Public opinion on renewable energy technologies: the Portuguese case

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Abstract:

Renewable energy technologies are part of the solution to meet future increasing demand of electricity and decommissioning of power plants in the European Union. Public opinion surveys indicate general support of these technologies, but particular projects face local opposition, a phenomenon known in the literature as the NIMBY (Not In My BackYard) hypothesis. In this study, the public opinion on renewable energy technologies was analyzed by means of a survey implemented in Portugal. The survey addresses four technologies: hydro, wind, biomass and solar power. The study has three main purposes: firstly, to recognize if the people acknowledges the existence of these technologies, secondly, to study the validity of the NIMBY hypothesis in Portugal while realizing in which technology it is more pronounced, and thirdly to perceive the levels of acceptance of each technology, under Sustainable Development aspects (Economy, Ecology and Society). The results suggest that acknowledgement of technology decreases with age, increases with educational degree and is greater in males. There is a generally positive attitude towards new projects of all technologies, and this tendency is more pronounced for solar power. Solar power plants are regarded by the Portuguese public as the most desirable technology in terms of economic and environmental aspects, while hydro power is perceived as the RES technology that can contribute the most to local residents' welfare.

Keywords: Survey, questionnaire, public opinion, social acceptance, renewable energy technology, NIMBY

JEL Classification: P28; Q42; C83

1. INTRODUCTION

Electricity demand projections for 2030 in the European Union (EU) impose the construction of new power plants, due to the required replacement of obsolete ones and increase of the electricity demand (European Commission, 2009). Many uncertainties exist in this process, and their nature lie both on the costs associated to the technologies to implement and on the prices for primary energy, often imported from geographically unstable areas and subject to even higher increasing demand in the developing world. Planning on the long run becomes essential, as power plants require the commitment of large initial capital sums and operate for long periods.

Planning assumes a variety of time scales and purposes. While the practical guide called roadmap2050 (http://www.roadmap2050.eu/) is directed to a very long-term frame, the policies EU20-20-20, targeted to 2020, involve concrete goals: (i) to cut in greenhouse gases (GHG) emissions to at least 20% below the 1990 levels, (ii) to reach 20% of renewables' share in the energy mix and (iii) to increase energy efficiency in 20%. Therefore, Renewable Energy Sources (RES) are expected to play a significant role in the electricity generation mix, and policies have been successfully designed in order to do so (Marques and Fuinhas, 2012). The present study addresses RES in Portugal, so the remainder of this section outlines the country past and present electricity generation situation.

1.1 Portuguese electricity system

As can be seen in Figure1, Portugal's non-renewable production is provided by power plants using coal, natural gas and non-renewable cogeneration (representing roughly half of "Other"). The consumption of electricity from renewable sources represented approximately 46% in 2011 (REN, 2011). This share was achieved with 18% of wind, 20% of hydro, and nearly half of the 18% of "Other", comprising renewable and non-renewable cogeneration, biomass and photovoltaic.

Figure 2 presents data concerning renewable energy in more detail and demonstrate the importance of both large hydro and wind power technologies. Having produced, in 2010, electricity from a mix of energy sources, where renewable ones accounted for 39%, Portugal achieved its EU target. The other successful countries achieving these goals were Denmark, Germany, Hungary, Ireland, Lithuania and Poland (European Commission, 2011).

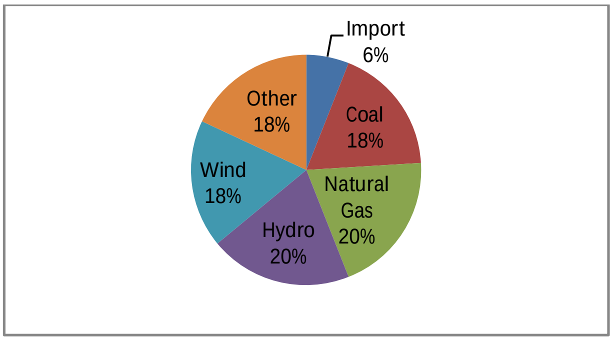


Figure 1: Electricity production shares, by technology, in 2011. Own elaboration from REN (2011) data.

The evolution of energy produced from RES has been increasing but not steadily. As the most significant part of it is based on hydro power it is, therefore, subject to the profile of the rainfall (the so-called hydroelectric productivity index) in a given year.

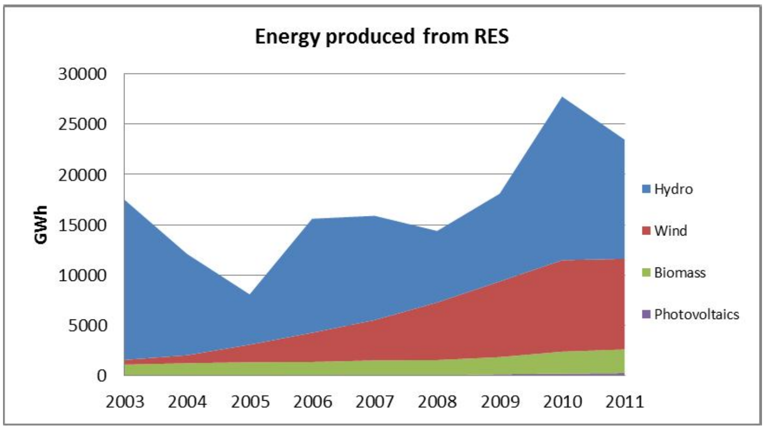


Figure 2: Energy production in Portugal, 2011, using the renewable energy sources addressed in the present study: hydro, wind, biomass and photovoltaics. Own elaboration from DGEG (2011).

