

Strategies and Measures for Accelerating the Market Deployment of *Sustainable Housing*

Gerhard Faninger

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1. Background

Strategies and measures for accelerating wide-spread market deployment of *Sustainable Housing* have been receiving greater attention in recent years as the market for energy-saving building constructions as well as for renewable energy technologies accelerate and show greater promise in developing and transition economies. Strategies and actions to increase the scale of deployment must be designed on the basis of confidence in technologies and markets.

To facilitate more rapid deployment of *Sustainable Housing*, it is important that people understand the advantages of using energy-efficient houses in the context of the full range of their benefits, in contrast to the environmental and other consequences of using energy derived from fossil fuels because of their apparently lower cost.

2. Instruments for market accelerating

Markets can be accelerated by working with governments and the private sector in five basic ways:

- clarifying and adopting the right policy frameworks.
- accelerating “learning investments”.
- increasing demand and confidence.
- strengthening “national systems of innovation” to link RD&D with markets.
- understanding economic, energy, and environmental benefits and potential adverse impacts.

The market share of *Sustainable Housing* can be greatly facilitated by establishing a *transparent framework and rules* from government to support during the market entry phase, and then competition within the mature market (i.e., through dispatch and pricing).

“*Learning investments*” represent the deployment expenditures that need to be made to bring a new technology to the point of commercial competitiveness. Learning investments lead to reduced costs through the accumulation of hands-on experience (“*learning by doing*”). As individuals and industries gain experience with technologies through a competitive market, they learn to improve technology and implementation costs. For example, the installation of solar thermal systems was facilitated through the development of *large-scale collectors* with up to 15 m² of absorber area. With this development not only the costs for the collectors and for the installation were decisively reduced but also the problems arising when connecting the pipes by means of prefabricated collector modules. Estimates for renewable energy markets are encouraging.

Learning investments are the commitments by governments and industries to accelerate the progression to market competitiveness of a technology.

The key issues for market acceleration are *understanding and confidence*: Governments, financiers and industry must understand the technologies and have confidences in them. *Experience curves* demonstrate that investment in the deployment of new and sustainable technologies could drive prices down to the point of commercial competitiveness.

Fundamentally, there is a challenge to create a clear “market position” for *Sustainable Housing*, so that their benefits and the ways in which they fit well into local markets are manifest to all concerned. There is a clear message that *Sustainable Housing* offer substantial benefits to consumers and to nations.

3. Realisation of marketing strategy

The realisation of a strategy for wide-spread deployment of *Sustainable Housing* will require:

- increased public awareness of the values and benefits of *Sustainable Housing*, and of the gains to be made by their significant market success.
- continuing innovation and research programmes to reduce costs, improve performance and establish market confidence.
- significant investment by governments to support development of appropriate policy frameworks, market infrastructure and consumer demand, leading to confidence by the private sector in the stable and rapid growth of markets.
- significant investment by the private business and financial sectors in technology, manufacturing, and supporting businesses, as well as projects, to improve performance and costs, and to provide necessary infrastructure, thus hastening the point where commercial competitiveness is achieved.

4. Market barriers for innovative concepts and technologies into the building sector

Market introduction and dissemination of innovative concepts and technologies in the building sector (high efficient insulation, use of solar energy, mechanical ventilation systems, securing of indoor air quality,...) is strongly influenced by different obstacles and supporting factors such as technical, legal, sociological, psychological, ecological and economical ones.

An essential impediment to the market introduction of innovative residential buildings is that most planners, builders, building contractors and residents have only a remarkably low level of specific knowledge concerning energy- and resource-efficient buildings. The lack of information on side of the potential users of a building causes a low demand for such dwellings.

Many actors in the building sector are organised as private enterprises whose main interest is to maximise profit. They usually have no interest in minimised technical systems and because of lack of information they are confronted with additional transaction costs if they would go for innovative concepts. Higher design costs which cannot be calculated for reasons of competitiveness as well as less material input (and thus less returns) through optimised constructions and minimised technical systems are a big obstacle to more engagement of the relevant actors. See chapter “Towards sustainable housing in Austria”.

5. Supporting factors for marketing

An essential supporting factor concerning the market introduction of innovative residential buildings is the engagement of single technically and / or ecologically motivated actors who push projects forward with a high degree of personal commitment. Further motives on side of the dwellers to choose a highly innovative building are the expectance of a highly comfortable and healthy dwelling environment, but also the wish to present something special to the outer world and thus gaining status. The acceptance of innovative residential buildings is strongly supported by a high level of identification with the building which mainly depends on the degree of participation during planning and building and the status of ownership.

