Energy Policy 39 (2011) 5182–5191

Contents lists available at ScienceDirect

Energy Policy

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

Energy saving in Swedish households. The (relative) importance of environmental attitudes

Johan Martinsson*, Lennart J. Lundqvist, Aksel Sundström

Department of Political Science, University of Gothenburg, P.O. Box 711, SE 405 30 Göteborg, Sweden

ARTICLE INFO

Article history:
Received 26 January 2011
Accepted 26 May 2011
Available online 17 June 2011

Keywords:
Household energy saving
Socio-economic characteristics
Environmental attitudes

ABSTRACT

The objectives for energy saving in the housing sector set by recent Swedish energy and climate policies are quite demanding. This article uses nation-wide Swedish survey data from 2004 to 2007 to explore the potential for achieving those targets. Earlier findings that socio-economic characteristics such as age, housing type and income are strongly linked to higher propensities to save on heating and hot water usage are confirmed by ordered logistic regression models. However, general environmental attitudes are also found to play a crucial role. When assessing the relative importance of socio-economic factors and environmental attitudes, the effect on energy saving is generally greater for the former than the latter. In addition, important interaction effects are identified. In relative terms, the effect of environmental attitudes is clearly stronger among households in apartment blocks than among those in detached housing, and stronger among households with higher income than among those with lower income. We end by discussing the implications for the selection and targeting of policy measures to tap the energy savings potential in the population.

1. Introduction

The objectives of the 2009 Swedish joint policies for energy and climate are very ambitious. Energy efficiency should increase by 20% up to 2020 to help decoupling economic growth from increased use of energy. Greenhouse gas emissions should be 40% lower by 2020 than they were in 1990. Among other things, this implies a decrease of no less than 20 million tons of CO_{2e} emissions from the sectors not covered by the EU ETS system, e.g., housing and transport. These ambitious goals should be viewed against the background of the already low per capita emissions in Sweden, and the fact that the most important decreases in CO_{2e} emissions have actually occurred in the housing and service sectors and in the production of district heating. Energy consumption for heating and the use of hot water has decreased since 1970 amidst a 1.3 million increase in population and a 40% increase in the number of dwellings (Cabinet Bill, 2008/09:162, pp. 48, 61; Cabinet Bill, 2008/09:163, p. 40; Energimyndigheten, 2009).

What becomes politically crucial is how Swedish households, who obviously already save on energy, react to these far-reaching policy objectives. It is evident from the arguments in the Government Bills that economic measures are expected to do the trick; they should be "directed towards supporting the [energy] effectivisation occurring spontaneously in society and as a consequence of policy measures adapted to market mechanisms" (Cabinet Bill, 2008/09:163, p. 155). Prominent among such measures are increases in and extensions of the carbon dioxide tax, as well as increases in other energy taxes. This is expected to encourage households to change their energy behaviours by way of energy effectivisation and changes in consumption patterns (Cabinet Bill, 2008/09:162, p. 231). Even informational policy measures are motivated in economic terms; such measures should provide households with explicit "economic inducements to act more energy efficient" (Cabinet Bill, 2008/09:163, p. 133).

What is remarkable about these future Swedish energy and climate policies is their strong reliance on market-based measures and economic incentives. This seems to go against growing evidence from studies on household energy behaviour that gains in policy incidence and effectiveness could be made if measures were broadened to address also households' environmental attitudes and beliefs. True enough, there are some reoccurring patterns that seem firmly linked to socio-economic factors. Household income, housing tenure and location, as well as demographic factors such as age and type of household do influence energy behaviour. Households with less economic resources are more eager to save on energy expenditures. Those living in owner-occupied dwellings tend to save more on energy than those living in apartment blocks, and these tendencies are stronger among older households (Barr et al., 2005).

Age, homeownership and household income are important predictors of energy behaviour also among Swedish households.

* Corresponding author. Tel.: +46 317865148; fax: +46 317864599.
E-mail address: johan.martinsson@pol.gu.se (J. Martinsson).

0301-4215/$ - see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.enpol.2011.05.046

A report from 2005 found housing tenure more important than income for heating and hot water usage. The authors conclude that the independent effects of income and housing indicate that people's economic self-interest affects the degree of energy saving. Although they also find that "green ideology" has an independent significant effect on general energy saving behaviour, they question its importance for energy saving on heating in owner-occupied housing: People "living in houses tend to save on heating costs regardless of whether they have a green or a grey attitude to the environment" (Hedberg and Holmberg, 2005).

There is, however, a growing body of research indicating that household attitudes and beliefs related to the environment do have effects on the propensity to save energy. With stronger and more clearly expressed environmental concern comes a more marked propensity to save energy in the household (Brandon and Lewis, 1999; Abrahamse and Steg, 2009). What is less evident from previous research so far is the *relative* importance of socio-economic and demographic factors for household energy saving on the one hand, and environmental oriented attitudes and beliefs on the other. This is particularly important to clarify from the point of energy policy, since this lack of evidence does not provide for a well-grounded choice of an effective and precisely targeted energy policy. There is a need for studies that explicitly seek to include the influence on household energy saving from both socio-economic/demographic characteristics and from environmental attitudes, and seek to assess how the importance of environmental attitudes varies depending on these other characteristics. This might enable us to pinpoint different key groups of households with a comparatively large potential for energy savings. Thus, to gain further knowledge on the relative importance of socio-economic versus attitudinal factors and their interaction will improve the possibilities for adequate choice of policy instrument and targeting of relevant groups of households.

