Sustainable housing policies and the environmental potential of the existing housing stock in Europe

Minna Sunikka, MSc

OTB Research Institute for Housing, Urban and Mobility Studies.
Phone: +31 15 278 78 39. Fax: +31 15 278 34 50. E-mail: sunikka@otb.tudelft.nl

ABSTRACT
What is the environmental potential of the existing housing stock in the EU and the accession countries? How prepared are the countries to face the challenge of the existing housing stock? This article describes policies and policy instruments currently used to encourage sustainable renovation in Europe based on the national progress reports of the 3rd European Ministers conference on sustainable housing in Belgium in 2002. The research shows that policies and policy instruments focus on new construction. Sustainable renovation is encouraged, but not enforced: legislation applies to new construction and fiscal measures do not address environmental objectives in particular. An examination of policies since 1996 shows that, apart from the initiatives resulting from the Kyoto Protocol, the lack of a strong driving force has kept policy developments moderate. This article argues that current policies and policy instruments are not effective enough to take advantage of the environmental potential of the existing stock either in the EU or accession countries. Different strategies for the forefront, platoon and laggard countries are suggested.

Keywords: housing policy, sustainable built environment, housing stock, renovation, Europe.

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1. INTRODUCTION
Ten years after the UN Earth Summit in Rio countries reaffirmed their commitment to sustainable development in the Johannesburg Summit in 2002. Sustainable housing is a key component in sustainable development. The building sector accounts for 25-40% of the final energy consumption in OECD countries, space heating being the largest proportion of energy consumption in both residential and commercial buildings (Hasegawa, 2002).

Sunikka (2000) and van der Waals et al. (2000) conclude that the real potential for sustainable building and CO₂ reduction lies in managing the existing stock of residential buildings. Yet this area has been largely ignored in research and development activities. A significant proportion of policy instruments for e.g. reducing CO₂ emissions target new buildings while government intervention for upgrading existing buildings has been modest (Hasegawa, 2002).

This article examines sustainable housing policies in Europe in relation to the potential of the existing housing stock. It aims to answer the research questions: what is the environmental potential of the existing housing stock in the EU and accession countries? How prepared are the countries to face the challenge of the existing housing stock? This is observed in policy context, legislation, fiscal measures, labelling and best
practices. Recent policy developments are examined. In order to recognise effective strategies the countries are grouped by their advancement in sustainable housing as either the forefront, platoon or laggards. Finally, opportunities for sustainable renovation and management in Europe are discussed.

This article is based on the national progress reports of the 3rd European Ministers conference on sustainable housing that was held in Genvalle, Belgium, in 2002 (Novem, 2002a). Before the meeting the Ministries in the EU and accession countries received a questionnaire on addressing the existing policy context, policy instruments (legislation, taxation and other instruments), priorities, best practices and future directions. Sustainable housing was defined from construction, social, economic and eco-efficient points of view. The meeting aimed to develop the idea of sustainable development in housing policies, to promote the implementation of measures, to improve information exchange between countries and to identify areas of common interest and possible policies at a European level (Novem, 2002b). The results of the meeting were used at the UN Earth Summit in Johannesburg in 2002. The reports from the 1st European Ministers conference on sustainable housing in Copenhagen in 1996, and the 2nd European Ministers conference on sustainable housing in The Hague in 1997 were used as a reference source for the present study (MVROM, 1996; Seijdel, 1997).

2. THE ENVIRONMENTAL POTENTIAL OF THE EXISTING HOUSING STOCK

In the Kyoto commitment, the industrialised countries agreed to reduce their total level of CO\textsubscript{2} emissions in 1990 by 5.2% between the years 2008 and 2012. The European Union is preparing to implement the commitment as a community, where its emissions and restrictions are studied as an entity. According to Kyoto article 4, the division inside the European Union is, e.g. Finland 0%, the Netherlands -6%, the UK –12.5% and Germany –21%. The comparison years cited are 1990 and 2010. New housing production in the EU is 1.9 million units per year, or approximately 1% of the building stock. Dwellings are demolished at a much lower rate than they are built, so the existing housing will make up an increasing proportion of dwellings over the next 50 years. Dwellings yet to be built will constitute 15% of the total housing stock in 2020 and 5-10% of the total housing stock in the Kyoto period in 2008-2012 (Novem, 2002b).