To achieve more rapid diffusion and further development of innovative residential buildings measures from the federal and provincial governments have to be taken. Regulations prescribing significantly higher insulation standards are expected to be very effective and to play a key role in triggering other technologies whose acceptance and economic application depends on an optimised building envelope. The development of certified standardised single components and complete solutions, for which producers can give warranty, will also speed up the diffusion of innovative buildings. Individual options for the supply of remaining heat demand which fulfil the criteria of *sustainability* on the one hand and support a high degree of identification for the user on the other hand, should be offered. Energy savings must have an effect on the energy bill of a resident and must not be weakened by collective billing arrangements in centralised systems. A high degree of personal identification with the building should be one of the major goals when dwellings are allocated within the scope of “social housing”. This can be achieved if the potential future resident may have the choice between an apartment in the innovative building and another apartment in a more “conventional” building. The way how residential buildings are subsidised has to be rethought. Subsidies should be based on a least cost strategy with minimisation of energy consumption and a sustainable supply of remaining heat demand as the major objectives and be harmonised on a national level. Subsidies should only be given if independent information centres whose task is to supply and spread information offensively (which still have to be created) are already integrated in the planning stage of a building.

Last but not least, the ecological relevance of tax systems has to be improved. The inclusion of external costs in the price of fossil energy carriers enables an objective economic comparison between fossil and renewable sources of energy.

Successful dissemination will in the long run depend on better matching technical and planning concepts to the needs and expectations of users. The improvement of low energy house technologies has to be organised as a mutual learning process of component producers and users (users in a wide sense, i.e. professionals, companies, building societies, etc.).

6. Criteria's and directions for sustainable housing

Buildings can be much more *sustainable* on average than they are currently. To achieve this goal, concepts for efficient-energy building design have to be defined and realized within *integrated building planning*, considering energetically, environmentally, economically as well as social aspects.

To meet the goals of energy-efficient buildings and to achieve a sustainable built environment it is necessary to define *common criteria and directions* for the whole building sector and to investigate and present policies and strategies to enhance urban sustainability.

To achieve energy-efficient buildings with good thermal comfort and indoor air quality the building envelope has to be optimised. Energy-efficient buildings are characterized with a high insulation standard. The performance assessment of insulation materials includes the thermal performance and aspects of environmental impacts, durability, reliability and life-cycle cost-effectiveness. Such a method will facilitate selection of components and enable comparative performance to be made.

7. Heating systems for sustainable housing

Efficient heating systems are a necessity for the realization of *sustainable buildings*. Today advanced efficient heating technologies are introduced on the market: energy efficient oil- and gas burners, biomass technologies with reduced emissions as well as co-generation plants and district heating with minimized heat distribution losses. Innovative sustainable heating technologies, including solar thermal, heat pump technologies as well as fuel cells are important new elements in the design of appropriate heating systems for sustainable buildings.

8. Indicators for marketing

The main indicators for the market penetration of *Sustainable Housing* are:

- new building standards for energy-efficient housing - in correspondence to the goals of national energy policy - supported with financial measures and
- the acceptance for new building standards and heating systems by consumers.

Main criteria's for *Sustainable Housing* are: Primary energy for building construction and operation (life-cycle-analysis), share of renewable resources, living standard, cost-effectiveness. These criteria's have to be guarantee by planers, architects and building construction firms.

9. New business opportunities

New technologies and products in the building and heating sector offers new business opportunities. The worldwide markets for buildings are changing. Buyers and tenants are demanding higher performing, more comfortable and healthier buildings. Forward-looking business, communities and energy companies are searching for ways to respond to customer demand. People want houses, offices, apartments and communities in which sound environmental principles are integrated into building architecture and surrounding amenities. New ideas and products are being developed on the world-wide market to respond to their changing demands.

11. Summary and future prospects

There is a general need for increased public awareness and understanding of *Sustainability*, especially for the main players involved in planning decisions (planning officers, local communities, pressure groups, etc.). Greater consideration needs to be given to the potentially useful role that *energy-efficient buildings* and *renewables* could play in meeting these targets and of ways of encouraging their development and deployment. Encouragement needs to be given also to increase research in this area and to improved sharing of information's on this topic.

In the past decade the demand of fuel for space heating as well as for hot water preparation could be reduced remarkably by energy-saving building constructions and by energy-efficient heating systems. Practical research in and demonstration of low-energy buildings as well as new technologies for the heating of buildings have resulted in a number of economical and marketable solutions in the building sector.

In principle, the criteria's of sustainable housing can be reached by all building constructions: bricks, concrete and wood with sufficient isolation.

The market development of sustainable housing and renewable energy technologies require the interest and active contributions by industry in co-operation with research institutions for the development of cost-effective technologies, both for energy saving building constructions and solar thermal and heating systems based on renewable energy sources. High quality could be achieved in the solar thermal sector and in advanced environmentally-friendly biomass heating systems with optimised combustion technology in the last decade. Especially test results led to technical improvements in technologies as well as to common standardisation.

Pilot and demonstration systems have made essential contributions and have apparently contributed to partially overcoming the market barriers for innovative building concepts.

Many examples show, that it is possible, to reduce the fuel supply in buildings by better building insulation standards as well as efficient heating systems with nearly the same investment costs.

Under these circumstances the future prospects for the market deployment of *Sustainable Housing* are favourable.

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