Among the policies used to promote RES, feed-in tariffs are a solution used by Portugal and many other countries. The justification for this support mechanism is that free market would constrain RES use as they are still economically less attractive than the traditional technologies. Among renewable energy technologies, the exception to this rule is hydro power, which has been playing a major role in Portugal since the 50's and is mostly operating outside the feed-in tariff schemes. These hydro power plants are now privately owned, and by the end of 2011, the total installed hydro power in Portugal was 5390 MW. From these, 92.4% of the installed power were power plants with more than 10 MWand were not included in feed-in tariff schemes (Ordinary Regime Production); only 7.6% were small units, subject to feed-in tariffs and included in the Special Regime Production (REN, 2011).

Among the remainder renewable energy sources, the most prominent is wind power. The first wind farm was built in 1992 and the growth of installed power was exponential until the end of 2011, when it totaled 4081 MW (REN, 2011b). According to the Portuguese Renewable Action Plan, this number will increase to 5300 MW in 2020 (DGEG, 2012).

There exist various types of biomass production, and they can be divided in two types: a first one where the origin of biomass is the forest or agriculture (dedicated production), or a second type where biomass results from the processing of primary biomass, including residues, waste and subproducts (Carneiro and Ferreira, 2012). In some cases, the power plant may generate, besides the electricity, an amount of heat that is useful for industrial purposes. Currently Portugal has 462 MW of biomass installed power, among which 348 MW exist in cogeneration mode (e2p, 2012).

Installed solar power in Portugal, in 2011, was 149.3 MW (DGEG, 2011). Among these, the units that can be considered "solar power plants" or "solar farms" are 17 (besides two in the island of Madeira, not addressed in the present study) and represent 90.5 MW. The biggest of these units has 45.8 MW installed. These large-scale units are the object being addressed in our study (E2p, 2012).

The remainder of the paper is as follows: in section 2 we address the paper design and implementation, in section 3 we present results, in section 4 we discuss the results and in section 5 conclusions are made, along with future work proposals.

2. Survey design and implementation

The survey aims at studying the differences of public opinion towards the four technologies (hydro, wind, biomass and solar) between regions where they are and are not present. Therefore, four different surveys exist, each to be applied in two samples consisting of distinct regions, totaling eight cases. A hydro power questionnaire delivered in municipalities where hydro power is present is further represented as "H"; the same questionnaire applied to respondents who live in municipalities where hydro power is not present is represented as "NH", the equivalent for wind is "W" and "NW", for biomass "B" and "NB" and finally for solar "S" and "NS".

Given that the study addresses the NIMBY hypothesis, perhaps the best case would be studying the opinion of the respondent and relate it to the distance to a given infrastructure; however this approach would be difficult to implement, given the survey was intended to be handled by telephone. As a result, it was needed to define the delimitations of the "region" size, and in the present study, the geographical unit is the municipality (*"concelho"* in Portuguese). There are 308 of these in Portugal, with population ranging from 451 to 529.485, and areas between 7.9 to 1720.6 km^2.

Information on the Portuguese renewable energy generation infrastructures can be found online, in the http://e2p.inegi.up.pt/ website. This website was used to retrieve a list of municipalities which contain wind, biomass and solar power plants. For the large hydro power plants, the website www.edp.pt was used for the same purpose.

In our study, some municipalities were not consulted for some technologies. In the case of hydro power, the municipalities affected by the 10 power plants expected to be built in PNBEPH (2011) were left outside. In the "non-hydro", "non-wind" and "non-biomass" cases, only municipalities with less than 20.000 permanent residencies according to the National Institute of Statistics, www.ine.pt, were consulted. This option was taken to avoid inquiring urban districts where these technologies are unlikely to be implemented due to their own urban nature.

The surveys were taken during May and June of 2012, and were delivered using CATI (computer assisted telephone interviewing), by a specialist company. The number of surveys to be collected was 381 in each case, which would ensure at least a confidence degree of 95% with a margin of error of 5%.

2.1 The surveys

Each survey addresses only one technology. The surveys cases N and NH only ask the respondent about hydro power, the N and NW only wind power, and so on.

Each survey was divided in six sections. The first section acted as a filter, and the questionnaire would count as valid for the respondents that passed on this filter question. When the interviewer read the scales of possible answers, scales were reversed randomly, to avoid biases.

Section I (Filter question)

Have you ever heard of electricity produced in HYDRO DAMS / produced from the WIND, or on WIND FARMS / from BIOMASS, or in FOREST RESIDUE FIRED POWER PLANTS / produced in SOLAR POWER FARMS or SOLAR POWER PLANTS?

Note: Respondents who do not pass the filter question do not proceed to complete the questionnaire.

