

Ecoinnovation diffusion in the building energy efficiency market

Ilze Laicāne, Andra Blumberga (*Riga Technical University*)

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I. INTRODUCTION

In recent years the development of EU environmental policy is aimed to build a closer relationship between environmental and innovation policy. Particular attention is focused for the promotion of ecoinnovation in construction sector.

The literature review on “ecoinnovation” found many different definitions of ecoinnovation [1]. The Wupertal Institute for Climate, Environment and Energy for their research [1] of the most relevant EU policy for reducing energy use and improving resource efficiency, used a comprehensive definition of ecoinnovation, given by Reid and Miedzinski (2008) and they defined ecoinnovation as “the creation of novel and competitively priced goods, processes, systems, services, and procedures that can satisfy human needs and bring quality of life to all people with a life-cycle-wide minimal use of natural resources (material including energy carriers, and surface area) per unit output, and a minimal release of toxic substances”.

However, studies done by so far points that a lack of relevant data and indicators have hampered the development of policies and measures for promoting ecoinnovation [2].

Stimulating ecoinnovation initiative in the construction sector significant results in waste reduction, energy efficiency and climate change abatement can be achieved.

II. DRIVERS AND BARRIERS OF ECOINNOVATION IN BUILDINGS' ENERGY EFFICIENCY MARKET

Buildings' sector development studies have found that ecoinnovation for buildings refurbishment in Europe have not fully been developed yet [1]. However companies in the construction sector are more likely to have brought a new product or service to the market (i.e. system innovations) [3].

Trends contributing to ecoinnovation in housing sector are associated with high-impact use of construction materials, access to appropriate and affordable housing, growing demand for housing space, increasing urban sprawl and lower urban density and growing energy consumption in the housing use phase [3]. According to Timo Makela, these trends partly offset environmental policies and lead to additional demand for action [3].

The table I below shows an example of the main barriers and drivers for ecoinnovation in energy efficiency renovation of buildings [1]. This table I discloses very complex and dynamic system of interrelations between factors that affects the diffusion of ecoinnovations in buildings energy efficiency market.

TABLE I

DRIVERS AND BARRIERS IN REFURBISHMENT OF OLD BUILDINGS

Drivers	Barriers
<u>1. Socio-economic:</u> 1.1. General economic development; 1.2. Demand for housing/building space; 1.3. Hours of use per year;	<u>1. Socio-economic:</u> 1.1. Limited incentives for landlords or tenants to invest in ecoinnovation; 1.2. Long payback periods of ecoinnovation in housing

1.4. Number of households and firms; 1.5. Development of energy and material prices (including energy or emissions taxes) and interest rates); <u>2. Technical:</u> 2.1. Availability of low-impact technologies and materials; 2.2. Development of infrastructures affecting location of residential and non-residential buildings; <u>3. Natural:</u> 3.1. Climatic zone where building is located; <u>4. Cultural-institutional:</u> 4.1. Willingness of residents to participate in shared housing concepts; 4.2. Readiness for public administrations to develop green building and infrastructure concepts on former industrial areas in city centers instead of further following the strategy of urban sprawl.	and construction; <u>2. Financial:</u> 2.1. Insufficient financial means for initial investment; 2.2. Transaction costs for receiving information, advice and financial support often is high; <u>3. Cultural-institutional:</u> 3.1. Life Cycle thinking is not widespread; 3.2. Lack of information about existing support measures for tenants and landlords; 3.3. Insufficient motivation, training and qualification of planners and installers; 3.4. Insufficient information of tenants and building owners about ecoinnovations.
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The study [1] concluded that there are urgent need to create EU policy for promoting ecoinnovation aimed to address the barriers for ecoinnovation and the most attention should be focused on such informational and socio-economic barriers:

- Lack of understanding of benefits;
- Lack of coordination;
- Resistance to change;
- Low awareness /education about ecoinnovation;
- Price of the ecoinnovation being higher than the alternative;
- High transaction costs for information or advice.

III. FURTHER RESEARCH

Sustainable energy consumption in buildings and ecoinnovation diffusion involves a complex, socially embedded and socially constructed market. Further research will focus on application of a system dynamics approach to explore the short, medium and long term impact of different policies promoting ecoinnovations in building energy efficiency sector. This approach will enable to make the relationship between cause and effect explicit in complex, dynamic systems that have delays, feedbacks and non-linearities.

IV. REFERENCES

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