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The ECO-BUILD project

Deliverable 2

Executive Summary

National and regional policy measures for improving the energy efficiency in the building sector

1 Executive Summary

This report comprises the second deliverable of the ECO-BUILD Project, funded under the EU FP6. The main focus of this document is on national policies and corresponding measures that have contributed to the reduction of energy consumption and increased energy efficiency in the building sector in Austria, Germany, Italy and France. Emphasis is placed on the national transposition of the European Union Directive 2002/91/EC on the Energy Performance of Buildings (EPBD) and complementary legislation is taken into consideration guiding the building sector in the respective countries. The impact of the EPBD and related initiatives and financial measures are explored with the aim of providing a contextual framework as to the type and impact of policies on energy demand in the building sector in the four countries examined.

The main findings of the report relate to the importance of the building sector in reaching European and national goals for greenhouse gas reductions and the success or failure of certain initiatives on the national level. The following summary presents the main results and conclusions of the analysis undertaken for this report.

1.1 Energy Demand is Growing

Energy consumption within the building sector continues to grow. National energy consumption in each of the four target countries of Austria, Germany, Italy and France differs slightly by sector, yet is dominated by transport and households (buildings) overall. Household final energy consumption increased by about 16% over 1990-2005 within the EU-27, as rising personal incomes permitted higher standards of living, with increases in comfort levels and the ownership of domestic appliances. This global trend was also reflected in Europe. Consumerism has increased the share of household appliances to approximately 21% of residential energy use, surpassed only by space heating and cooling demands. The GDP-energy nexus is exemplified in Austria, which recorded an increase of 15.3 % in the average size of dwellings and a sharp rise in absorption rates for electrical household appliances of 110% for dishwashers and 402% for clothes dryers, boosted by higher, yet modest growth rates of 2% in 2004. Consequently, energy efficiency gains due to technological advancements in Europe are being offset by increased consumption attributed to a lack of environmental consciousness and limited understanding of energy saving practices.

1.2 Limited Policy Impact

The Kyoto commitments, enveloped in the EU 20-20-20 targets, are a paramount policy driver for reducing energy consumption. Yet, the national approaches and impacts have been mixed, underlined by varying levels of political commitment and measures implemented. According to the Climate Change Performance Index (CCPI) for 2009, Germany and France ranked high on account of successful legislative measures, whilst Austria and Italy were rated poor in the same context. However, according to Germanwatch and CAN-Europe, the publishers of the index, no country has demonstrated leadership and the genuine fortitude to bring about the necessary paradigm shift towards an integrated environmental consensus.

The EPBD is one of several EU policy directives aimed at promoting change in the building sector through harmonized standards, certification and inspections of systems. Complementary measures that have had important impacts are contained in the Directive on the Promotion of Electricity from Renewable Energy Sources in the Internal Electricity Market (2001/77/EC), which has encouraged countries such as Germany and Italy to mandate use of renewable technologies in certain building scenarios. Moreover, the Energy Efficiency Directive is playing an important role in delegating responsibility to other sectors and mandating power companies to meet specific energy saving targets, which, in turn, have fostered information campaigns on efficient practices targeted at households and property owners. Consolidating the fragmented building industry around harmonized building product standards is the challenge of the Construction Products Directive (89/106/EEC) and pending regulation underscoring the concept of life cycle planning. The impact of such normative measures has yet to be fully assessed, but initial indications as regards EPBD implementation to date suggest that a lack of expertise and legislative discrepancies on national and regional levels, weak political will and a lack of co-ordinated support on the part of stakeholders have thwarted significant energy savings in the building sector.

1.3 National Energy Policies and Implications

National policies are the means by which EU legislation is transposed to the country level. In such, national energy policies set the framework for measures undertaken by multiple sectors and help steer the role of institutional actors in practical implementation. By nature, they also prioritize local interests and place inherent values on energy resources. Respectively, the four target countries have adopted varying national policies each responding in their own way to the EU's strategic parameters of sustainability, competitiveness and security of supply.