Section II (NIMBYism)

1: More HYDRO/WIND/BIOMASS/SOLAR power plants should be built in our country.
2: More HYDRO/WIND/BIOMASS/SOLAR power plants should be built in our concelho. (Note: municipality).
3: More HYDRO/WIND/BIOMASS/SOLAR power plants should be built in our freguesia. (Note: subdivision of municipality)
Scale of possible answers: 1 – totally disagree, 2 – tend to disagree, 3 – tend to agree, 4 – totally agree, 5 – doesn't know/doesn't answer. (Note: the order of the scale has been randomized to avoid biases.)

Section III (Perception of costs)

What impact do the dams/wind/biomass/solar power plants have upon the electricity bill, in your opinion?
Scale of possible answers: 1 – lowers extremely the bill, 2 – lowers slightly the bill, 3 – has no impact in the bill, 4 – raises slightly the bill, 5 – raises extremely the bill, 6 – doesn't know/doesn't answer. (Note: the order of the scale has been randomized to avoid biases.)

Section IV (Perception of environmental impact)

What impact do the dams/wind/biomass/solar power plants have upon the environment, in your opinion?
Scale of possible answers: 1 – degrade the environment considerably, 2 – degrade the environment slightly, 3 – have no environmental impact, 4 – protect the environment slightly, 5 – protect the environment considerably, 6 – doesn't know/doesn't answer. (Note: the order of the scale has been randomized to avoid biases.)

Section V (Perception of social impact in local populations)

What impact do the dams/wind/biomass/solar power plants have upon the populations near which they are built?
Scale of possible answers: 1 – develop considerably the populations, 2 – develop slightly the environment, 3 – don't develop nor harm the populations, 4 – slightly develops the populations, 5 – greatly develops the populations, 6 – doesn't know/doesn't answer. (Note: the order of the scale has been randomized to avoid biases.)

Section VI (Socio-demographics)
Education degree: *scale of possible answers: 1 – no studies; 2 – 4 year level, 3 – 9 year level, 4 – 12 year level, 5 – university degree*
Sex:
Age:

3. Results

In this section we begin by characterizing the respondents of the questionnaire, and their responses in the questionnaires. From the 3646 respondents that agreed to take the survey, 16% did not acknowledge the technology mentioned in the survey (and therefore did not proceed to complete it to the end).

3.1 Respondent's characterization and technology acknowledgement

In table 1 the results are distributed by gender, and the two conclusions to be taken are (i) the majority (64%) of respondents is female, and (ii) the lack of knowledge is more pronounced in their case, 19% against 12% in the case of males.

Table 1: Results of the filter question, according to gender.

	Gender (beforefilter)	Gender (afterfilter)	% did not pass the filter
Female	2346	1905	19%
Male	1300	1145	12%
N	3646	3050	16%

The values related to age are presented in Table 2. It can be concluded that the group of respondents that passed the filter have a slightly lower average age than the original group.

Table 2: Results of the filter question according to age.

	Age (beforefilter)	Age (afterfilter)	% did not pass the filter
N	3619	3027	16%
Missinganswers	27	23	15%
Minimum	16	16	
Maximum	95	95	
Mean	54,3	53,9	
Std. Deviation	16,8	16,6	

The educational level of respondents is not evenly distributed by the five categories predefined: 46% of respondents either have no schooling or only completed the 4 degree educational level, and only 17% have a high degree. It is noteworthy that the more advanced is the educational level attained by the respondents the more acknowledged is the technology.

Table 3: Results of the filter question according to educational level.

	Education (beforefilter)	Education (afterfilter)	% did not pass the filter
N	3529	3002	15%
Missinganswers	117	48	59%
1 - No schoolingcompleted	219	160	27%
2 - 4th grade	1390	1150	17%
3 - 9th grade	665	580	13%
4 - 12th grade	645	564	13%
5 - Highereducation	610	548	10%
Minimum	1	1	
Maximum	5	5	
Mean	3,01	3,06	
Std. Deviation	1,23	1,23	

For each of the eight cases of questionnaires, acknowledgement of technologies is as follows:

