ACCEPTANCE OF RENEWABLE ENERGY SOURCES

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ABSTRACT

Social acceptance of Renewable Energy Sources (RES) has been identified as a crucial factor to the development of RES projects to the direction of the further penetration of RES in the energy mix. The aim of the present work is the investigation of respondents' attitude towards RES, exploring their beliefs and perceptions, while highlighting the main parameters that affect their social acceptance. For this purpose a properly designed questionnaire was used which was addressed to the residents of Athens. The statistical analysis was based on 536 valid and representative questionnaires. The results of the research revealed that the majority of the participants are in favor of the development of RES and declare themselves supporters to corresponding investments, however they do not want RES projects to be located near their residences and they do not seem particularly willing to contribute financially for the development of RES.

KEYWORDS

Athens; environment; Renewable Energy Sources; social acceptance

1. INTRODUCTION

The concept of social acceptance of Renewable Energy Sources (RES) refers to the level of support or rejection of RES technologies, as a result of the interaction between different beliefs, opinions, knowledge, ideologies, values and motivations of individuals or social groups[1].

Citizens play one of the most important roles in transforming the energy model into RES, as no new technology related to them can be implemented effectively without social acceptance [2,3]. New energy technologies require active and increased support from society in order to compete with conventional energy sources [4]. It has been shown that it is important to know the attitude of consumers, since their behaviors are the foundations of social acceptance [5]. The indicators that play an important role in shaping public behavior are: the knowledge and information about the various aspects of new technology, the fear and concern about risks directly related to new technology and the perception and the way people think and interpret RES applications [6].

Social acceptance is affected both by awareness of climate change and its effects, and by knowledge of renewable technologies. There is an obvious positive relationship between citizens' awareness and awareness of climate change and their readiness to act [7, 8]. The lack of information and meaningful dialogue with the local community is one of the main reasons for the reaction to the development of RES. The dialogue must take place in a timely manner with the full involvement of the state, stakeholders and

local government [9]. The acceptance rate of new energy projects shows an increasing trend over time in case of proper and timely public information at the local level. In many cases, a specific type of social behavior is recorded as described by the international term NIMBY and attributed to the phrase "Not In My Backyard". The typical behavior of citizens acting under the influence of this syndrome, includes the acceptance of the need to create a public facility, but still there is a complete reaction to the location of the facility, near to their residencies [10].

The aim of the present work is the investigation of respondents' attitude towards RES, exploring their beliefs and perceptions, while highlighting the main parameters that affect their social acceptance

2. METHODOLOGY

To achieve the purpose of the survey, a questionnaire was used as a research tool for the collection of the empirical primary data.

The construction of the questionnaire was based on an extensive literature review intended to identify similar surveys. The survey was conducted in Athens, the capital of Greece, between January and April 2018, through face to face interviews. The collection of the questionnaires took place in ten different places of the Athens Region at different times of the day and on different days of the week. After the data collection was completed, the statistical processing followed (using the statistical package IBM SPSS Statistics) based on 536 valid questionnaires The participants' responses were analyzed using descriptive statistics (frequency analysis, percentages, mean and standard deviation). Chi-square test for independence was used to determine whether the variables concerning the participants' views related to RES were statistically related to personal socio-demographic characteristics.

3. RESULTS AND DISCUSSION

3.1 Environmental sensitivity

The 73% of the respondents supported that environmental problems greatly affect their daily lives. They have strongly expressed their concern on a number of environmental issues and prioritize "air pollution" as the most important environmental problem. They expressed strong concern about "water pollution", "climate change" and "ecosystem disruption" too.

3.2 Cognitive level – sources information

The concept of Renewable Energy seemed to be not widespread but when deconstructing the concept through the questions, the participants acknowledge specific forms of RES without knowing the meaning of the term. However, men are more informed than women, with younger ages (up to 39 years old) showing greater familiarity with the concept of RES. Those with a high level of education have the lead in knowledge regarding RES, compared to the lower levels of education. Solar energy appeared to be the most widely known form of RES with 77.6% (Fig. 1) of the citizens answering that they have "Enough" to "Excellent" knowledge with wind energy following with a corresponding percentage of knowledge 66.2%.

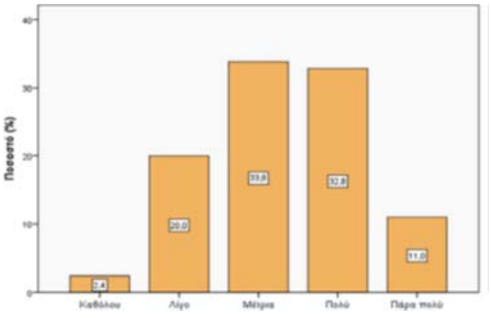

Figure 1. Information about solar energy

The 45.4% of the participants stated that they have "Not at all" knowledge about biomass while even greater is the percentage (48.2%) who answered that they do not know "Not at all" about geothermal energy (Fig. 2). In addition, the cognitive level for specific forms of RES is mainly related to the gender, age and educational level of the respondents. Regarding the investigation of the sources of

information on RES, the respondents derive information and knowledge primarily from the internet. The family and wider social environment as well as television are important sources of information mainly for the elderly, who however do not have sufficient knowledge about RES. On the contrary, younger respondents and people of high educational level who considered that they have significant knowledge about RES, showed incomplete knowledge about both biomass and geothermal energy. The lack of information on renewable energy sources through the education system is remarkable and is evident in all age groups.