The **Austrian** Climate Strategy seeks to co-ordinate measures on different political levels and reduce energy consumption in eight sectors to meet the national Kyoto commitments. Its main three components include:

1. An assessment of currently available technologies that may lead to improvements in energy efficiency, ideally making use of available local sources of renewable energy.
2. Development of renewable technologies with long-term promise for reducing greenhouse gases.
3. Increase in cost efficiency using the flexible instruments for emission trading via the JI/CDM programme and the EU CO₂ Emission Trading Scheme.

With its regionalized governmental structure, Austria has struggled to promote greater energy savings on the national level. Harmonization of technical building codes and energy targets aiming at alignment with subsidy levels across regions was initiated with the adoption of Article 15A to the constitution in 2004, constituting a paradigm shift in the country's policy making. The Austrian experience has demonstrated a strong correlation among subsidy levels, energy targets and retrofits, underscoring the importance of institutionalizing common parameters to generate greater impact. Ambitious energy consumption targets have been proposed with thresholds of 36 kilowatt hours per square meter annually (kWh/m²/a) for new single dwellings and 20 kWh/m²/a for new multi-storey buildings, as compared with current levels of 90 kWh/m²a for multi-single family houses and detached houses estimated at 200 kWh/m²a. Demand for public subsidies indicates € 100/m² as the average breakeven point for households to perform retrofit action. In addition, Austria's continued reliance on oil for residential heating has encouraged a greater investment in research for the development of renewable technologies with an emphasis on utilizing local resources such as biomass.

Germany's Energy Saving Regulation (Energieeinsparverordnung – EnEV) of 2002 - already amended twice: 2007 and 2008 - has been amongst the most important normative measures for buildings, despite an implementation deficit of 0% - 25%. Lessons learned indicate the need to ensure policies are enforced and incorporate monitoring and enforcement mechanisms from the outset and are reinforced by adequate budgets for financial assistance and incentives. Moreover, enhancing awareness and training opportunities and initiating legislative changes to allow energy saving contracting to play a larger role would augment energy savings across building types. Germany's CO₂ Building Refurbishment Programme has had a positive employment effect as well as helped in reducing energy consumption and CO₂ emissions. Research shows that in 2005 around 55.3 kg/m²a CO₂ were saved per subsidized m² of floor space in one and two-family houses, whilst the figure was 47.5 CO₂ kg/m²a in 2007. This was due to a mix of solutions involving higher levels of insulation and the increased use of renewable technologies (biomass, solar, PV) and has served to highlight the paradox that a

reduction in the rate of CO₂ emissions does not always correspond to an equivalent reduction in energy consumption. The latest Renewable Energy Heating Law 2009 (*Erneuerbare-Energien-Wärmegesetz – EEWärmeG*) is a complementary policy measure instrumental in promoting the use of renewable technologies in the building sector, mandating that 14% of energy used for heating is to come from renewable sources by 2020.

Italy's policies for energy performance in buildings has followed two tracks: the first being a 'normative-prescriptive' approach, adopted by the L. n.10/91 'Regulation for the implementation of the National Energy Plan regarding the rational use of energy, energy savings and the development of renewable energy sources' and the law 192/2005, transposing the EPBD Directive. The second method involves the 'White Certificate' system and follows a cap and trade approach. However, policy has been hampered by incomplete implementation and poor enforcement, resulting in limited effect on the national level. The 'White Certificate' system, first introduced in 2001, was postponed until 2004 as part of a broader system reform, but it holds valuable promise for future gains in energy savings. The 2007 and 2008 Finance Acts (Law 296/2006 and Law 244/2007) were instrumental in finally providing economic incentives for energy savings in the household sector for legislation dating back to 1998. The 2007/8 Acts, in particular, provided a tax credit equivalent to 55% of the costs for enhancing energy efficiency through heating system upgrades, retrofitting the building envelope and small building renovations amortized over a period of 10 years. In its first year of implementation, 29,000 requests for tax credit were received, with estimated average costs of €8,800 per energy efficient refurbishment, and translated into primary energy savings equivalent to 5MWh per year and mitigation of approximately 1,1T/ year of CO₂ per household. One of Italy's most successful programmes has been the Ministry of Environment's '10,000 PV Roofs National Programme', which supports the installation of small photovoltaic energy systems (PV systems), ranging from 1 kW to 20 kW, on buildings, roofs and terraces and helped by grants covering up to 75% of costs. A component of the programme entitled 'The Sun in Schools' benefited public and teaching institutions and coupled PV equipment and environmental and energy education for students on the national and regional levels.

