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CARBON MITIGATION IN HUNGARY: CHALLENGES FOR A SUSTAINABLE NATIONAL ENERGY POLICY

János SZLÁVIK*, Tamás PÁLVÖLGYI*, Miklós FÜLE*
and Diana ÜRGE-VORSATZ**

*Department of Environmental Economics and Law
Budapest University of Technology and Economics
H–1521 Budapest, Hungary
**Department of Environmental Sciences and Policy
Central European University
H–1051 Budapest, Nádor u. 9. Hungary

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Abstract

While on a world-wide scale Hungary is a key greenhouse gas emitter neither on an absolute nor on a per capita basis, Hungary recognizes the significance of limiting its greenhouse gas emissions. This paper is based on the Hungarian contribution to a two-year, ten-country research effort, funded by UNEP, aimed at developing a state-of-the-art methodology for the understanding of the economics of greenhouse gas abatement. This paper concentrates on the challenges of the implementation of greenhouse gas mitigation measures. While Hungary has an important cost-effective potential for reducing the emission of carbon dioxide by improving energy efficiency, the implementation of this mitigation strategy is a complex and challenging task. The implementation and financing of energy efficiency measures require the concerted targeting of close to 4 million households, and a wide variety of actors, including banks, the industry, government, international and multilateral organisations, and NGOs. Thus, developing an implementation strategy requires a clear understanding of the existing structures, barriers, and experiences to date. This paper provides a strategic framework for the implementation of demand-side energy efficiency, and examines a case study, the tool of energy efficiency labelling and standards, within this framework.

Keywords: energy efficiency, climate change policy, integrated energy and environmental policy, financing, institutions.

1. Introduction

Hungary recognises the importance of limiting greenhouse gas emissions in order to prevent or mitigate their impact on the global climate. On an international level, Hungary is not a significant carbon dioxide emitter, neither to the absolute degree nor on a per capita basis. This means that the principal reason for Hungarian participation in emission's reduction is not perceivable international consequences but solidarity and participation in the common action of the countries of the world. Hungary is a signatory to both the Framework Convention on Climate Change and the Kyoto protocol. However, the (Hungarian) National Environmental Program also emphasises that the fulfilment of international conventions must happen at a level and pace reasonable for Hungary. This paper is based on a multi-year

research effort funded by the United Nations' Environment Programme (UNEP) aimed at understanding the economics of greenhouse gas limitation world-wide. The Hungarian project component has embraced research efforts from all Hungarian key institutions and a broad group of experts influencing climate and sustainable energy policy in Hungary. This paper summarises the challenges with relation to the implementation of energy-efficiency related climate change mitigation options in Hungary.

2. Climate Change Overview

Hungary signed the United Nations Framework Convention on Climate Change (UN FCCC) on June 13, 1992. The Parliament passed a resolution in December 1993 ratifying the Convention (Ogy # 102, 1993). The ratification instrument was deposited in February 1994, took effect in May 1994, and was announced to the public by Law LXXXII of 1995. According to this law, the Government undertook that anthropogenic CO_2 emissions in Hungary in the year 2000 will not exceed emissions in the base year (see below). CO_2 emissions in Hungary totalled 59.2 Mt in 1994. Hungarian emissions for 1994 are almost 10 Mt lower than the FCCC base year (1990) emissions of 68.1 Mt; the low quantity of emissions, however, is primarily attributable to the economic recession that resulted from Hungary's economic transition. Because of the post-89 economic recession, the UN FCCC allowed a certain degree of flexibility in the fulfilment of the general provisions concerning the stabilisation of emissions in economies in transition. Consequently, Hungary has chosen the base year emission level to be the average emissions of 1985, 1986, and 1987 (the years in which emission levels were highest prior to the transition), about 80 Mt. CO_2 emission intensities in terms of CO_2/GDP were still almost twice as much as the OECD average in the mid-1990s. The second National Communication to the FCCC took place at the Kyoto conference in 1997.

