TRANSACTION COSTS IN ENERGY EFFICIENT BUILDING RENOVATIONS – CASE STUDY IN ALINGSÅS, SWEDEN

Bernadett Kiss, International Institute for Industrial Environmental Economics (IIIEE) at Lund University, +46 46 222 02 27, bernadett.kiss@iiiee.lu.se
Luis Mundaca, International Institute for Industrial Environmental Economics (IIIEE) at Lund University, +46 46 222 02 57, luis.mundaca@iiiee.lu.se

Overview

Transactions costs (TCs) can ostensibly hinder the deployment of energy efficienct technologies in the building sector. To tap cost-effective energy saving potential and related mitigation of GHG emissions, TCs of implementing energy efficient technologies need to be reduced. To that end, the nature and scale of TCs need to be better understood.

Since the building sector accounts for approximately 31% of global final energy use and 33% of energy-related CO_2 emissions sectoral improvements could make a substantial impact (Ürge-Vorsatz, D., Eyre, N., Graham, P., Harvey, D., Hertwich, E., Jiang, Y., et al., 2012). In the EU, the full costeffective energy saving potential of 27% by 2020 lies in the residential sector (EC, 2007). Heating energy saving potential in case of high performance retrofitting is in the range of 70-92% (Ürge-Vorsatz, D., Eyre, N., Graham, P., Harvey, D., Hertwich, E., Jiang, Y., et al., 2012). On a global scale, it is estimated that efficient technologies can deliver a 30% cost-effective GHG-emission reduction by 2020 (Levine, M., Ürge-Vorsatz, D., Blok, K., Geng, L., Harvey, D., Lang, S., et al., 2007). TCs however can hinder to achieve these potentials cost-effectively.

What are transaction costs? These are costs which are not directly involved in the production of goods or services, but unavoidable and often unforeseeable when contracting for such goods and services (Coase, 1960). In the context of technology change, TCs are also referred to as unmeasured costs preventing the adoption of new technologies, because they are often understood as costs occurring ex ante to the implementation of technologies and ex post in relation to the monitoring and enforcement of contracts (Matthews, 1986). TCs are often considered as a critical market barrier by making new technologies seem more expensive than conventional ones and/or, for instance, by preventing real estate developers from entering the energy efficiency market (Lee & Yik, 2002).

Methods

In order to better understand TCs within the building sector, this study analyzes the nature and scale of transaction costs resulting from the application of passive house concept in energy efficient renovation. The case study represents the first passive house renovation in Alingsås, Sweden, including 300 apartments. The methodology has three components. First, a literature study was carried out on the nature and scale of transaction costs in relation to low-carbon technologies and related projects. It resulted in a list of natures of transaction costs, conceptually categorized according to Mundaca et al. (2013): a) search for information, b) negotiation, c) approval and certification, d) monitoring and verification and e) trading. Second, based on the literature study, the nature of transaction costs in the passive house renovation project has been identified, analyzed and categorized through interviews. Sixteen semi-structured interviews were carried out with key decision-makers of the renovation project; questions include the nature and scale of transaction costs of energy efficient technologies and concepts. Thirdly, the information was cross-checked among actors and against official documentation. Quantitative estimates from different studies are also used as proxies. In the analyzes it is recognized that the source and the scale of TCs are influenced by a number of factors and thus uncertainty is an intrinsic aspect of transaction cost analysis for efficient technologies in the building sector. (See more details on internal, external and methodological factors influencing TCs analyisis in Mundaca T., L, Mansoz, M., Neij, L., and Timilsina, G.R., 2013).

In addition, this study explores potential strategies to reduce transaction costs. The study focuses on transaction costs borne by building owners and building developers in the planning, implementation and monitoring phases of a passive house renovation in Sweden.

Results

When it comes to the nature of TCs in relation to energy efficient renovations, multiple sources have been identified arising throughout the entire life-cycle of projects: in the planning, implementation and monitoring phase. TCs in the energy efficient building renovation project mostly arise as a result of project formulation, search for partners and/or

feasible technical and financial solutions, contract negotiations and monitoring the performance of the installed equipment.

Regarding the scale of TCs, data has been more difficult to obtain and thus extrapolated in relation to other studies having attempted to provide empirical estimates for the building sector. For instance, and as a proportion of investment costs, TCs for improved cavity wall insulation are estimated to be 30% and in the range of 20%-40% for energy efficiency measures carried out by ESCOs in the residential sector (Mundaca, 2007; EastonConsulting et al., 1999). In this study, the scale of transaction costs depending on the nature highly varies. The analysis shows for instance that for individual cost sources TCs can be 200% higher than for conventional renovations.

In order to reduce transaction cost, the promotion of learning and knowledge development have been identified as potential strategies. Learning and knowledge development activities, in the analyzed case included study visits, demonstration projects and new communication channels and novel internal and external organizational management.

Conclusions

Implementing energy efficient building technologies further increases the already high and often not encountered TCs in the building sector with its multiple participants and multiple transactions. Despite uncertainties related to TCs analysis, some strategies and policies have shown to have the potential to reduce TCs for improving energy efficiency in buildings. At the managerial level, for instance, procedure standardizing, full life-cycle cost accounting and learning via project bundling have led to reduced costs of search for information and monitoring. From a policy perspective, clear and simple legal frameworks promoting efficient technologies in the building sector are percieved as an option to reduce transaction costs. This can include streamlined procedures for baseline settings and requirements for monitoring and verification, coupled with testing, extensive information provision and education of building professionals. Despite the academic debate, whether TCs are market failures and thus whether policy intervention is required to reduce them or not, the research shows that there is a high-potential for public policy intervention to reduce TCs in the building sector.

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