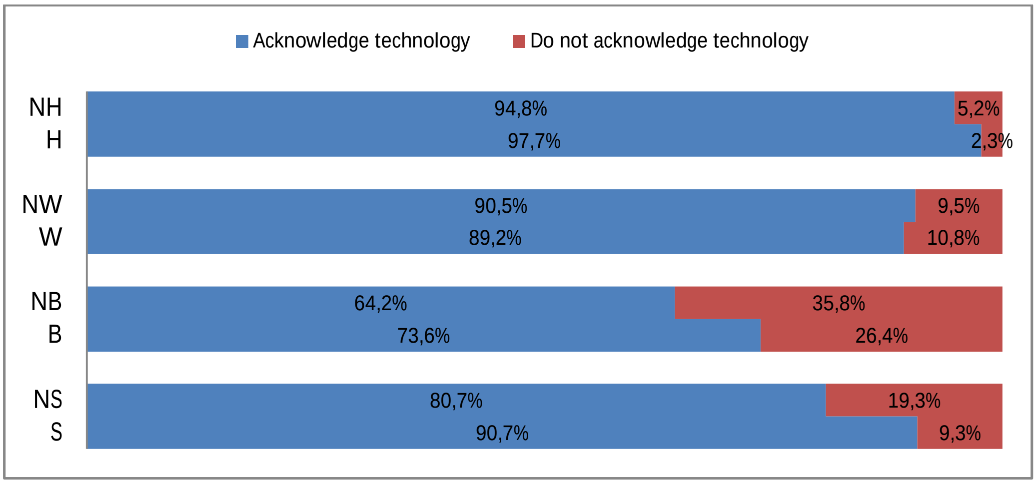


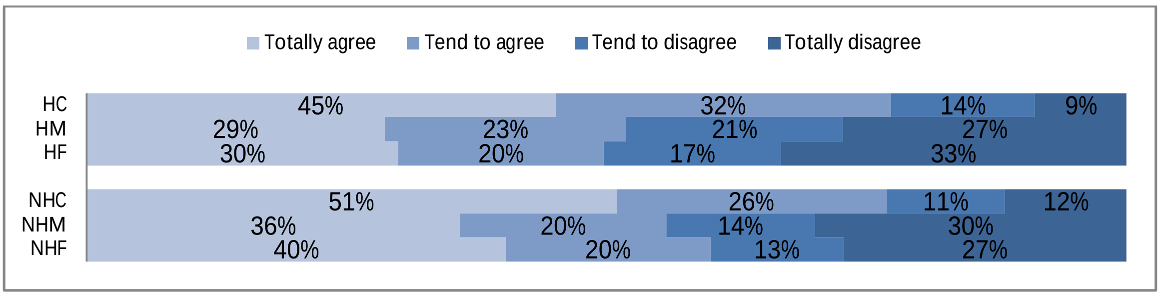
Figure 3:Acknowledgement of technology according to technology.
(Note that there are four different questionnaires applied to respondents who live in a municipality where the technology focused by the questionnaire is present (H, W, B, S) and where it is not present (NH, NW, NB, NS)).

Hydro power is the most acknowledged technology, which is quite expected, due to the importance that this technology has had during the last decades. Biomass remains the least known. Solar power, however the least contributor to the energy mix as shown in the previous section, remains better known than wind power in the cases where the questionnaire was implemented in municipalities in which these technologies were already implemented. Wind power is the only case in which a technology is more recognized in municipalities where it is not present than in municipalities where it exists, although with a small difference.

3.2 Willingness to accept new projects

The following plots are the results of the second section in the questionnaires, where the respondent is asked what is his opinion about the implementation of new projects of the technology (H=municipality with hydro, NH=municipality without hydro, W= wind, B=biomass, S=solar) taking into account an increasing proximity from country (C) level, to municipality (M) level and to *"freguesia"* (F) level, representing this last a sub-division of the municipality and as such showing the highest proximity situation enquired.

Respondents retain a better opinion towards new wind and solar power projects, whereas hydro power remains the least supported RES technology.



