Overview

The paper critically reviews and analyses the impact of renewable energy heat policies to induce technological change in Ireland. It is in response to the challenge of better understanding the broad effects and attributes of renewable energy policy instruments.

Accepting that there is no single best method to evaluation renewable energy policy instruments for residential sector, the paper explores what are best techno-economic variables that can be used as determinants for technology choice. Undoubtedly, complementary research methods are required to best comprehend the effects and attributes of renewable energy technology policy. Whereas economic factors are important, a much broader variety of determinants is required when analysing the process of adoption of technology. This could include social determinants, product reliability, and associated product support systems, consumer confidence and environmental awareness. This paper’s analysis focuses on the key determinants that influence consumer choice [and explores a [micro-economic] decision-making framework for technological choice, evaluated policy instruments, and the treatment of market failures.]

This paper is an evaluation of the Irish Government’s renewable energy policy (‘Greener Homes Scheme’) that aimed to induce technological change within the residential sector. It is concerned with the impact of different policy instruments and resulting technological change. It focuses on decision frameworks for technological choice, and a treatment of market and behavioural failures. It will consider how consumers have responded to new technological policies aimed at deploying renewable heat technologies, and the specific policies aimed at advancing certain technologies over others. It will reflect on market and behavioural failures. Critical aspects include the behaviour of household around policy changes, decision making choice frameworks and uncertainty.

Methods

Using the Irish residential sector as a case study, and analysing data of more than 31,600 technology installations, the paper will assess the extent to which policy makers consider the influence of the renewable energy (heat) technology policies and the likely willingness of consumers to adopt these technologies in their homes. In doing so, it attempts to provide valuable guidance for policy evaluation in relation to renewable energy in the residential sector. It represents investment decisions and technological choice by the end user and reflects the growing concern among energy policy markets regarding the representation of user preferences. The overall intent is to investigate the implications of analysing different variables and their contribution to making more balanced renewable energy policies.

An interrogation of the data of more than 31,600 applications reflects significant deviation in technology take-up across the three phases of the GHS. This equated to an investment of over €73 million of government exchequer financing, equating to approximately a 30% grant aid investment.

As a way of explaining the various factors that influenced consumer choice, the paper looks across the three phases of the programme to determine the impact of three (grouped) technologies, namely bioenergy, solar and heat pumps.

Assuming that technological choice is driven by a number of economic factors such as energy prices, operational and maintenance costs, discount rates and market information about the efficiency of certain technological choices, the paper explores some behavioural factors that may have impact on the renewable energy policy. The paper examines the effect of various attitudinal, behavioural and demographic variables on RET selection in the Irish residential sector.

Results:

This paper assesses the technology take-up by consumers within Sustainable Energy Authority of Ireland’s (SEAI) Greener Homes Scheme (GHS) since 2006. This paper interrogated the various consumer technology selection choices that were made and the factors than influenced such decisions. It considered the impact of various variables on decisions made by consumers concerning renewable energy technology (RET). These include:

1. Consumer take-up of RET
2. The implication of changing grant support (by phase) levels on technology take-up
3. Changing (non financial)conditions associated with eligibility of applicants to the GHS
4. Changing consumer confidence levels in technologies,
5. Changing national economic circumstances and impact of recession

Conclusions

In their attempts to make policy and set technology related goals across sectors, policy makers must consider both economic and social determinants delivering technology deployment schemes. Whereas economic factors are important, a much broader variety of determinants is required when analysing the process of adoption of technology. This could include social determinants, product reliability, product support systems, consumer confidence and environmental awareness.

Polices tend to target GHG emission reductions and achievement of energy savings without a full understanding of the determinants that consumers consider when making technology choices, not alone from fossil to renewable technology but also the nature of the renewable technology when compared to other technology types. The issue of heterogeneity (actors and their preferences) remains misunderstood by policy makers, along with the multi-agent decision nature of tech choice and interaction and complexities of household behaviour.

References

Amann JT (2006) V*aluation of non-energy benefits to determine cost-effectiveness of whole house retrofits programs.*

Bollino., CA (2009) *The Willingness to Pay for Renewable Energy Sources: the case of Italy with socio-demographic determinants*, Energy Journal V30No.2 (2009), IAEE.

Uitdenbogerd (2007) *Energy and households. The acceptance of energy reduction households in relation to performance and organisation of household activities*, PhD thesis

Greening LA, Bernow S. 2004. *Design of coordinated energy and environmental policies: use of multi-criteria decision frameworks*. Energy policy 32: 721-35.

IEA (2008) *Deploying Renewables*

IEA (2005) *The Variability of Wind Power and Other Renewables, Management options and strategies*

Kempton W, Montgomery L, 1982. *Folk Quantification of Energy. Energy* 7:817-27.

Lawrence Berkeley National Laboratory (2009) *Tracking the Sun III: The Installed Cost of Photovoltaics in the U.S. from 1998-2009* U.S. Department of Energy

Lutzenhiser L. 1993 *Social and Behavioural aspects of energy use*. Annual review of Energy Environment 18:247-89

Mundaca L et al. 2010. *Evaluating Energy Efficiency Policies with energy Economy models*, Annual Review of Environment Resource 35: 305-44

Quigley, J.M and D.L. Rubenfeld (1989) *Unobservables in consumer choice: residential energy and the demand for comfort.* The review of economics and statistics 71:416-425.

Stern PC, 1986, *What economics doesn’t say about energy use*. Journal of Policy Anal Management

Wang H (1997) *Treatment of don’t know responses in contingent valuation surveys: a random valuation model* Journal of Environmental Economics and Management 32(2): 219-232

World Business Council for Sustainable Development (2009) *Energy Efficiency in Building, Transforming the Market.*