Despite the relatively good condition of housing in the EU, renovation can reduce energy costs and energy demand, forestall increase in demand for new housing and improve the indoor air quality. The environmental potential of the existing housing depends on the age of the housing stock and the level of norms in building regulations. Important parameters in renovation are the service-life target, acceptable pay-back time and the ownership position. Another challenge that needs to be examined in the future is the choice between the renovation or demolition of a problematic housing estate with the resulting environmental impacts. In the Netherlands a 3.6 Mton CO\textsubscript{2} reduction could be achieved from existing housing if an average investment of € 2,300 per dwelling was made and the energy tax was increased 2.5 times to shorten the pay-back time (ECN/RIVM, 1998). Another study by Slot et al. (1998) estimates the CO\textsubscript{2} reduction potential to vary between 13-44%, which implies a reduction of 3.1 to 10.6 Mton, depending on the effectiveness of the measures used. In practice, the implementation of ambitious measures is limited due to costs and long pay-back time, but an average investment of € 954 could already ensure a 13% saving.
The energy saving potential in the accession countries equals, and exceeds, the EU countries. Previously, inexpensive gas imports from the Soviet Union did not require much attention to energy efficiency, but the situation has changed and energy prices that have been artificially kept low with subsidies are expected to rise. All the accession countries have a large stock of pre-fabricated concrete housing with reinforced concrete foundations, double-glazed windows with wooden frames, flat roofs and lightweight concrete external walls, built in the sixties following the Soviet example. Problems are caused because of the flat roofs, weak joint points in structures, corroded pipes and weaknesses in the engineering systems. Due to external wall structures, poor ventilation and lack of control in district heating leads to an uncomfortable indoor climate, regardless of the season (Sinha, 2001). In Slovenia, the energy saving potential that could be achieved by renovating the existing block housing is estimated to be 60%, although economically viable energy-saving may only reach 29% if a payback time of less than 10 years is considered feasible (Sijanec Zavrl, 2001). If the existing housing was brought up to the current requirements in building regulations in Lithuania, 45% energy saving would be possible. If thermal insulation was improved in pre-fabricated housing in Latvia, which accounts for the total 20 million square metres, an energy saving potential of 50% could be achieved. However, the renovation costs to achieve this objective are estimated to be 5.5-6.3 billion USD in Latvia (MVROM, 1996).

3. THE EXISTING STOCK IN SUSTAINABLE HOUSING POLICIES

Policy context
Policies to regulate and promote sustainable housing have been developed in all the EU countries, using instruments ranging from mandatory norms to guidelines that can be
applied voluntarily. Most countries rely on the environmental consciousness of the market actors and avoid the use of strict methods in their policy approach. In the accession countries sustainable housing is a new issue, but the need for renovations and energy efficiency is considered as a priority in housing policies. Economic conditions, however, limit the use of policy instruments such as legislation and subsidies.

In the national progress reports the Ministries of the Environment in each country were asked to evaluate the importance of the listed sustainability issues in their sustainable housing policies. Priorities were presented from construction, social-economic and eco-efficient points of view, on a scale from ‘not important’ to ‘very important’. No distinction was made between new and existing housing. The results show that energy saving and economic aspects like housing affordability are considered as very important objectives in housing policies in all the countries which responded. Several social aspects were considered of little importance in sustainable housing policies, especially in the EU countries (Novem, 2002a). However, the need for renovation is usually caused by social and economic problems and cannot only be solved by physical improvements. Traditionally, renovation of the residential stock has been based on technical modifications, but these operations have not been sufficient to resolve problems that exist and new strategies, e.g. a neighbourhood approach, have increasingly been adapted (Priemus et al., 2000). Current sustainable housing policies, however, are not closely linked to urban renewal.

**Legislation**

Regarding the priorities in sustainable housing policies, environmental requirements that are housing related are focused on energy in new construction and include regulations for indoor air quality, waste and emissions of hazardous material substances in the EU countries. Due to EU directives and national Kyoto strategies, many measures are now being established through environmental legislation. A comparison of the maximum allowed thermal transmittance values, the U-values, shows that, even in the
forefront countries, the level of building regulations could be more ambitious. For example, in the Netherlands, the U-value requirements for exterior walls and base floors in current regulations are at the level of Finnish thermal regulations of 1971. Furthermore, the U-values for roofs are at the level of Finnish building regulations of 1951.

The level of building regulations norms is lower in the accession countries than in the EU countries. In sustainable housing policies, the accession countries state their willingness to bring their current building regulations in line with EU standards and to also implement the new standards in the existing stock. When energy efficiency is recognised as a basis for sustainable economic growth, the situation improves and new thermal regulations, e.g. in Bulgaria, are approaching the EU standards. Apart from thermal insulation requirements in new construction, there is no general legislation for sustainable housing in the accession countries. Furthermore, the legislation institutions remain complicated and slow and so the building regulations are not always obeyed in practice.

An OECD report on sustainable building policies concludes that enforced mandatory standards appear to be the most effective instrument for achieving energy efficiency in buildings and, despite difficulties in setting standards of substantial impact, there may be room for upgrading and improving their effectiveness in many OECD countries (Hasegawa, 2002). It has to be considered, however, that building regulations can never affect the majority of buildings, since they apply to new construction. The implementation of new mandatory standards on the existing housing stock can also cause unbearable renovation costs for the inhabitants.

