Applied Energy 114 (2014) 409–416

Contents lists available at ScienceDirect

Applied Energy

journal homepage: www.elsevier.com/locate/apenergy

The relative importance of home, school, and traditional mass media sources in elevating youth energy awareness

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HIGHLIGHTS

- The importance of various information sources to school students has been investigated.
- Gender, place of residence, and school type are the tested variables.
- Parents scored the highest mean value followed by internet and teachers.
- Statistical differences among study variables were found and highlighted.
- Principle Component Analysis revealed three dimensions of preferences.

ARTICLE INFO

Article history:
Received 31 May 2013
Received in revised form 12 September 2013
Accepted 30 September 2013

Keywords:
Energy saving
School students
Jordan
Mass media
Parents

ABSTRACT

Elevating public knowledge and awareness is positively correlated to public support to renewable energy (RE) development and elicit support to achieve measures to reduce energy consumption at the domestic level. Since information about particular issue might be obtained from various sources and according to students' preferences, therefore, the main objective of this study is to explore the role of social interactions, mass media, and school profile on youth knowledge and awareness. In this vein, we conducted a survey-based study during which we collected 617 responses from 16-year old school students from two contrasting geographical regions in Jordan. The study found noteworthy differences in responses between gender, place of residence, and school type variables. Interestingly, parents scored the highest mean value and thus perceived as the most important source of information for the students. A Principle Component Analysis revealed three dimensions with statistical differences among the study variables. The internet is found to be a preferable source to obtain information in future and for all the respondents. However, females and private-mixed schools seem to also prefer TV and school activities to obtain information in future while males preferred school teachers and parents. The policy implications of this study imply devising proper outreach and energy saving campaigns targeting parents through mass media and community-based initiative. The education authorities are encouraged to develop and implement energy saving campaign at the public schools and finding room for introducing RE related issues within the domain of school curricula and school activities.

1. Introduction

Jordan is a small country located at the heart of the politically contentious and profoundly transforming Middle East or the *Levant*. Jordan is extremely dependent on fossil fuels imports mainly from its juxtaposition to Saudi Arabia, Iraq, and natural gas from Egypt to fulfill over 95% of its primary energy needs [1]. In economic terms, energy importation accounts for 25% of the Gross Domestic Product (GDP) and 20% of its total imports [2]. Due to the unexpectedly negative repercussions of the social unrest and riots in North Africa, cumbersome refugee's influxes (10% of its 7 million population), perplexing international oil and natural gas prices, and most crucially, the discrepancies between the virtual energy production costs and end-user energy costs (subsidies distortion), the country suffers chronic energy crunch characterized by alarmingly exacerbating public debt. Worse enough, natural gas pipeline extending from Egypt was bombed over 15 times causing power generation distortion shifting to heavy oil to produce electricity with total losses estimated at US$ 5 million per diem. Since the future of the region's political stability remain merely a prognostications and oil prices keep oscillating, the overarching priority is to irrevocably achieve national energy sovereignty through harnessing the commercially harvestable local

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0306-2619/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.apenergy.2013.09.072

resources particularly the renewable resources accompanied by vigilant plans to eliminate the market distortions created by the outdated fossil fuel and electricity subsides [3].

In its endeavor to leapfrog the dire economic crisis, the newly assigned Prime Minister made a pair of economic decisions with remarkable impact on the whole energy sector: linking fossil fuel prices to the international prices and abolishing electricity subsidies in August 2013 through tiered electricity price (TEP) reform mechanism with seven-tier tariff rate structure. Very much alike to TEP reform implemented in China, Korea, and Japan [4]. To reduce economic pressure on poor households, the government kept the electricity subsidized up to 50 JD (70 $US) monthly bill, however, any increase beyond this predetermined limit causes households to enter the TEP system thus pay more systematically. As a result, such policies provoked mass public grievance and opposition against such reforms.

The Jordanian government also approved its "2007 Energy Strategy": by the year 2020, the share of RE in primary energy supply is to increase from 1% to 10%. A number of single targets have been set, such as for wind power (installation of 600 MW) and solar thermal energy (300–600 MW) [5]. The introduction of 800-MW nuclear power plant in a yet-to-be determined location is confronted with public grievance and only advocated by a handful of proponents.

