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Factors influencing the electricity generation preferences of Turkish citizens: Citizens' attitudes and policy recommendations in the context of climate change and environmental impact

Mustafa Ozcan

Electricity and Electronics Department, Şişli Technical School, Şişli, 34381 İstanbul, Turkey

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ABSTRACT

Drawing on the findings of a survey on Turkish citizens' energy preferences, the aim of this study is to propose policy recommendations on Turkey's energy policies. To realise this aim, this study analyzes the attitudes and behaviours of the citizens of Turkish Republic concerning their preferences on electrical energy generation. This article scrutinizes the preferences of citizens on nuclear power plants (NPPs) and renewable energy sources (RES)-based power plants. Moreover, taking into consideration the issues of global warming and climate change, the article provides a separate analysis of how recent developments in these two issues affect citizens' preferences on electrical energy generation.

Findings of the study indicate that a vast majority of Turkish citizens are against the establishment of NPPs in the country. The first choice in electricity generation is RES. RES endorsers state that RES-based power plants will result in no environmental problems and that they are willing to pay more for electricity in case of an increasing reliance on RES-based electricity generation. A vast majority of the respondents think that the prime consideration in electricity generation should be its effects on climate change.

1. Introduction

Up until the 1970s, energy policies were treated as a technical issue outside the sphere of public discussion. With the first severe oil crisis in 1973, energy issues attracted the interest of the public, and public opinion started to influence energy policies. Citizens' energy preferences became an important factor that needed to be taken into consideration before making energy investments since they were seen as important for successful realisation of energy projects [1–3]. Opinion polls and studies on citizens' energy preferences gained importance in various, albeit not all, parts of the world.

So far, three studies have been carried out on the formation of Turkish citizens' energy preferences [1,4,5]. Greenpeace [4] and BBC [5] studies are opinion polls. The BBC study, which consists of a two-question survey, does not include items on citizens' knowledge of climate change and environmental issues and their concerns and attitudes in relation to these issues. Although it is more comprehensive, Greenpeace study focuses on nuclear energy and nuclear power plants (NPPs), but it lacks detailed items on citizens' knowledge, attitudes, and concerns in relation to climate change and environment. It can be said that the descriptive statistical study carried out by Ertör et al. [1] is the first comprehensive research on Turkish citizens' electrical energy generation preferences.

Changes in citizens' energy preferences resulting from new developments should be discussed by studies carried out in the new conjuncture. This study differs from the studies carried out heretofore in terms of the conjuncture in which its data were collected and the scope and content of the survey it deployed for data collection. This study was carried out at a time when Turkey's long-planned NPP projects were initiated and NPPs attracted the interest of the public. Fukushima nuclear accident in Japan raised doubts about nuclear safety all over the world. After the accident, many countries started discussing NPPs and some decided to phase out existing NPPs or not to establish any new ones. While little was known in 2007 about the nuclear technology that was to be preferred and the companies to set up and run the NPPs, these are known today, and therefore this study has been able to include the issue of "trust". Turkey is located in a conflict zone with a high risk

E-mail address: ozcanm2000@gmail.com.
URL: http://www.mustafa-ozcan.com

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of war that has considerably escalated recently. Considering the recent conjuncture, the study has included the effect of citizens' NPP preferences on their views on nuclear security and nuclear proliferation.

In such a context, this study presents policy makers with up-to-date data that can assist them with revisiting their decisions and consider tapping into the country's rich renewable energy potential, which is not adequately exploited in Turkey. The study was designed considering that the survey would be conducted four years after the Fukushima accident and therefore responses of citizens would be more informed and less likely to be influenced by their emotional state in the aftermath of the accident. The experience of Fukushima accident and increasing shares of renewable energy sources (RES) in Turkey are among the changes that have taken place since 2007. The period when the data were collected concurred with the intensification of citizen protests against hydroelectric power plants, increases in the installed capacity of RES, and accumulation of experience and knowledge on these resources. The use of coal-fired power plants for electricity generation was one of the most controversial topics of the debates on environment and climate change. The study described in this article analyzes the changes in citizen preferences in the face of the new conditions and includes detailed items on knowledge of and attitudes concerning climate change and global warming.

The cities to implement the survey were determined according to certain criteria. Some of these cities have relatively high reliance on RES while some others are known for their opposition to hydroelectric power plants (HPPs). All Turkish cities where NPP construction plans were underway are included in the survey and Istanbul has been included since it is a metropolis.

