication/269994052_A_qualitative_study_on_home_energy-related_renovation_in_five_European_countries_homeowners_practices_and_opinions) (Accessed 20.01.15).
- Bartiaux, F., 2011b. Homeowners and energy-related renovations in Belgium (Wallonia): An analysis of 23 interviews, in: Bartiaux, F. (Ed.), A qualitative study on home energy-related renovation in five European countries: homeowners' practices and opinions, pp. 51–72. Available from: [https://www.researchgate.net/publication/270158353\\_Homeowners\\_and\\_energy-related\\_renovations\\_in\\_Belgium\\_28Wallonia\\_29\\_An\\_analysis\\_of\\_23\\_interviews](https://www.researchgate.net/publication/270158353_Homeowners_and_energy-related_renovations_in_Belgium_28Wallonia_29_An_analysis_of_23_interviews) (Accessed 20.01.15).
- Bartiaux, F., Vekemans, G., Gram-Hanssen K., Maes, D., Cantaert, M., Spies B., Desmedt, J., 2006. Socio-Technical Factors Influencing Residential Energy Consumption, Belgian Science Policy Office, Brussels. Available from: [http://www.belspo.be/belspo/organisation/Publ/pub\\_ostc/CPen/rappCP52\\_en.pdf](http://www.belspo.be/belspo/organisation/Publ/pub_ostc/CPen/rappCP52_en.pdf) (Accessed 20.01.15).
- Besnard, P., 1993. Diffusion. In: Boudon, R., Besnard, P., Cherkaoui, M., Lécuyer, B.P. (Eds.), Dictionnaire de la sociologie, Larousse, Paris, pp. 71–72.
- Bickerstaff, K., Walker, G., Bulkeley, H., 2013. Introduction: making sense of energy justice. In: Bickerstaff, K., Walker, G., Bulkeley, H. (Eds.), *Energy Justice in a Changing Climate: Social Equity and Low-carbon Energy*. Zed Books, London and New York, pp. 1–13.
- Bourdieu, P., 1979. La distinction, critique sociale du jugement. Éditions de Minuit, Paris. (Bourdieu, P., 1984. *Distinction: A Social Critique of the Judgement of Taste*. Routledge, London.).
- Bourdieu, P., 1986. The forms of capital, in Richardson, J., (Ed.), *Handbook of Theory and Research for the Sociology of Education*, Greenwood, New York, pp. 241–258. Available from: <https://www.marxists.org/reference/subject/philosophy/works/fr/bourdieu-forms-capital.htm> (Accessed 02.08.15).
- Bourdieu, P., 1987. What Makes a Social Class? On The Theoretical and Practical Existence of Groups. *Berkeley J. of Sociology* 32, 1–17.
- Carfagna, L.B., Dubois, E.A., Fitzmaurice, C., Ouimette, M.Y., Schor, J., Willis, J.B., Laidley, T. M., 2014. An emerging eco-habitus: the reconfiguration of high cultural capital practices among ethical consumers. *J. Consum. Cult.* 14 (2), 158–178.
- Eurostat, 2015. Inequality of income distribution. <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdc260> (Accessed 20.01.15).
- Fraser, N., 2000. Rethinking Recognition. *New Left Rev.* 3, 107–120.
- Gram-Hanssen, K., 2008. Consuming technologies, developing routines. *J. Clean. Prod.* 16 (11), 1181–1189.
- Honneth, A., 1996. *The Struggle for Recognition: The Moral Grammar of Social Conflicts*. The MIT Press, Cambridge.
- INE (Instituto Nacional de Estatística), 2011. Censos 2011. Resultados Provisórios. Lisbon: INE.
- INE (Instituto Nacional de Estatística), 2012. Parque habitacional em Portugal: evolução na última década. Available from: [http://www.ine.pt/ngt\\_server/at\\_tachfileu.jsp?look\\_parentBoui=149571899&att\\_display=n&att\\_download=y](http://www.ine.pt/ngt_server/at_tachfileu.jsp?look_parentBoui=149571899&att_display=n&att_download=y) (Accessed 27.02.15).
- International Energy Agency (IEA), 2012. World Energy Outlook. Available from: <http://www.iea.org/publications/freepublications/publication/English.pdf> (Accessed 24.11.12).
- Islam, T., 2014. Household level innovation diffusion model of photo-voltaic (PV) solar cells from stated preference data. *Energy Policy* 65, 340–350.
- Jensen, O.M., 2005. Consumer inertia to energy saving, in: *Energy savings: what works and who delivers? ECEEE 2005 Summer Study Proceedings*, pp. 1327–1334. Available from: [http://www.eceee.org/conference\\_proceedings/eceee/2005c/Panel\\_6/6147jensen](http://www.eceee.org/conference_proceedings/eceee/2005c/Panel_6/6147jensen) (Accessed 11.01.10).
- Katz E. and Lazarsfeld P.F., 2006 [1955]. *Personal influence. The part played by people in the flow of mass communications*, Transaction Publishers; New Brunswick and London.
- Keirstead, J., 2007. Behavioural responses to photovoltaic systems in the UK domestic sector. *Energy Policy* 35, 4128–4141.
- Lazarsfeld P., Berelson B. and Gaudet H., 1969 [1944]. *The people's choice. How the voter makes up his mind in a presidential campaign*, third, Columbia University Press; New York and London.