Almost 97% of CO_2 emissions in Hungary originates from fossil fuel combustion. Thus, Hungary recognises that the most effective strategy for meeting the FCCC targets is the promotion of energy efficiency. Thus, among other measures, the National Energy Saving Action Plan (NESAP) has been analysed and endorsed recently. The government also acknowledges that reducing the country's energy intensity, which is still two to five times higher than that of OECD countries, will provide numerous economic benefits. Tools used for improving energy efficiency have included the removal of most of the subsidies on energy prices, the liberalisation of oil product prices, the privatisation of the gas and electricity industry, and joining the OECD and EU. However, further measures are essential to reduce energy intensities, and thereby improve economic productivity.

3. Strategic Framework for the Improvement of Energy-efficiency on the Demand-side: Implementation of Integrated Environmental and Energy Policies

3.1. Target Areas of Measures Leading to Emission Limitation

The direct goal of the Hungarian climate protection strategy is to implement a package of measures which can be introduced and implemented (financed) as well as to support the rational production and use of energy. The indirect effects (environmental, employment, regional development, incentives for businesses, etc.) are also significant. The measures have to serve the reduction of energy intensity and a more substantial use of renewable energies. The common activity to promote the achievement of the outlined goals, whose elements are present in the National Energy Saving Action Program and the National Environmental Program, has to cover the following main measures:

- *An incentive system to improve energy-efficiency:* The existing financing mechanisms are to be improved (The Energy Saving Credit Program, German Coal Assistance Tender, international credits and aids, etc.) including the conditions necessary for funding by a third party. In accordance with the EU Directive the energy savings labels on household appliances are to be introduced and the development of energy management consulting firms and services are to be encouraged. (These latter businesses manage the whole process of revealing, planning, permitting, funding, investment, construction, operation, follow-up consultation of energy rationalisation investments on the consumer side. Their profit comes from the price of saved energy).
- *Macro economic instruments to moderate energy demand:* The possibility to introduce energy (eco) tax, an energy/carbon product fee and tradable emission quota system as alternatives is to be examined with special regard to phasing out hidden subsidies, preference for renewable energy sources and the analysis of impacts on the energy sector, environment, budget, employment, etc.
- *Replacement of fuel: the renewable energy program:* The framework of the program, self funding in the long run, which is aimed at the use of solar cells, biomass and geothermal energy just as at the development of energy forests with special regard to the establishment of the necessary stakes and incentives and to the analysis of indirect social/economic effects (e.g. budgetary, employment, regional development, etc.) are to be elaborated on.
- *Influencing consumer behaviour and increasing social participation:* A significant task is to familiarise a wide circle of the society with the possibility of environmentally friendly, energy-saving and economic use of energy. Favourable change in consumer behaviour will be reflected in the business strategy of energy producers and services. This will lead to healthy competition in the long run. The press and electronic media should pay greater

attention to publicising economic energy consumption. Energy-aware behaviour developed in a school education, the activity of non-profit consulting services and voluntary agreement among the players in the energy market have outstanding roles.

3.2. Measures on the Consumer Side: the Government's Role in the Promotion of Energy-Efficiency Improvements

On the basis of the energy concept adopted by the National Assembly in 1993 a National Energy-Saving and Energy-Efficiency Improvement Program was elaborated in 1994. On the basis of that program the Government adopted an action program in 1995. The Energy-Saving Action Program includes the following main measure packages:

- promoting the use of renewable energy sources
- improving energy-efficiency
- energy saving 'labelling' of household appliances
- raising energy awareness, promoting technical development

3.3. Funding the Improvement of Energy-Efficiency

The improvement of the energy management of municipalities is an outstanding target area in the Energy-Saving Action Program. These measures have to serve the elaboration and practical application of the energy concepts of municipalities and the exchange of knowledge and information necessary for rational energy management. There has been some progress regarding the energy-efficiency of the population. In the production sector increasingly more businesses recognize the relationship between energy wasting and a decrease in profits. The growing economy provides favourable conditions in the cost sensitive sectors and thus resource and energy consumption saving have become an integral part of economic planning. Several multinational companies based on their own will have shown significant progress in improving energy-efficiency.

The measures promoting energy-efficiency funding can be put into two categories:

- development of institutional background and
- measures shifting the current cash flow towards energy-efficiency.