The aforementioned policy reforms are characterized by a number of shortcomings and have been missing one quintessential issue; they are purely economic tools with facile considerations to deploy energy efficiency measures across the various sectors. They also failed to link environmental issues and benefits to energy strategic planning. Most importantly, the failure to propose and activate measures to encourage energy saving and cultivate energy awareness at the household level, which accounts for the lion-share (43%) of electricity consumption in Jordan (Fig. 1). The electricity consumption at the household's level is steadily increasing and it surpasses the consumption growth compared to the other sectors (Fig. 2). Notable change in consumption behavior is bizarrely juxtaposed to the abolished fossil fuel subsidies- rich people switched to electric heaters instead of traditional petroleum-based winter heating due to the abrupt higher petroleum prices. Solar water heaters (SWH), on other hand, experienced a boom in unit installation especially in poor rural areas.

The Jordanian society, like many other Arab nations, is traditionally patriarchy, collective society characterized mainly by "faith and family" and lifestyle is largely defined by consumerism [6]. Therefore, traditions and norms play pivotal role in shaping energy consumption at the domestic level (for example, part of wedding celebration involve hanging a 50-lamps string on pride's and groom's parents' house for a week). Furthermore and in the light of regional conflicts and high birth rate (3.2%), the population of Jordan is expected to reach 10 million in 2030. This demographic trend exerts greater pressure on meeting the growing demand of

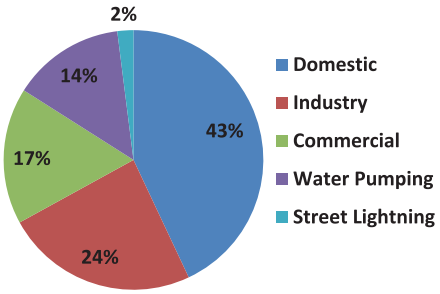

Fig. 1. Final electricity consumption by the major sectors [5].

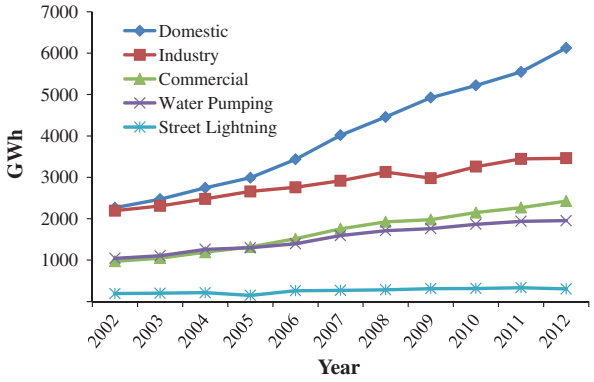

Fig. 2. Historical electricity consumption among the various sectors [5].

energy especially for domestic use. Consequently, there is a need for studies that assiduously seek to understand and influence household energy saving behaviors and from both socio-economic and environmental attitudes perspectives [7]. Such line of studies is truly scarce in many Arab states.

Jordan, on the other hand, is a very young country with approximately one-third (1.9 million) of the population (close to 7 million counting the Syrian refugees) are attending public schools [8]. This remarkable share of young people accentuates the pivotal role of schools and teachers in equipping youths with insightful knowledge and elevating their awareness to shift toward a more environmental caring and rationale energy choices [9]. It is also essential for young students to be acquainted with RE and its modern applications to guarantee more public support to clean projects, find skillful technicians [10], and achieve, albeit modest, energy saving targets at the individual and community level. To that end, investigating school students' and their teachers' knowledge and attitudes toward RE is conducive to energy efficiency policymaking. Another key social dimension is investigating how various information sources such as mass media, internet, family and school are influencing the type and volume of information the students receive and accordingly which channel of information is best prescribed in devising e.g. proper public outreach campaigns or eloquently empower the youth at early stages via modern education approaches.

On this pretext, we conducted a pair of studies to unveil the knowledge level and nature of attitudes toward RE school students and secondary school teachers may exhibit. According to Zyadin et al. [9,11], 16-year old school students in Jordan, especially female, appear to exhibit positive attitudes toward RE and both male and female are keen on learning more about it, however, the students had misconceptions of RE nature and nuclear power. The same results were also reported for the school teachers (modest knowledge yet positive attitudes). The teachers were also willing to learn more about RE and see RE-related topics in school curricula. In moving forward, it became of great relevance to explore the role of various information sources in developing the youth knowledge and probably influencing their attitudes and behaviors regarding energy and environmental issues. Research shows that school students have varying preferences to acquire information. For instance, Hungarian and Finnish school students tend to appreciate mass media to acquire relevant information and school and home and teachers comes after [12,13].

Therefore, the main aim of this study is to investigate how Jordanian school students perceive the importance of various formal and informal learning options (for example, school curricula, teachers, T.V., newspaper, the internet, friends, and parents) to comprehend contemporary environmental and energy-related issues. Besides investigating their perceptions, the study will explore