Survey questions are novel questions that have been formed as a result of the interviews carried out by various stakeholders involved in the issue and a pilot survey that was carried out with 30 respondents.

Analysing survey findings and the energy policies of various countries, the aim of this study in general is to come up with policy recommendations for energy policy makers. More specifically, the objective of the study is to answer the following questions:

- What are the opinions of the participants on Turkey's electricity generation policies?
- What are their perceptions in relation to utilising NPPs and RES-based power plants?
- What kind of relationship do they think exists between different types of power plants and environmental problems such as climate change and global warming?
- How do their preferences for different types of electricity generation power plants vary? In particular, what kind of power plants do they prefer the most for electricity generation and what are the reasons for them preferring particular types of power plants to others?
- What kind of energy policies can be recommended based on the findings of the study? What are the issues that need to be taken into consideration during the implementation of these policies?

2. Studies on citizens' electrical energy preferences around the world and in Turkey

There is a large body of scholarship on citizens' electrical energy preferences, attitudes, and the factors that determine these attitudes. Studies involving fieldwork carried out in different countries [1,4–8] report a high level of opposition to NPPs. Studies carried out in 2011, after the Fukushima accident, show that there is a strong opposition to NPPs in countries that have operational NPPs such as Germany and Japan.

Opposition to NPPs is related to high levels of concern for the environment, possible threats for future generations, and risks associated with nuclear proliferation and accidents [1,4,6]. Also, local populations oppose the construction of NPPs in their neighbourhood, which is often related to the public perception of "not-in-my-back-yard" (NIMBY) syndrome [4,9].

Studies show that concerns for climate change and energy supply security are significant determinants of nuclear endorsement [1,6,10]. A large majority of citizens who endorse NPPs provide conditional support. When respondents in this group are provided with RES as an alternative, their endorsement level of NPPs decreases while that of RES increases. Studies report differences in endorsement levels depending on gender [8,11], age [6,8,11], social class [6], concern for environment [6], education [4], share of nuclear energy in total power generation [12], and immediate economic benefits to the local community [13].

Nuclear accidents exacerbate citizens' negative views on NPPs [8,9,12–14]. A sudden negative shift in public perception towards nuclear is observed in the immediate aftermath of nuclear accidents [8,9,14].

Factors that influence public perception of NPPs are education, media, political views, information shared with the public, and attitudes of state authorities towards energy sources [9,11,12,15,16].

Studies report a high level of citizen support for RES [1,4,5,7,8,10,11,16,17]. High preference rate for RES is related to the perceived need for combating climate change, increasing local employment, and ensuring energy supply security [1,2,4,7,8,10,18]. Level of support for RES can change depending on gender [8,11,18], age [11,18] and income [18]. Also, attitudes towards RES depend on the type of the renewable energy to be used [16,18].

In the aftermath of NPP accidents renewable energies are the first choice in dealing with climate change and ensuring energy supply security due to the significant changes taking place in perceived risks and benefits [8,14,17].

Citizens regard climate change and global warming as threats to their lives and report these two phenomena as the main reasons for their endorsement of NPPs [1,6,8,10]. Studies report increases in willingness to pay (WTP) for increased RES-based generation instead of building NPPs [1,9,18,19]. Reported level of trust in state institutions is low in the case of WTP [19] and the need to obtain information in the aftermath of a nuclear accident [4].

An analysis of energy policies in Germany, Spain, Denmark, and Japan shows that these countries are turning to RES-based electricity generation in order to ensure energy supply security, mitigate climate change, prevent further destructive effects of fossil fuels on environment, and phase out NPPs [20–26].

Germany has set an example for many countries with its successful and sustainable electrical energy generation policies [22,24–26]. RES-based energy policies of Germany were modeled after by Japan in 2012 and significant increases in installed power were reported in PV sector [22,27]. An analysis of the energy policies of the countries that transition into RES, Germany in particular, reveals that the most efficient and effective RES-based electricity generation incentive mechanism is the source-dependent and long-term feed-in-tariff (FiT) mechanism. Moreover, FiT levels have been constantly updated in the light of the developments in installed power of RES and experiences that have accumulated over time. In these countries, FiT mechanism is implemented along with a set of complementary policies such as research & development (R&D) and innovation subsidies, investment incentives, tax exemptions, grid access support, and emissions trading system.

Energy policies are shaped by various factors such as energy supply security, environment and climate policies, and economic and industrial priorities. Ensuring active participation of