The **French** Energy Law of 2005 adopted a novel integrated approach and set targets for energy efficiency and CO₂ reductions of 2% per year by 2015. Moreover, the law introduced a system utilizing 'white certificates' as a tool to raise awareness across sectors as well as a sense of shared responsibility for reducing energy consumption and improving the national carbon footprint. The Energy Law was complemented by the National Climate Plan of 2004, which proposed additional measures to comply with the Kyoto commitments and specifically targeted energy savings in buildings with the new thermal regulations of 7.3 MteCO₂ (of savings) for households and 3 MteCO₂ of savings in public and private services. The French National Energy Efficiency Action Plan (NEEAP) emphasizes

demand-management in buildings as a key priority for reducing GHG emissions by a factor of four by 2020 and was supplemented by the Grenelle de l'Environnement Initiative, promoting multi-sector public dialogue on environmental issues. France's use of public awareness campaigns and information/advisory centres has been a preferred and valued tool in communicating energy efficiency practices and reaching out to a broad population base. Similarly, France's use of VAT tax reductions has been an important part of the country's energy strategy. Of a total of 25 million French households, 7% have benefited from energy retrofitting actions utilizing the VAT reduction, with 61% of households (in 2002) taking energy efficiency measures and generating an estimated investment of €2,640 per household.

Comparatively, the four countries have placed different policy emphasis on energy resource use in the building sector. In general support exists for the utilization of renewable energy technologies advanced by various types of financial incentives. Germany and Italy have mandated the use of renewable technologies in certain building types; policies respectively backed by subsidy schemes and tax credit. While Austria has seen an increase in the use of biomass and solar thermal for heating, policymakers have resisted from legislating such implementation preferring to generate action through provision of subsidies. France's use of VAT credits is promoting greater use of renewables; while on the other hand, the country has also adopted policies requiring energy suppliers to meet specific reduction targets by working with building owners and residents to increase efficiency practices.

1.4 MURE Database Analysis

An analysis of the household sector of the MURE Database (Measures d'Utilisation Rationnelle de l'Energie) undertaken by ICCR formed part of the ECO-Build Deliverable with the aim of building on existing information and learning about the inter-relationship between multiple policy measures. The following key results are highlighted:

- France exhibits the most diversified portfolio of policy measures, yet with the use of tax credits accounting for more than 20%.
- Germany demonstrates the greatest number of policy measures underway, with a total of 47, of which an estimated 1/3 have been completed. This reflects the country's comparatively early start with energy efficiency initiatives for the household sector.
- Italy evinces a disproportional preference for legislative action with more than 50% of total measures, yet the impact of actual implementation is

questionable, given the lack of either financial incentives or enforcement controls to reinforce policies.

- In Austria, financial subsidies are the key driver for energy efficiency actions and instrumental in ensuring that legislative measures are effective.
- In France, VAT tax reductions for energy investments, tax credits for efficiency renovations and the use of renewable technologies have resulted in the greatest impact over time.
- In all of the four target countries, tenants were among the least targeted groups, raising the question as to how best to address the issue of split incentives, the landlord-tenant dilemma or the challenge of developing strategies for changing end-user behaviour.