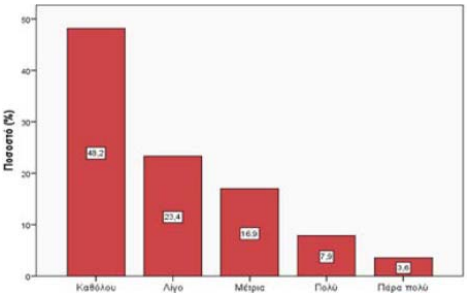

Figure 2. Information on geothermal energy

3.3 Impact and benefits

A minor proportion (1.1%) reported that a RES project could cause environmental degradation. The largest percentage of the sample 37.3% appeared to disagree with the previous view while the remaining 28.9% disagree "A little". One in four respondents believes that the implementation of a facility related to RES can degrade an area "Moderately". The 68.5% of the respondents believe that the implementation of a RES project creates new jobs while at the same time 39.3% believe that the contribution of such a project to the local economy of the region will be significant. It is also recognized by the majority of the participants that the implementation of a RES project significantly enhances the economic development of an area. Very crucial for the evaluation of the results was the position of the respondents on whether they are in favor of the development of RES. Most said they were in favor of developing RES for electricity generation with just 1.3% against (Fig. 3).

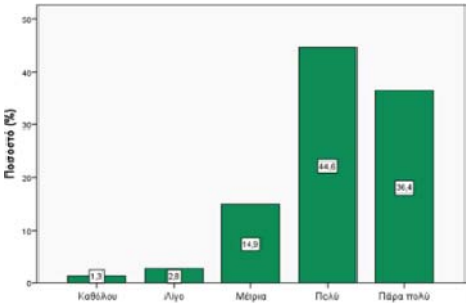

Figure 3. Support of RES for electricity production in our country

The majority of the sample (46%) answered that they would not be bothered "at all" by the location of a photovoltaic park or system near his home. The "Moderate" annoyance expressed against the possible installation of a biomass project near their home The 41.3% stated the full acceptance of a geothermal project in the area of their residence with only 5.0% expressing to the maximum extent their reaction to the above proposal.

3.4 Management Body Preference

For the management of both the design and the construction of RES projects it seemed that they prefer mainly private bodies while on the contrary for the determination of the energy prices the preference in the public body is obvious. It is noteworthy, however, the percentage (39.2%) of preference of the equal distribution of the bodies in the pricing policy of RES (Table 1). For their exploitation, both public and private bodies prefer to participate with the same percentage.

Table 1. Preference of Public and Private body for the design, construction, exploitation and pricing of RES

	Ποσοστό %			
	Σχεδιασμό	Κατασκευή	Εκμετάλλευση	Καθορισμό τιμών
Πλήρως Δημόσιοι	11.2	9.5	19.4	20.5
Αρκετά Δημόσιοι	9.9	9.5	12.5	18.1
Ίσης κατανομής	34.0	31.0	40.1	39.2
Αρκετά Ιδιωτικοί	22.2	23.3	14.9	11.2
Πλήρως Ιδιωτικοί	22.8	26.7	13.1	11.0
ΣΥΝΟΛΟ	100	100	100	100

3.5 Willingness to pay

A very small percentage of 1.3% of the sample stated that they were willing to contribute financially for the benefit of RES, while the

largest percentage of 36.2% of them refused to pay any amount for this purpose. Additionally one in five respondents stated that they intend to pay "Moderately" (Fig. 4).

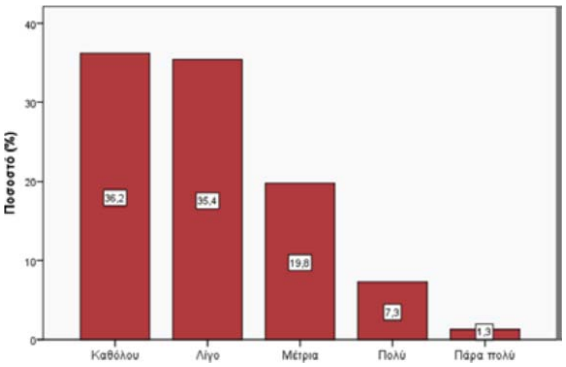

Figure 4. Willingness to pay for the benefit of RES

Although some of the respondents, initially, stated that they would be willing to pay in favor of RES, when they were asked about the amount of money they were intended to offer, their willingness turned into a denial.

4. CONCLUSIONS

The results showed that, although the environmental problems affect the daily lives of the respondents, the concept of RES is not widespread. Men and younger respondents seemed to be more familiar with RES. As the main source of information about RES, the respondents mentioned the internet, while there is an important absence of information from the education system. Of the main forms of RES, the respondents know more about solar energy, with wind energy coming next, while they ignored geothermal energy. The majority of the participants do not consider that biomass is very environmental friendly. Most of the respondents also believe that the production of electricity from RES is cheaper than conventional sources and they are very positive with the development of RES for electricity production. Women in particular consider that electricity production from RES is cheaper than from conventional sources, while younger people have a higher acceptance of RES for electricity production. The majority of respondents believe that priority should be given to solar energy. This may be due to the fact that Greece is a sunny country.

Concerning the possibility of RES installation in a region, the respondents believe that it would create new job positions and would help the economic development of the region, while it would reduce the dependence of the region on fossil fuels. On contrary, they believe that large lands areas are reserved for the installation of RES and a high initial investment cost is required, but they do not consider that the installation of a RES project could cause environmental degradation. In addition, regarding the management of RES, the respondents prefer the private bodies in terms of design and construction, while they prefer a public body in terms of exploitation. This public body should also fix the price of the electricity produced. Furthermore, the respondents believe that the installation of RES in a short distance from their residence would not be a nuisance for their region. However, the respondents, although they support the development of energy projects near their residence, set, in average, a minimal distance at 10Km. Respondents are also not willing to pay for the installation of RES. Mostly men are the ones who are less willing to pay for RES, while younger people are less negative and are more willing to pay for RES.

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