Resulting from problems related to project development, management and funding, the existing financial resources, promoting energy-efficiency, are not distributed efficiently. The development of the institutional background might provide a solution for this problem and might help create a business environment which attracts foreign investors and enable the transfer of technology. Possible ways to develop the **institutional background** are the following:

- the establishment of energy-efficiency centres which would strengthen or replace the existing EU Energy Centres. These new institutions would become the focal points of market evaluation, further training, exchange of information and publicity, demonstration projects and elaboration of financing schemes. A regional 'virtual centre' through the Internet could help the work of these centres and could create relationship among actual institutions and would provide connection points to other energy-technology, investment and institutional development web pages of the Internet;
- raising the energy and environmental awareness of the population;
- elaboration of further training accreditation and qualification along with other countries in the region (in several institutional forms; for example bilateral, among local universities, through professional associations, etc.);
- support for energy management consulting firms. Special instruments are: signing service contracts with the authorities; adoption of a general energy saving measurement; elaboration of the general form of contracts to be signed with the authorities and their funding conditions;
- co-operation with international development banks to provide new concession funding possibilities for the consulting firms and in this way the firms could intermediate the bank and private capital into the energy-efficiency sector. In the countries where establishment of consulting firms based on private capital is difficult state owned firms may be established and they might be privatised in the future.

A part of the private investments aimed at energy production, with adequate measures, might also be shifted towards financing the improvement of energy-efficiency. These measures have increasingly greater significance since private investments have greater and greater roles. Governmental and other aids would not further increase therefore their efficient use should be improved. The current capital flow could be redirected in the following ways:

- The parties in the Framework Convention on Climate Change, as the shareholders, managers or the borrowers of international development banks may encourage the credit institutions to take steps to reduce the emission of greenhouse gases. They may urge the banks in the same way to study the possibilities of promoting energy-efficiency; to offer common or concession funding for energy-efficiency; to provide intersectoral advice; to carry out background institution development; and to apply investment-evaluation techniques which take externalities caused by greenhouse gases into account. The development banks should actively promote local financial institutes to be able to efficiently intermediate credits for projects.
- The OECD member states should urge the Export Credit and Credit Guarantee Commission of the OECD that export credit agencies receiving project support to take environmental criteria into account and they should provide information on the environmental impacts of the projects they support.

- The lack of a government guarantee for the main energy-efficiency projects is a significant financing obstacle. However, at the same time the governments provide a high level guarantee for private capital investments of the electric energy production. The governments should consider their guarantee for energy-efficient projects and therefore, in this way, they would promote the division of investor risk, the renewal of credit or of increasing the equitable participation of energy management consulting firms which have financial muscle.
- The public procurement programs may create markets for energy-efficient solutions. Governments, bilateral assistance offices and international development banks may promote the establishment of consumer associations in the private sector. Incorporation of energy-efficiency investments into greater transactions will decrease costs and make energy-efficient technologies and services more attractive for energy producers.

3.4. Characteristics of the Hungarian Situation from a Feasibility Perspective

In terms of energy and environmental policies the Hungarian situation shows both similarities and differences compared to the situation in the western countries.

Hungary is heading for a democratic political system and a market economy. However, eight years after the collapse of the centrally planned economy, Hungary is still in a transition, which is characterised by painful social processes and a level of chaos.

It has to be mentioned that the energy policy instruments designed for developed market economies are not always applicable in the transitional economies. For example, in Hungary there is much debate on the role of the state. In the centrally planned era the state had a decisive role in all segments of the economy. Now the Hungarians are trying to be more 'capitalistic' than the classic capitalistic societies. They over-emphasise the role of the free market and minimise the responsibilities of the state. After 40 years of over-regulation now they are front-runners of deregulation. The policy-makers of today's Hungary are very reluctant to launch central energy-efficiency programs. They dislike the idea of increasing the level of redistribution (financing energy-efficiency from tax money), and at the same time would not like to modify the tax system (a sensitive economic area) for environmental reasons. The present policy-makers basically leave the task of improving energy-efficiency to the market. True market prices for energies will do the job, they claim.