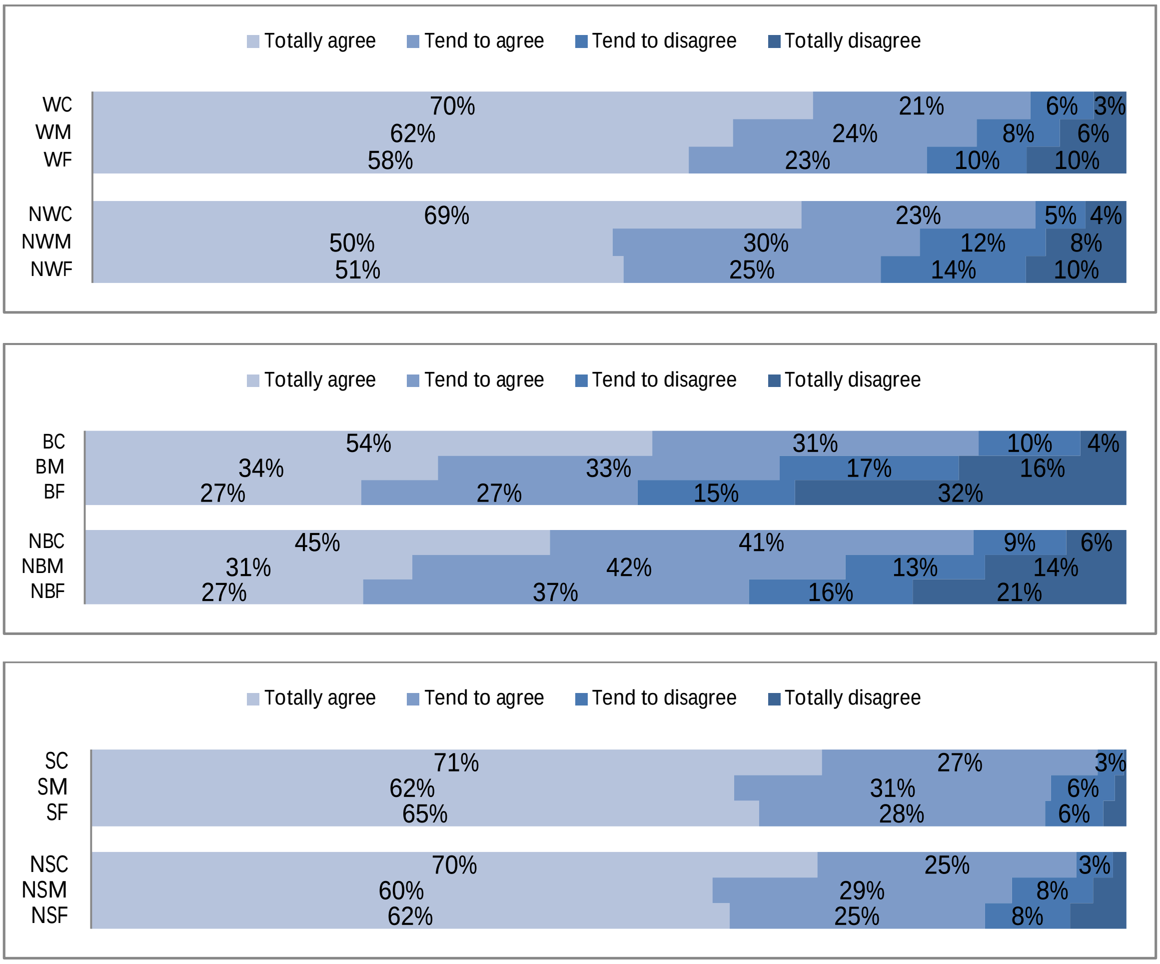


Figure 4:Willingness to accept new technology implementation projects in country (C), municipality (M) or freguesia (F).

Three major conclusions can be drawn from these results. Firstly, the attitude of respondents is generally positive towards all energy generation forms: the case with least support is that of respondents HF, who live in municipalities with hydro power projects and who are asked whether they would support new hydro power plants in their *freguesia*; if we sum the results of "totally agree" and "tend to agree", this result is 49.7%.So, always more than a half of the respondents are favorable to a new power plant, whether it is in their *freguesia*, municipality or country. Solar power, followed closely by wind power, are the technologies which have the higher acceptance, both if projects would be implemented in the country, in the municipality or in the *freguesia*". The result facing higher acceptance is that of respondents who live in municipalities with solar power, when asked their opinion on new solar power plants in the country, with 98% of "totally agree" and "tend to agree" responses.

Secondly, the residents in municipalities where wind and solar power already exist are more supportive (adding the "totally agree" and "tend to agree" results) than residents where this technology does not exist.

Finally, the respondents which did not express their opinion amounted to 2.5% when asked about new project implementation in the country, 3.1% in the municipality and 3.6% in the *freguesia*. The respondents showing more reluctance to give an opinion were the S case (6.1% did not respond what their opinion was about new projects in country, 6.3% in the municipality and 6.6% in the *freguesia*), followed by NH respondents (5.5% for country, 6.1% for municipality and 5.3% for *freguesia*). The respondents more willing to respond were invariably the B case (99.7% for country, 99.2% for municipality and 99% for *freguesia*).

3.3 NIMBYism

Similarly to Jones (2009), in our work we will use the term"NIMBYism" as an attitude of generally supporting a technology but rejecting it in the particular case of seeing it implemented near one's "backyard".A new variable "nimby_aggregate" was created.

For each respondent, the computation of this variable is:

$$NIMBY_{aggregate} = NIMBY_{country} - NIMBY_{freguesia}$$

The scale of $NIMBY_{country}$ and $NIMBY_{freguesia}$ ranges from 4 (totally agree with new projects) to 1 (totally rejects new projects), so that high values for $NIMBY_{aggregate}$ indicate a high NIMBY attitude, i.e., that the respondent totally supports new projects in the country but rejects them near his backyard. Negative numbers will indicate a PIMBY attitude (please in my backyard, as in Swofford and Slattery (2010)).