Therefore, the aim of this study is to add to our knowledge of what more exactly makes which households save or not save energy. We examine the main determinants of household energy saving and the relative importance of various factors by using a large survey data set on Swedish inhabitants and their environmental attitudes and energy-related behaviours. From the results we obtain, we then proceed to discuss the implications for policy and what could be done to target energy saving policy measures for those different groups of the population where the savings potential is comparatively large.

2. Theoretical considerations and previous research

Research on what makes people save energy can be divided along two major lines, each with distinct subthemes (cf. Steg, 2008). On the one hand, there is a string of studies of the influence on energy behaviour of 'objective' factors, roughly grouped under the headings of socio-economic and demographic characteristics. On the other, there is a very large body of studies on possibly influential 'subjective' motivational factors that could, in turn, be specified in at least four different ways. On a general level, studies seek evidence on how personal norms and values affect energy behaviour. Of particular importance here are studies of the effects of energy savings from attitudes and beliefs related to environment and climate. Furthermore, a number of studies deal with the influence of social norms and social integration on the propensity to save energy. Finally, some studies have focused on political orientation and trust in governmental institutions as potentially influential variables.

The study of socio-economic and demographic factors has yielded some clearly validated patterns. A series of Swedish studies and overviews of current research corroborate and illuminate further these patterns. A report published by the Swedish Energy Agency concludes that "household energy behaviour differ with household size, age, housing tenure and income … [and] … can thus reasonably be identified as interesting separate groups" for targeting energy policy measures (Lindén, 2007: 35; cf. Hedberg and Holmberg, 2005). Also gender seems to influence energy use and the propensity to change energy habits, where women are generally found to be slightly more inclined to save energy (Carlsson-Kanyama and Lindén, 2007; Räty and Carlsson-Kanyama, 2010; see also SEPA, 2009). Findings from studies in other countries point in the same direction. The "analysis of individual studies shows that there are a set of core variables which have significant efficacy: homeownership, income (or socio-economic status), family size and age" (Barr et al., 2005: 1426).

Theoretically, these links to income and type of housing could be taken as signs that individuals are utility maximising market actors that react to economic stimuli to make rational choices given their preferences and amount of resources. Psychological research views such individuals as driven by self-centred values (Hirsh and Dolderman, 2007). Energy consumption and use can be viewed as a means for individuals and households to realise their preferences for "the good life", i.e., own comfort, welfare and development. However important as changes of such lifestyles may be in view of, e.g., global climate change (see, e.g., Roy and Tal, 2009) they may still prove very difficult to bring about (Steg and Vlek, 2009: 311; Barr et al., 2005: 1427).

The image of self-centred individuals has been widely challenged. Values and beliefs about moral obligations are held to be important motivations for human behaviour. After testing his Value-Belief-Norm theory, Stern concludes that "personal moral norms are the main basis for individuals' general predisposition for pro-environmental action" (Stern, 2000: 413). These norms are activated partly by the individual's views of whether environmental degradation threatens things highly valued by the individual, and partly by how the individual views his or her personal responsibility and ability to launch effective action to help solving the problem (Stern, 2000; Faiers et al., 2007). Based on the activation of altruistic and self-transcendent values (cf. Hirsh and Dolderman, 2007), people "may refrain from individual short-term gains if the society at large is better off in the long term" (Berglund and Matti, 2006: 555).

One should note that Stern does not view individuals' general predisposition for pro-environmental action as the sole driving force behind significant environmental behaviour. He contextualises individual choice by pointing to how public policy with its arsenal of economic, regulatory and informative measures affects individual behaviour, as do possibilities and hindrances stemming from technological development and physical infrastructure. Stern invokes the concept of personal opportunity structure; i.e., actors' knowledge, monetary resources and engrained habits as affecting the 'bite' of the general (moral) predisposition for pro-environmental action (Stern, 2000; see also Friese et al., 2008). Recent studies of energy behaviour emphasise the importance of the context of household choice. In particular, the existing "socio-technological system" in the energy sector tends to reduce household opportunities to undertake energy conservation measures (Maréchal and Lazaric, 2008). As a consequence, "policy-makers should specifically address the performance context of habits in order to increase the effectiveness measures aimed at reducing domestic energy domestic energy consumption." (Maréchal, 2010:1112). A broader opportunity structure is linked to a broader perception of behavioural control. A recent Dutch study concludes that "the more respondents thought they were capable of saving energy, the more energy they tended to save" (Abrahamse and Steg, 2009: 717). It is important to note that