Energy prices have significantly increased in Hungary since 1990. The trade of solid and liquid fuels has been liberalised, and the prices are determined by market forces (and taxes). The price of electricity and natural gas has reached a level which is enough to finance (re)production. These prices do not include margins for environmental investments of the production facilities (flue gas desulphurization, redwaste disposal, landscape rehabilitation, etc.). And, what is more serious, there

is no provision for external costs, such as health impacts or the greenhouse effect. No special taxes are implied on energies (except for the motive fuels), and the VAT on electricity and gas is less than half of the VAT on any other products or services.

In the course of the 1989-90 changes Hungary demolished its old national institutions of energy-efficiency policy. As explained by the above strong belief in market forces, no powerful institutions have been developed to replace the old ones. Today Hungary has no energy-efficiency law, there are no departments in the relevant ministries specialised in energy-efficiency policy, there is no national agency with proper authorisation and budget, etc.

Hungary is a small country influenced by its neighbours. It may not develop an environmental policy which is significantly different from the policy of the neighbouring countries and especially the EU. For example, it will probably never be a pioneer in introducing energy taxes. It will follow the European trends.

With regard to financing environmental programs (including the mitigation of climate change) it has to be understood that Hungary is rather poor. The country suffers from shortage of capital. Money is needed for several critical economic and social purposes. The environment, being a longer-term issue, with few immediate hard effects, is not very high on the priority list. The little capital that is available at the time, is used for shorter-term, survival-type programs.

Any Hungarian environmental program shall rely mainly on resources that are abundantly available within the country such as engineering knowledge, local labour, and the traditional wisdom of the people. The chances of capital-intensive efforts are low, and will remain low for the foreseeable future. The good news is that the Hungarians have not yet progressed very far in the way of developing energy wasting lifestyles associated with the consumer economy[1]. Per capita energy consumption is moderate, and if with proper policies the economic structure is rearranged, GDP growth is feasible for some time without significant growth of energy consumption.

There is a special characteristic of the Hungarian situation, which has to be considered when energy-efficiency programs are designed. In Hungary, the energy supply industry has been extensively privatised. Typically foreign investors own most of the power generation companies, and all the gas and power distribution utilities. These investors are interested in profit generation and their enthusiasm for helping Hungary meeting environmental goals is limited. An example: the progress in introducing integrated resource planning and demand side management is very slow.

Finally, the position of the local governments deserves mentioning. In most of the western countries the local governments have good powers in formulating their energy and environmental policies. They typically own the local energy distribution systems, they have the right to influence the end-use energy prices, they are allowed

[1]For example the thermal insulation of the Hungarian buildings is much poorer than that of the Swedish ones. However, the average size of the dwellings is much smaller, so the resulting household heating energy consumption is lower. The Hungarians are far from the materialistic consumption levels of the western countries.

to introduce local environmental regulations, etc.

The Hungarian local governments have much less possibilities. Out of the municipal energy supply systems they own only the district heating networks. The electricity and gas distribution systems are in the hands of regional utilities. The local governments have no influence on electricity and gas prices, which are regulated by the minister of industry and trade. They may only set the district heating prices but their freedom in this field is rather limited: the district heating organisations often buy the heat from power plants, whose prices are again centrally regulated.

The Hungarian local governments' possibilities in environmental regulation are also limited. The most important emission limits, pollution fees, etc. are set by the central government.

Finally, an important barrier at the local level is the lack of funds. The local governments claim that they are seriously under-financed. Their budgets are hardly enough to cover the costs of elementary municipal services.

With respect to the above considerations, under the present legal and administrative setting, one cannot realistically expect much financial investment from the Hungarian local governments in implementing climate change mitigation policies.

3.5. Main Obstacles to the Implementation of Energy-Efficiency Measures

A significant emission reduction may be realised just by grasping the potential in economic and achievable energy-efficiency. Additionally, in this case investment costs can be recovered through saving costs on energy. In the case of energy saving investments, in the category of 'economic' and 'achievable' energy-efficiency potential, the internal savings rate is 12% or in some cases even higher. The exploitation of the energy savings potential is hindered not only by the insignificant number of cost-effective energy saving projects but by the development, management and funding difficulties of these projects.