**Fiscal instruments**
All EU countries and the majority of the accession countries use environmental tax measures to support environmental objectives and to apply the polluter-pays principle (PPP) that has been adopted by the OECD countries. In most EU countries, the Ecological Tax Reform has been introduced. However, these taxes are only indirectly related to housing and their impact on practice remains small.

A reduced Value Added Tax (VAT) rate is a taxation measure that can be used to encourage environmental investment in housing. For example, the UK, Belgium and Luxembourg apply a reduced VAT rate to renovations in order to encourage maintenance of the existing stock. In France, the 5.5% VAT is combined with a subsidy and, according to the social housing sector in France, this has enabled improvements for energy efficiency (Sunikka, 2001). However, apart from a number of measures to favour energy efficiency, the reduced VAT rate is currently used without specific environmental criteria. The accession countries do not report using the reduced VAT rate as a policy instrument.

Subsidies are often wanted by the market actors in order to implement sustainable building in practice (Sunikka and Boon, 2002). All EU countries have established some subsidies for improving energy efficiency in new construction, but general subsidies to support sustainable housing and renovation are not common. However, subsidies need tax revenue and do not implement the polluter-pays principle.

Due to financial restrictions, subsidies are therefore seldom used in the accession countries.

**Labelling**
An environmental label for housing can give consumers a sense of assurance that they are getting value for their investment and therefore increase their interest in sustainable housing and stimulate market demand. The fact that energy labels for domestic appliances, with energy ratings from A to G, have increased sales of the A-labelled goods, associated with good quality and long-term financial savings, supports the development of environmental labelling of housing.

In the EU countries, energy labelling for housing has been developed, but is not implemented widely. In Denmark, a labelling scheme of buildings (Energimaerkte) is used as a policy instrument to improve the energy and water efficiency in new and existing housing when sold to a new owner. This labelling policy has managed to have some impact on the existing housing stock, traditionally a complex policy issue. In Finland, the use of the environmental assessment and classification system for buildings (PromisE) has recently been developed and its application is voluntary. The environmental classification is conducted on the basis of the consumption of natural resources, waste and emissions, the bio-diversity of the construction location, transport and service, environmental risks and health aspects. The outcome is based on indicators for measurable ramifications and on performance aspects. The aim is to enable the use of the assessment documentation as an attachment to official procurement documents and contracts (Huovila et al., 2002). The initiatives to develop indicators have also come from the building industry where it is seen to increase the property value. For example in Austria, a building certificate for apartment buildings (Mischek Oekopass) was developed in liaison with the leading developer and builder in Vienna who aims to receive it for all its residential buildings (Belazzi and Lipp, 2002).

In the accession countries, energy labelling of the existing residential stock has been introduced in some countries, but sustainable housing labels in general do not exist.

Best practices
In the country progress reports, both the EU and the accession countries also present renovation projects as best practices in sustainable housing. The demonstration projects confirm the potential of the existing stock discussed in section 2. In the Czech Republic, a 40% reduction in thermal energy demand was achieved in the renovation of pre-fabricated apartment blocks. In the Baltic countries, the tenants’ energy bill for heating and hot water was reduced by 33% by improvements in heating installations with a payback time of 6-10 years (Novem, 2002a).

However, there exists a gap between the subsidised demonstration projects and follow-up activities both in the EU and the accession countries. For example, in Bulgaria experiences obtained from sustainable renovation projects were positive, but the inhabitants stated that the improvements would not have been economically feasible without subsidies (Groseva, 2001).

4. POLICY DEVELOPMENTS
An examination of policy developments since the 1st European Ministers conference on sustainable housing in Copenhagen in 1996 shows that sustainable policies and policy instruments in the housing sector have improved slowly. In 1996, most European countries had not yet formulated a policy plan for sustainable housing. In the countries that had policy plans, measures focused on energy-saving in new housing and at the building level instead of a neighbourhood. Legislation and subsidies for energy...
efficiency in the residential stock had been introduced in 1996, but on a small scale. Some countries, e.g. the Baltic States, emphasised updating the existing dwellings to the current standards, but in general the attention was focused on new construction.

Lack of motivating factors, feared costs and low market demand have kept the progress in sustainable housing policies moderate, despite the amount of subsidies that governments have invested in environmental research and development. Most initiatives relate directly or indirectly to the Kyoto Protocol and the EU directives. The Kyoto Protocol has had a positive impact on the development of national climate strategies both in the EU and the accession countries. It has to be considered, however, that 1994 is considered to be a culmination in policy-making (MVROM, 1996). Therefore, the developments would be more striking if an earlier year was studied.