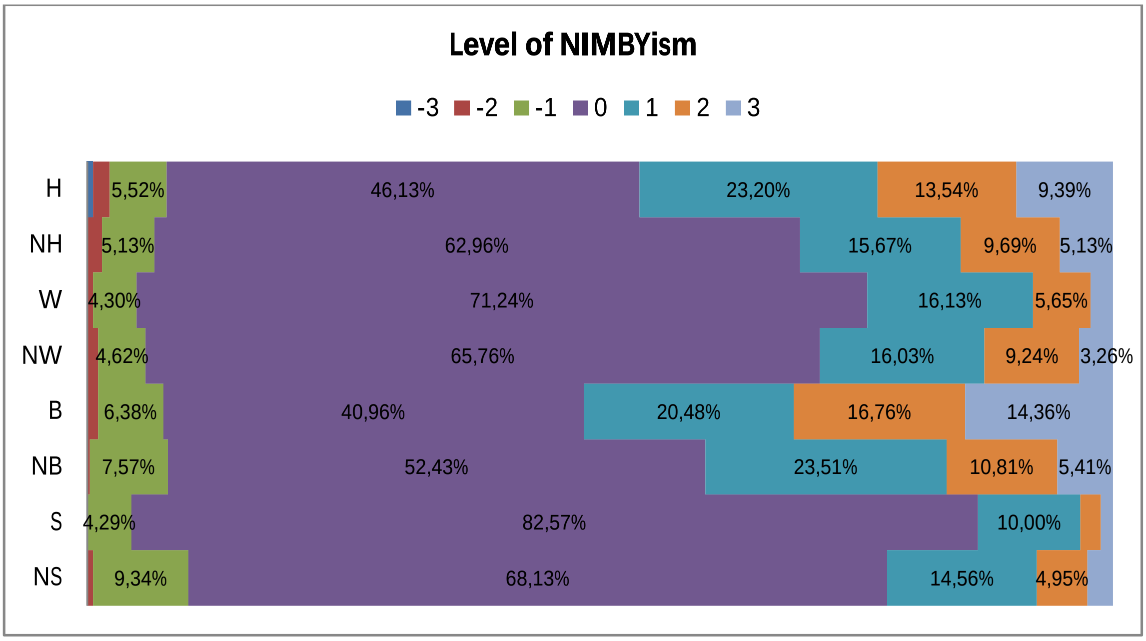


Figure 5:Levels of NIMBYism. The more positive the value, the greater is the difference between acceptance of the technology in the country and the acceptance of technology in the freguesia.

From figure 5 some conclusions can be drawn:

- Respondents whose opinion remains the same for new projects in the country or in the *freguesia* (i.e. $NIMBY_{aggregate}$ = 0) vary from 83% in the case of residents in municipalities with solar power plants, to 41% in the case of respondents who live in municipalities with biomass. This suggests that NIMBYism is not, in any case, affecting the vast majority of respondents.

- If we count the cases of positive $NIMBY_{aggregate}$occurrences, NIMBY attitude is leaded by residents in municipalities with biomass (51%), followed by residents in municipalities with hydro power (46%) and municipalities without biomass power plants (40%). As seen in Figure 5, attitude towards solar power is in every case very positive, and it is the less susceptible technology of generating negative reactions, to residents in municipalities where it exists or not.

- Between residents that have a NIMBY attitude, those who live in municipalities with biomass tend to be more extreme (14.4% cases of $NIMBY_{aggregate}$= 3).

- PIMBYattitude, i.e. NIMBYaggregate< 0, is not greater than 10% in any case (9.34% for residents in municipalities with solar power plants), and is not greater than NIMBY attitude in any case.

3.4 Perception on economy, environment and social impacts of different technologies

The perception of economic impact in the respondent's bill showed that more pessimistic attitudes (i.e. perception of higher costs) are the ones of hydro and wind power. Among these, the more extreme positions ("greatly raises bill") are the cases of respondents that live in municipalities where the technology is implemented. Biomass is the one that causes a more positive perception of reducing the bill, but solar power is the one that receives the more extreme attitude of greatly reducing it.

Aggregating the results in three categories ("reduces bill", "does not changebill" and "raises bill"), only three cases exist where respondents perceive the costs as more "raising bill" than "reducing bill": H, NH and W.

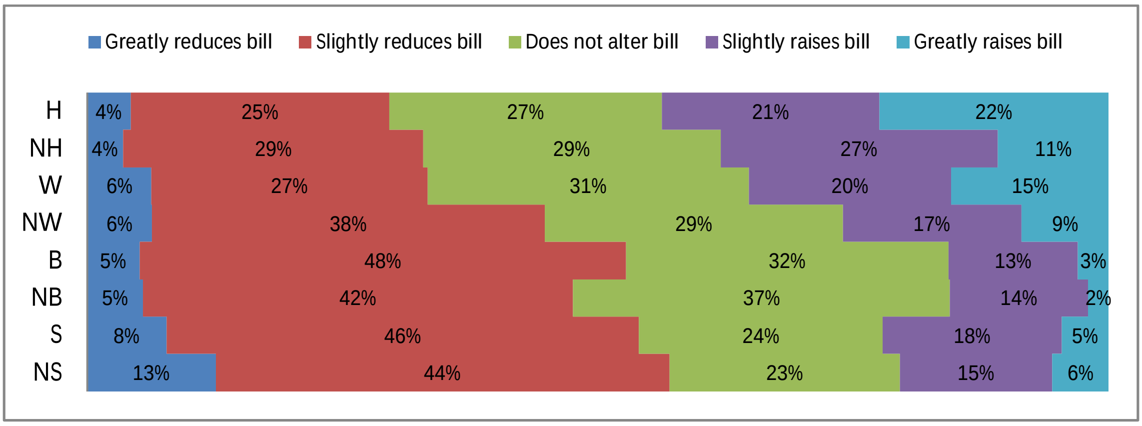


Figure 6:Respondents' perception on technology's contribution to the electricity bill.

A major finding of our study is that the perception that the majority of the Portuguese population hold on the full costs of electricity produced by different sources does not necessarily reflect real market costs or the existence of support mechanisms. Portuguese are negative about the costs of hydro power, which in fact is the only one of the analyzed RES technologies that operates outside the subsidized feed-in tariff system. They also perceive wind power as being more expensive than biomass and solar power. Judging from the feed-in tariffs, which are calculated in a way that gives the investor the payback of the investment, plus some rent, solar power is the most expensive (45 c€/kWh), followed by biomass (10.7 c€/kWh) and in last place wind power (7.45c€/kWh) (EREF, 2012). There is, therefore, a total inversion of the perceived costs and the actual costs, if we accept that the feed-in tariff reflects true costs of technologies.