The price of energy significantly influences the achievable efficiency potential. The rising price of energy raises the value of saving, improves the pay-back period of investments and increases the number of cost-effective projects. Although an indirect state subsidy, especially in district heating areas, still exists other energy prices approximate market price level. (In several cases, for example for industrial users, the prices of some energy sources are higher than in certain OECD countries). Capital scarcity for energy-efficiency investments, lack of information, unpaid energy bills, or uncertainty regarding ownership are all factors which contribute to the under-utilisation of the energy-efficiency potential. Raising energy prices themselves will not solve this problem.

Table 1. The obstacles of implementation and their possible solutions

Obstacles:	Possible solutions
1. Macroeconomic environment: • high inflation and fluctuating currency political and sector political uncertainty • indebtedness, breach of contract and frequency of barter trade	• increasing economic performance • project guarantees • long term loans by international development financial institutes to local banks • elaboration of conditions for the implementation of experimental projects supporting the joint enforcement of the Framework Convention on Climate Change[2] (e.g. monitoring, accreditation) • blending aids and preferential credits with credits of market interest to reduce medium term interests • establishment of energy-efficiency funds
2. Lack of information and experience • lack of information regarding energy-efficiency	• Information programs, advertisement campaigns, energy-efficiency trademark
• lack of meters • no uniform measurement stipulation for savings	• installing meters and bills with more information • adoption of uniform stipulation on efficiency savings
• lack of business and risk management experiences	• training financial and technical experts, managers, etc. with the assistance of the EU energy-efficiency centres or with multinational companies
• investors and project managers are not familiar with possibilities	• increasing the role of the project preparation in matching the projects and the investors
3. Inadequate administration of creditworthiness and past credits of the borrower • businesses, municipalities and other borrowing organisations do not handle their past credits adequately • lack of cash flow	• leasing funding; and/or municipal bond funding, signing service contracts through energy management consulting firms, experimental projects and joint businesses for the common implementation of the Framework Convention on Climate Change • expanding and developing the local bank network • connecting energy-efficiency investments and other modernisation investments for long term feasibility (e.g. housing construction)

[2]In the framework of this mechanism one participant in the conventions performs its emission-reduction obligations in another participatory country

Table 1. (continued)

Obstacles:	Possible solutions
4. Institutional system/ownership • 'historical' traditions of central planning policy • state owned energy monopolies	• determining and implementing a clear-cut energy-efficiency strategy constituting organic part of environmental policy • establishment of public service regulation system, which favours the energy saving on the consumer side • government policy promoting the establishment and involvement of energy management consulting firms
• the interests of the owners and tenants of buildings are divided • poor institutional background	• clarifying and rationalisation of ownership to increase stake (e.g. offering reconstruction package during the privatisation of housing associations which include energy-efficiency instruments); • strengthening institutional background which determines the standards
5. Energy-efficiency projects are not widespread	• transformation of the credit policy of international development financial institutes, e.g. local credits for local financial institutions which directly grant the credits to smaller projects; wider use of automatically renewable credits • joining projects • establishment of energy management consulting centres/firms
6. Energy prices • low energy prices • pricing uncertainties	• price can reflect full cost of production and distributions by scheduling price rises; social and political factors are to be taken into account in price compensation
• energy compensation	• compensation system should be clear and transparent and gradual withdrawal of compensation is to be planned (schedule) • compensation demand is to be decreased by energy-efficiency investments
• externalities are not internalised (a world-wide problem)	• international development banks and governments should take externalities into account during financial evaluation • imposing tax on polluting emissions or establishment of the market of pollution (prevention) rights

Domestic capital is dominant in energy and environmental investments therefore the mobilisation of the local industrial and domestic energy consuming ex-

penditure is indispensable to make use of the energy-efficiency potential. Foreign companies should also be encouraged to invest energy-efficiency investments. The experimental projects supporting the joint implementation of the Framework Convention on Climate Change exemplify excellently that technical, financial and management problems hindering energy-efficiency and carbon dioxide emission reduction can be overcome.