5. THE FOREFRONT, PLATOON AND LAGGARDS
An examination of the country progress reports shows that at the moment Germany, the Netherlands, Sweden and Denmark are the forefront countries in sustainable housing in Europe. These countries have established sustainable housing policies and policy instruments that include the existing housing stock and deal with environmental measures more widely than just energy efficiency, e.g. considering materials, waste management and water saving. However, recent market research in the Netherlands and Sweden show that the implementation of sustainable housing at a wider level is limited by the lack of market demand and feared negative impact on short-term profits (SBR, 2001; Baumann et al., 2002).

The need for sustainable renovation is recognised in sustainable housing policies in Austria, Belgium, Finland, France, Ireland, UK, Spain, Italy, Greece, Portugal, the Czech Republic, Slovenia and the Baltic states. In these platoon countries, guidelines and assessment methods for sustainable housing exist. Energy saving is considered of high importance, but other aspects of sustainable housing like good indoor air quality, water-saving measures, and the recycling of building materials receive less attention. Furthermore, effective policy measures such as legislation and taxes to improve environmental performance of the existing housing stock have not yet been implemented in practice.

Bulgaria, Romania, Poland, Malta and Cyprus are currently the laggards in sustainable housing policies in Europe. Due to heavy problems in the existing stock, sustainable renovation is of great concern in housing policies in these countries of low Gross Domestic Product (GDP), but housing policies have to tackle fundamental problems that take priority over environmental improvements. The laggards do not have much knowledge and experience of implementing sustainable housing in practice. Sustainable housing is a new concept and guidelines and measurement tools have not yet been developed.

6. CONCLUSIONS
Regarding the environmental potential of the existing stock and the policy measures taken in the EU and the accession countries, it can be concluded that current policies and policy instruments are not effective enough to meet the potential of the existing housing stock and reach the Kyoto targets. Financial barriers remain a major problem to sustainable housing, especially in the accession countries, where the economic situation means that the industry uses the cheapest building methods.
The use of policy instruments depends on the economical and political situation in the country. It appears that voluntary policy instruments e.g. subsidies and labelling, are in general a more suitable way to support the renovation of the existing housing stock than the use of mandatory measures e.g. legislation and taxes. The use of enforced policy instruments on the existing housing stock can create resistance in practice and it is difficult to set the standard high enough to have any real impact. However, voluntary instruments are by no mean self-policing and their use needs to be enforced by legal means.

An overview of developments since 1996 shows that initiatives in national policies have mainly resulted from the Kyoto Protocol and, therefore, progress has focused on energy savings and EU-directives in the EU countries. The importance of the residential stock in energy-saving and the reduction of CO₂ emissions have only recently been recognised politically. The contexts in sustainable housing policies are extending towards the existing stock, but this progress is happening very slowly.

It has to be recognised that the countries studied are in different stages of implementing sustainable housing and, therefore, need different strategies and instruments to profit from the potential of the existing stock. Recommendations for the forefront, platoon and laggard countries are presented in section 7.

7. RECOMMENDATIONS

The forefront have to make sustainable housing mainstream
In the forefront countries, sustainable housing is a recognised issue, but its wider implementation has to be ensured. In this process of increasing the market interest for sustainable housing, environmental labelling, standards such as the ISO 14001 and influence on users’ attitudes can play an important role, if enforced with legal backup. Furthermore, sustainable housing policies still neglect social issues too much. The withdrawal of the welfare state, the political significance of safety and increasing economical and social inequity can all contribute to the political shift to the right that has recently happened in the Netherlands and Denmark. Regarding the policy context, the forefront should extend their policies towards the social aspects of sustainable housing.

The platoon needs to look beyond energy saving
In the platoon countries, policy measures to improve energy efficiency in the existing housing have been introduced. However, the policy scope should be wider and more attention needs to be targeted on other aspects of sustainable housing e.g. materials, waste, good indoor climate and social aspects. Since the market demand for sustainable housing is still low in platoon countries, sustainable housing policy needs to be government-led. In order to support implementation of the policy, the level of norms in building regulations should be raised, preferably with the backup of EU directives. The introduction of environmental taxes is also a strong signal to the market actors. However, voluntary measures, e.g. information dissemination and establishment of subsidies, are equally important measures in sustainable housing policies.

The laggards have to focus on a few areas
In countries that are lagging behind in sustainable housing, there is still a need for guidelines and assessment methods to specify and assess sustainable housing. Since this information already exists, the forefront and platoon countries should take responsibility
for taking their knowledge to the laggard countries. Due to serious institutional problems related to housing, there is a need to focus on a few sustainability priorities, such as energy saving. Government has to lead the sustainable housing process in the laggard countries. These countries, that are all accession countries, aim to bring their building regulations to EU standards and renovate the existing stock to meet the current regulations. The enlargement of the EU and development of directives provides an opportunity to support them in achieving this target.

8. REFERENCES