In the question of environmental impacts, hydro power and biomass are perceived as the most threatening technologies. Solar power is the technology perceived as more protective of environment, but that perception is more pronounced in municipalities where it is not implemented.

Aggregating the results in three categories ("protects environment", "no impact" and "endangers environment"), there is no single case of respondents' perceiving any case as being more protective than endangering towards the environment, although it comes close in the case of residents of solar power municipalities.

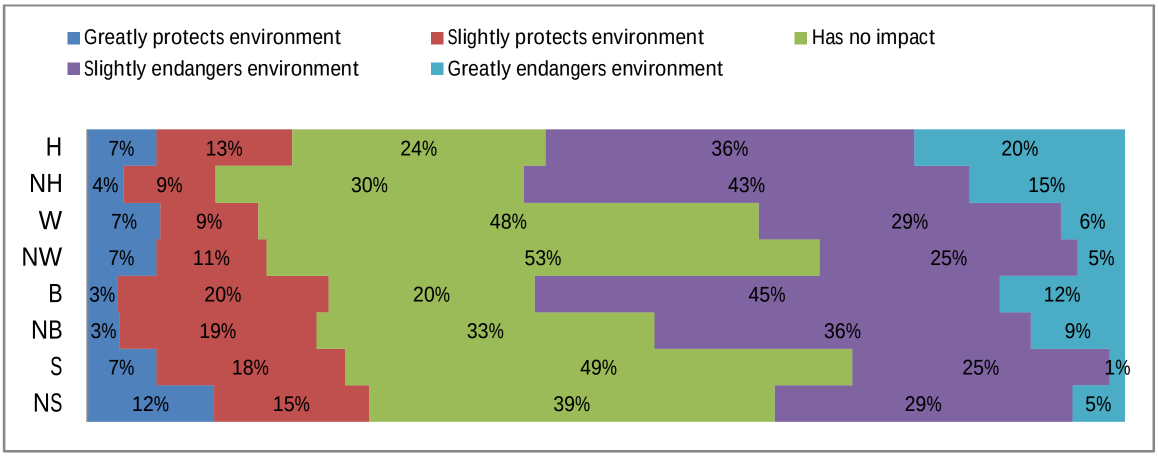


Figure 7:Respondent's perception on technology's environmental impact.

To what concerns the social impacts of the technologies, answers are globally more positive than economic or environmental impacts. More negative opinions ("greatly harms local population") represent, at most, 7% of H respondents. However, it is also 20% H respondents who support the vision that hydro power "greatly develops local population".

Among the optimistic opinions ("greatly develops local population"), the less emphatic are obtained in the case of NB, with only 3% of respondents.

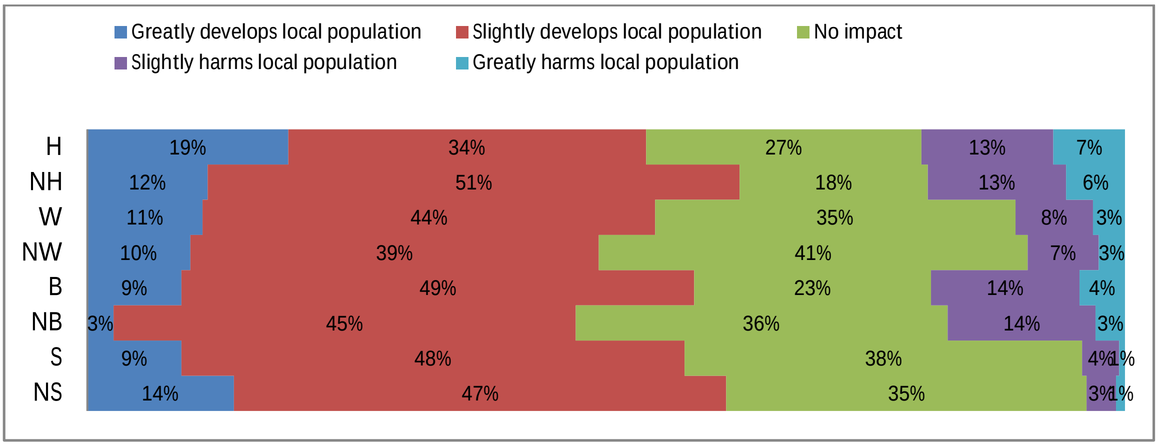


Figure 8: Respondent's perception on technology's social impact.

Regarding no responses in the last section of the questionnaire: respondents that live in municipalities where the technology is not implemented were always more inclined to give a "no answer" than respondents that live in municipalities where the technology is implemented, the only exception being the case of perception of costs of biomass. The biggest difference between no response rates was in the hydro power technology: "H" respondents were always more willing to respond, and their rates of no response were always lower than half of "NH" respondents. The highest no response rate was 18% in the cost perception of hydro power.