Development institutes play key roles in the preservation of economic and environmental benefits. The international development credit institutes and other financial institutes do not really support small scale projects with their current credit policy because of the high transactions costs compared to the expeted profit. An accord between small scale projects and big credit funds is to be created: one way would be to have capital flow through energy management consulting firms.[3] The firms would sign the smaller service contracts and would pay credits for the greater number of small scale projects. The marketable construction loan provided for the local banks by international development institutes serves the same purpose.

Another deficiency is the lack of experience in the field of project development and in the preliminary evaluation of investments which would be indispensable to see whether the project can be financed. The EBRD deems the latter criterion the greatest obstacle to significant energy efficient investments. During project preparation it would be efficient to help the work of local managers, project leaders, bankers and other decision makers by the exchange of information or technical co-operation. The energy efficiency centres working in the region, employing local experts, are exemplary in the field of institution development.

3.6. Main Governmental Tasks

Therefore, the tasks of the government are as follows:

- making energy compensation more transparent, schedule for gradual withdrawal of compensation
- encouraging energy efficient investments
- development of a tax system including environmental criteria
- support for experimental and commercial projects on public buildings
- creating favourable investment conditions for energy management consulting firms.

3.7. Instruments Effective in All End-Use Sectors

In this section the inventory of policy measures potentially applicable in Hungary for the implementation of climate change mitigation policies is presented together with comments regarding the chances of introduction.

[3] The profit of these firms comes from cost saving as a result of energy saving at other firms.

Table 2.

Instrument	Chances of introduction	Comments
Development of the legal, economic and institutional background of energy-efficiency (EE)		
Creation of an energy framework law	Real chances in the medium term	This law could clearly determine the responsibilities of the relevant actors.
Evaluation and modification of existing legislation from the aspects of EE	Real chances	There is, for example, contradiction between the public procurement regulation and the ESCO type activities.
More careful enforcement of existing legislation	Real chances	For example, the Hungarian building code compares to the international standards. Still, due to the poor enforcement of the code, a high % of the buildings is constructed with inadequate thermal properties.
Development of the organisational background of EE including development of ministry staff, unambiguous allocation of governmental tasks, development of national and regional EE centres.	Real chances on the longer term	The conception on the role of the state has to be re-evaluated.
Awareness development		
Integration of energy efficiency into all levels of education	Real chances in the medium term	The whole system of environmental education has to be re-evaluated, and a comprehensive program has to be developed. Certain elements of a possible EE education program era available from earlier efforts.
Awareness development campaigns	The only issue is financing	
Labelling	Real chances	Hungary will probably adopt EU practices. The development of labelling is hindered by the lack of accredited certification institutions.
Policy development		
Better preparation of energy related political decisions	Chances depend on political commitment	The conception on the role of the state has to be re-evaluated. The process of over-deregulating the state has to be stopped. It has to be understood by policy makers that the funds spent on proper preparation of political decisions are good investments.

Establishment of an EE data base	Real chances	A database, which could be established with modest expenditure could help policy development. The database could be continuously updated by data supply from implementers of EE projects.
Consideration of the aspects of EE at public procurement	Real chances	The public procurement regulation ought to be modified in such a way that EE is included in the scope of evaluation criteria.
Voluntary agreements with sectors/trades	Poor chances	The individual economic sectors and trades have not established their representation organisations yet, which could be negotiating partners of the Government.
DSM		See the evaluation of DSM later
Energy-efficiency programs		
Energy audit programs	Good chances	According to the western experience state-organised audit programs are the most cost-effective instruments.
More support for R&D	Chances depend on the availability of funds	
Demonstration programs	Chances depend on the availability of funds	Demonstration programs could assist market penetration of EE technologies through decreasing the risk of users.
Energy-efficiency upgrading of state-owned public buildings	Real chances on the longer run	The state itself owns a big infrastructure with hundreds of buildings. Energy modernisation of the buildings would serve two purposes, a) demonstrate the political commitment of the state, b) contribute to the implementation of national environmental goals.
Macroeconomic instruments		
Modification of the energy price and tariff system	Poor chances	The present price and tariff system was formulated through debates among the relevant parties. Modification of the system could be easily classified as disturbing a sensitive area.
Special tax credits for EE investments	Certain chances	The present financial government opposes interventions into the tax system.
Subsidies for EE investments	Certain chances	Certain subsidy schemes are already operated. The volume of investments mobilised by them is minimum a magnitude lower than the desirable volume of EE investments.
Tax reform	Chances only on longer term	The present political course opposes interventions into the tax system. Getting through a major tax shift (what would be most desirable) would be difficult. Much depends on the developments within the EU.