- Maréchal, K., 2009. The crucial role of habits in energy consumption: an evolutionary approach on changing current patterns, in: *Act! Innovate! Deliver! Reducing energy demand sustainably, ECEEE 2009 Summer Study Proceedings*, pp. 1693–1703. Available from: [http://www.eceee.org/conference\\_proceedings/eceee/2009/Panel\\_8/8.062/paper](http://www.eceee.org/conference_proceedings/eceee/2009/Panel_8/8.062/paper) (Accessed 06.08.12).
- McMeekin, A., Tomlinson, M., 1997. The diffusion of household durables in the UK, CRIC Discussion Paper No. 4. University of Manchester.
- McMichael, M., Shipworth, D., 2013. The value of social networks in the diffusion of energy-efficiency innovations in UK households. *Energy Policy* 53, 159–168.
- Mustafa, H., 2010. Gaining campaign support through peer networking: an impact analysis of energy efficiency projects in Malaysia. *Appl. Environ. Educ. Commun.* 9 (1), 38–49.
- Nilsson, M., 2008. Rethinking redistribution and recognition: class, identity, and the conditions for radical politics in the “postsocialist” age. *New. Propos.: J. Marx. Interdiscip. Inq.* 2 (1), 31–44.
- Pellegrini Masini, G., 2007. The carbon-saving behaviour of residential households. *Futures of Cities – 51st IFHP World Congress*, 23–26 September 2007, Copenhagen.
- Poortinga, W., Steg, L., Vlek, C., Wiersma, G., 2003. Household preferences for energy saving measures: a conjoint analysis. *J. Econ. Psychol.* 24, 49–64.
- Pordata, IPMA/MAM, 2015. Temperatura média do ar. Available from: [www.por.data.pt](http://www.por.data.pt) (Accessed 25.08.15).
- Rawls, J., 1971. *A Theory of Justice*. Oxford University Press, Oxford.
- Reckwitz, A., 2002. Toward a theory of social practices: a development in culturalist theorizing. *Eur. J. Soc. Theory* 5 (2), 243–263.
- Rogers, E., 1995. *Diffusion of Innovations*, fourth ed. The Free Press, New York.
- Schatzki, T., 1996. *Social practices: A Wittgensteinian Approach to Human Activity and the Social*. Cambridge University Press, Cambridge.
- Schlosberg, D., 2004. Reconceiving environmental justice: global movements and political theories. *Environ. Polit.* 13 (3), 517–540.
- Schmidt, L., Horta, A., Correia, A., Fonseca, S., 2014. Generational gaps and paradoxes regarding energy consumption and saving. *Nat. cult.* 9 (2), 183–203.
- Schmidt, L., Horta, A., Correia, A., Fonseca, A., Rebelo, M., Menezes, M., Silva, C., Pombeiro, H., 2012. *Net Zero Energy School: Reaching the Community*. Report ICS (not published).
- Schmidt, L., Prista, P., Correia, A., 2011. Estudo qualitativo sobre valores, representações e práticas de consumo e eficiência energética, Report ICS.
- Shama, A., 1983. Energy conservation in US buildings: solving the high potential/low adoption paradox from a behavioural perspective. *Energy Policy* 11 (2), 148–167.
- Shove, E., Chappells, H., 2001. Ordinary consumption and extraordinary relationships: utilities and their users. In: Gronow, J., Warde, A. (Eds.), *Ordinary Consumption*. Routledge, London and New York, pp. 45–58.
- Shove, E., Pantzar, M., Watson, M., 2012. *The Dynamics of Social Practice. Everyday Life and How it Changes*. Sage, London.
- Statistique cadastrale du parc de bâtiments, 2014. Available on <http://bestat.economie.fgov.be/BeStat/BeStatMultidimensionalAnalysis?loadDefaultId=107> (Accessed 11.08.15).
- Tarde G., 1903 [1890]. *The Laws of Imitation*, Henry, Holt and Co.; New York.
- Timmons Roberts, J., 2009. The international dimension of climate justice and the need for international adaptation funding. *Environ. Justice* 2 (4), 185–190.
- Valente, T., Davis, R., 1999. Accelerating the diffusion of innovations using opinion leaders. *Ann. Am. Acad.* 566, 55–57.
- Veblen, T., 1902. *The Theory of the Leisure Class: An Economic Study of Institutions*. Macmillan, New York.
- Walker, G., 2012. *Environmental Justice: Concepts, Evidence and Politics*. Routledge, London.
- Walker, G., 2013. Inequality, sustainability and capability: locating justice in social practice. In: Shove, E., Spurling, N. (Eds.), *Sustainable Practices: Social Theory and Climate Change*. Routledge, London and New York, pp. 181–196.
- Warde, A., 2005. Consumption and theories of practice. *J. Consum. Cult.* 5 (2), 131–153.
- Watts, D., Dodds, P., 2007. Influentials, networks, and public opinion formation. *J. Consum. Res.* 34, 441–458.
- Weimann, G., 1994. *The influentials. People who Influence People*. State University of New York Press, Albany (NY).
- Yavas, U., Riecken, G., 1981. Stimulating energy conservation. The use of the opinion leadership process. *Energy Policy* 9 (3), 226–231.
- Young, I.M., 1990. *Justice and the Politics of Difference*. Princeton University Press, Princeton (NJ).