4. Discussion

We start the discussion pointing to potential weaknesses of our survey. The results obtained do not seem to differ much in cases where technology is already present and where it is not present, with the exception of biomass. It is possible that distance to the power plant becomes more influent in a smaller distance. In our case we based our geographical area roughly in literature results, (50 miles in (Greenberg, 2009) and (Ansolabehere, 2007)), which in Portugal can be roughly the size of municipality *concelho*. Other intrinsic problem in our survey could be the size of some power plants: some of them are small enough that the population might not be aware of their existence. For example, the biggest solar power plant is 45.8 MW with an area of 250 ha, and the smaller has only 0.4 MW installed power, 625 times smaller than the former; in biomass the bigger is 95 MW and the smaller 0.3 MW. Other difficulty in our survey was the task of formulating a question that addresses each of the three pillars of Sustainable Development. In order to avoid a long questionnaire that would imply a larger absence of responses, only three questions were addressed in this section. It would have certainly been needed more than one question for each pillar to obtain a better perception of the respondents' opinion, since the pillar "economy" is more than the cost of the electricity bill, and the pillar "social", besides not being still fully understood, certainly means more than local issues (Ribeiro et al., 2011).

Some studies present in the literature address the question "willingness-to-pay" (WTP). Since the renewables are generally more expensive than the traditional sources, schemes such as feed-in tariffs are created to compensate them, and it would be required that the consumers would pay a higher price for the electricity bill. For example, the Eurobarometer (European Commission, 2006) clearly asks whether respondents would be willing to pay 5%, 10%, 25% more than the present electricity bill; the majority of respondents (59%) would not be willing to pay more. In our study, while we didn't directly asked the respondents their willingness to pay, it is possible to articulate two questions (section 2 "opinion about new power plants in the country" and section 3 "perception of costs") and deduct the willingness to pay, although not on concrete values like the Eurobarometer. Crossing the tables of the respondents that agree with new projects in the country ("totally agree" + "tend to agree"), with the respondents that perceive the technologies increasing the prices ("greatly increases bill" + "slightly increases bill") we have the results shown on Table 4.

Table 4: Willingness to pay.

	A: Perceives technology as contributing to higher prices	B: Agrees with new projects	Responded both A and B	C: Disagrees with new projects	Responded A and C
H	43%	77%	30%	23%	13%
NH	37%	76%	26%	24%	12%
W	35%	90%	29%	10%	6%
NW	25%	91%	19%	9%	6%
B	16%	86%	12%	14%	4%
NB	15%	87%	12%	13%	4%
S	21%	97%	19%	3%	2%
NS	20%	95%	18%	5%	2%

Results suggest that, in line with the Eurobarometer (European Commission, 2006), it is a minority of the respondents that agree with new projects when they are aware that they will increase the electricity bill. This minority ranges from 30% in hydro power to 18% in solar power. Of course, like said in the previous section, it is also only a minority of the respondents that appear to be aware that wind, biomass and solar power plants are subsidized (i.e. their real costs are above the average of the electricity bill); but it is still interesting to note that most of the respondents who perceive the technology as more expensive still agree with its implementation: this fact is observed in the similarity of the first and third columns of Table 4. On the other hand, the last column of Table 4 shows the percentage of respondents who disagree with the implementation of the technologies and at the same time perceive that costs contribute to raise the bill: we can conclude that it is a small minority inclined to disagree with new projects because of the higher costs, and this minority is even smaller than the respondents inclined to agree with them even knowing they represent higher costs.

The Eurobarometer (European Commission, 2012) emphasizes that the Portuguese believe that the goal of achieving 20% of renewable energy in the EU is reasonable, more than the EU average citizen (59% vs. 57% of respondents). Our results are in line with the Eurobarometer 2012, since the Portuguese showed a generally supportive attitude towards more renewable energy projects: as shown in Table 4, the case showing least acceptance for "building new projects in country" is NH, which still shows 77% of positive attitudes.

Greenberg (2009) surveyed in the USA different samples that differed in the fact that one of them was within 50 miles to a nuclear power plant while the other didn't. The author also included natural gas and coal in the options to be studied. Similar conclusions to our work were that the majority of population agreed with more hydro, solar and wind power plants, and that this tendency was stronger for younger and male respondents. The opinion of the sample of the population that lived in the area of the nuclear power plant did not differ much from the other sample. That also applies to our case: results don't vary much within the same technology samples, not nearly as much as they differ from technology to technology.

5. Conclusions and future work

Surveys addressing the public opinion on four renewable energy technologies (hydro, wind, biomass and solar) were implemented in Portugal. Major conclusions can be resumed in eight topics. (i) Portuguese residents are fairly aware of renewable energy technologies. Always more than half of the respondents were aware of technologies: hydro power remains the most known source, whereas biomass is the least known. (ii) Females, less educated and older respondents tend to be less acquainted with the technologies. (iii) There is a generally positive attitude towards new projects of all technologies, being solar the one that receives the most favorable opinions. (iv) NIMBYism is more pronounced in biomass. (v) Respondents do not generally tend to perceive the technologies as contributing to raise the costs of electricity; biomass and solar are seen as the least cost ones; this suggests that the Portuguese are unaware that most of the technologies under study benefit from feed-in tariffs precisely because they are not competitive in the market. (vi) Solar power is positively seen in environmental terms. (vii) Respondents tend to believe that the technologies under study, when implemented, bring more development than harm to local populations.(viii)Among those who perceive the technologies as contributors to raise the electricity bill, there is a tendency to still be favorable to the projects implementation; as a result, willingness to pay is high among these individuals.

Future work will involve the construction of logistic regression models using data from this survey. As a result, predictors of attitudes will be modeled.

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