4. Case Study: Energy-Efficiency Labelling and Standards

4.1. Overview of the Current Situation

In accordance with the EU regulation new and updated heat insulating standards have been introduced. In the case of the design and construction of new buildings updated standards are compulsory and their application – as a function of technical possibilities – is to be considered during the reconstruction of existing buildings. Although new standards were introduced for a certain group of household electric appliances, the majority of energy-efficiency requirements are outdated and require review. Taking the relevant EU regulation into account a feasibility study was carried out for the introduction of energy-efficiency qualification (labelling) of household refrigerators, freezers, washing machines and dryers and the energy certificates of buildings. The Ministry for Environment Protection and Regional Policy introduced the use of an environmentally friendly trademark in 1994; energy-efficiency is one significant criterion in the evaluation.

4.2. Instruments of Implementation

In this section, on the basis of standards as case studies for refrigerators/freezers and office equipment, the energy-efficiency 'minimum compliance' standards are studied. The energy-efficiency standards for different equipment and appliances and the application of trademark (labelling) testifying energy-efficiency gains an increasing role in the integrated energy and environment policy. Refrigerating and freezing are important items in household electric energy consumption, and in this way provide great possibilities for energy saving. Although the consumption of electric energy is the highest in the trade sector for air conditioning and lighting, the energy consumption of office equipment, amounting to 5–20% of the trade sector, is increasing dynamically. Differing from refrigerators the technical and energy-efficiency features of office equipment are almost identical since these products are sold on a uniform market.

The conditions of introducing the Convention in the developed and transitory countries differ significantly: energy prices are different (they influence the cost-effectiveness of the standards), fuel structure is different (which influences the impact of standards on emission) and the institutional and legal backgrounds are also different (which influence the applicable political instruments). Often, the energy-efficiency standards and other national (or regional) measures, for example information for the consumer, labelling, demand side consumer influencing programs through Demand Side Management (DSM), financial incentives for the consumers, support for innovation, etc. all are applied together. Feasibility possibilities are manifold: binding (stipulated by legal means) regulation, governmental intervention policy or the system of voluntary agreements.

The foreign national standards, the common standards of a group of countries

or the state or regional standards may play significant roles in the domestic political and social adoption of a standard. The unilateral measures aimed at the improvement of standards may further promote multilateral co-ordination although they lead to some kinds of market interference with the limitation of trade. The 'Energy Star' labelling system for US computers, for example, influenced the efficiency of computers sold on the whole world market since the US market in this field is decisive. On the other hand, international agreements may urge national measures since multilateral commitment may facilitate national reforms which are difficult to carry out politically. The standards which are not too closely related to 'technical descriptions' can be taken over by international qualification bodies, in this way later on they can be introduced also on a national level.

In the case of durable products the standards may influence emissions even in the short run but their impact is significant only in the long run. The standards of office equipment have impacts in the shorter run than the standards of more durable goods (for example refrigerators). The refrigerator/freezer standards in Japan where the average life of these appliances is 8.5 years have favourable emission impacts sooner than in the USA where the average life of refrigerators is 19 years.

On the basis of the EU experiences the period necessary for the research, planning and negotiation of uniform standards may be 5 years. The co-ordinated measures of product standardisation may require a series of steps which are to be taken gradually by all the developed parties in the Convention. Some transitory countries may not be in the position to introduce common, uniform standards simultaneously with the OECD member states. Gradual introduction of the requirements of the standards according to a published schedule might also be advantageous in minimising the costs of the producers.