1.5 Conclusions and Recommendations

- **Need for heightened environmental consciousness:** The global financial crisis has prompted a time for reflection and re-prioritization of values, as it coincides with post-Kyoto negotiations and a deterioration in natural, economic and personal resources. These parallels represent an ‘opportunity in crisis’ and a unique chance for governments and individuals alike to re-assess personal, social and environmental values. It is an opportunity for governments to exert leadership to orientate policies towards broadening understanding of sustainability and the interdependence of nature and mankind. Through the concerted efforts of the EU and its Member States, it is an opportunity to encourage a change in behaviour and a higher level of environmental consciousness. This can be initiated through a series of educational and awareness-raising campaigns and demonstration activities, targeting all sectors of society, to understand the time urgency of environmental targets and required actions to meet them. Italy’s ‘Sun in the Schools’ programme, in which PV systems and environmental education were provided to primary and secondary institutions, is an example of a valuable initiative coupling technology and information to cultivate sustainable and long-term results.
- **Greater policy impact through monitoring and enforcement:** Strong national frameworks with supporting mechanisms for information dissemination, enforcement and monitoring are essential for promoting a unified and sustained policy impact. In this respect, attaining the necessary and higher levels of energy savings requires policies structured with long-term horizons and ambitious targets coupled to strong political leadership to ensure strategic consistency and fiscal support. Similarly, policy amendments should be reinforcing and promoting, building upon and correcting previous experiences, in order better to penetrate industry and related sectors. Monitoring mechanisms are essential in this respect, as are enforcement measures to ensure compliance, with the energy performance certificate providing a good example. Dissemination of information on legislative acts from the national level to local and regional governments on a timely basis and with clarity of intention and division of responsibility helps mitigate potential problems of competences and implementing authorities and ensures a harmonized policy position.
- **Financial incentives boost energy savings:** Encouraging refurbishments on a large scale to affect national carbon footprints requires financing from both public and private sources. The strong correlation between the availability of subsidies and energy efficient retrofits gives governments the opportunity to link ambitious energy saving targets to financial assistance. Public financial incentives, such as

subsidies and grants able to be leveraged by private instruments like 'green' loans or lines of credit, are important to reduce short-term financial investment, amortize the balance over time and to accelerate the rate of retrofits. More innovative incentives, apart from deductions from taxable profits, are needed to address the issue of split incentives and allow landlords to realize the benefits of energy savings for multi-family buildings. Greater consideration should be given to the UNECE Committee on Housing and Land Management proposal for an 'energy inefficiency tax' as a means by which landlords with energy inefficient buildings are taxed until they meet energy performance standards. Such a scheme could also serve to influence the real estate and property management sectors and increase the appreciation for and value of energy efficiency measures.

- **Increasing role of energy suppliers:** In the current global environment, it is essential that power companies are encouraged to adopt a new energy paradigm that conveys a realistic valuation of energy costs (fully incorporating externalities, e.g.. GHG emissions) and embraces modern technologies effectively to control and modulate the varying energy consumption levels of society and particularly of buildings. The EU Energy Services Directive (2006), which mandates the role of suppliers in energy savings initiatives, is an important complement to the EPBD and offers significant energy savings opportunities under a proper policy regime. Examples are offered by countries such as France and Italy, which have made good use of White Certificates to oblige energy suppliers to meet specified energy targets and work with their customer base, predominately in the residential sector, to foster efficiency behaviour. Increased partnerships between the building trade and energy companies offer new avenues in integrated building design and management, increased use of renewables through improved feed-in tariffs and advancements in the concept of buildings as power plants or energy producers. Such actions will, in turn, help drive down prices for renewable technologies and enhance market penetration.
- **New orientation for the building industry:** Buildings are multi-dimensional in their planning, construction and management and therefore warrant a broader orientation incorporating life-cycle and multi-disciplinary inputs in order better to promote cost-effective, energy-efficient and sustainable end products. Whole-system design approaches, including both passive and active measures, can reduce energy use by as much as 70% (WBCSD 2009). Tools, particularly ICT-enabled ones, with such examples as the Building Information Model (BIM), have the potential to reduce emissions in buildings by 15% by 2020. The holistic and integrated approach offered by such tools can reduce communication errors among construction project participants and greatly facilitate planning as well as

incorporate maintenance operations often overlooked, yet vitally important for buildings. To encourage use of more sophisticated methods by building professionals and practitioners on a large scale, technical training is necessary at all levels, coupled to the ultimate institutionalization of such practices in vocational/trade schools, academic institutions and industrial associations. The WBCSC Energy Efficiency in Buildings Report, 'Transforming the Market', goes further in suggesting the establishment of the new industrial profession of 'system integrator' to function as a facilitator among the various craftsman, technicians and building professionals with the competences to ensure the necessary synergies and energy-efficient parameters are met. Such a position would be particularly valuable in refurbishment work, requiring the greatest energy efficiency measures, and could serve as a means to encourage industry to reset its sights on renovation rather than new construction.