4.3. Participants

Municipalities, consumer protection associations, national standardisation bodies, industrial, professional associations or some industrial companies in addition to the government may take part in national standardisation. On a regional level the possible participants are: EU member states, the European Union, members of NAFTA (North American Free Trade Association), countries of APEC (Asian Pacific Economic Co-operation), international industrial companies and industrial associations. Important partners and intermediates may be the main non-governmental standardisation organisations, in this way ISO (International Standardisation Organisation) and IEC (International Electromechanical Committees). Additional supporters of the co-operation may be IEA and OECD in the field of co-ordination and analysis and EC (European Commission).

4.4. Benefits and Disadvantages

The improvement of energy-efficiency (depending on the fuel structure and, to a different extent, on energy sources) helps to moderate the use of energy and contributes to the reduction of emissions related to electric energy production. The energy-efficiency standards contribute to the improvement of commercial standards, economic growth and to the reduction of import dependency regarding electric energy. The energy-efficiency standards may have a favourable effect on employment and foreign investments.

The introduction of energy-efficiency standards influences the development of energy-efficiency, the emission of greenhouse gases, foreign investments and trade between those countries which are introducing common measures and those which are not. Adopting one system of standards may decrease the overall costs of measurement and certifying procedures since products will no longer have to comply with and be tested for many different standards. At the same time the producers who cannot make the energy-efficiency of their products comply with higher standards may lose their markets. In the case of refrigerators, the application of common standards in the short run will probably have an insignificant impact on the emission of countries not participating since the characteristics of these products differ by countries and regions and the turnover of these products among regions is very little. Regarding the global market of office equipment, no significant impact on the countries not participating in the measure is expected even in the case of these appliances.

The international energy-efficiency standard stipulations of office equipment today already follow the American 'Energy Star' labelling program.

The developed and transitory countries of the Convention can be characterised by different institutional systems, economic policies and legislation preferences, therefore different approaches are necessary in the different countries for the implementation and introduction of common standards. It is unlikely that the same sectoral instruments can be enforced in all the transitory economies simultaneously with the OECD member states. At the same time the benefit of the co-ordinated measures can be enforced if the countries use the same minimum energy-efficiency standards.

4.5. Main Possibilities for Co-ordinated Standardisation Measures

Cost-Effective Energy-Efficiency Level

The participating countries may agree on the values of cost-effective energy-efficiency levels regarding the products. The levels of cost-effective energy-efficiency vary in the different countries. Although uniform standards would be beneficial for trade, identical levels are not necessary for each country on the basis of cost-effective energy-efficiency.

Co-ordination of Product Testing Procedures and Measurement Methods

Harmonisation of testing methods may be the basis of the uniform standardisation. Harmonised testing procedures and standards would be useful for producers present on several markets or 'with an eye to' new markets since today they have to meet several, different national procedures entailing significant extra costs.

Minimum Energy-Efficiency Levels

The introduction of uniform energy-efficiency minimum levels for the products would definitely improve energy-efficiency in several countries. Most probably mass produced and widely distributed products are suitable for the introduction of uniform energy-efficiency levels. The accord on the support of product distribution may be a part of the agreements among the countries. The trade of refrigerators and freezers happens mainly on local markets, in this way the parameters of the products distributed in different regions may differ significantly. Therefore primarily co-ordinated measures within the regions may be useful and there is no need to co-ordinate the testing procedures and energy-efficiency levels widely in their complexity. In the case of office equipment broad and co-ordinated introduction of energy-efficiency levels are more realistic. As a result of the fast technological development of office equipment standards are to be updated regularly.

Product standards are static instruments which hinder dynamic and innovative development. Thus impact may be decreased if the applied standards stipulate the compliance with the required levels and not the application of given technologies.

Control and implementation costs of standards may be significant for a wide range of products incorporated into the regulation. The lack of or inadequate institutional and legal background hinders the introduction, control and implementation of the standards. In certain cases the incorporation of the product standards into the existing environmental and energy regulatory system might cause problems.

Product standards hinder the commercial turnover of the products which do not meet the standard. Industry accepts new standards more readily if there is enough time between the announcement of the standard requirements and the introduction of the standard. If the period is too short the producers who cannot sell their stock not meeting the standard in time or who cannot change their technology to meet the higher requirements during the given period may resist.

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