10

# Effective Choice of Consumer-Oriented Environmental Policy Tools for Reducing GHG Emissions

Maria Csutora and Ágnes Zsóka
*Corvinus University of Budapest*
*Hungary*

## 1. Introduction

Due to the perceived and expected environmental impacts of climate change there is an urgent need to reduce Greenhouse Gasses (GHG) at each and every point of emission (see World Research Institute, 2010). The ongoing efforts of governments to establish and implement policies include investigating changes in consumer behaviour and attitudes towards sustainability. The often very high costs of measures makes economic analysis necessary in order to find out which technologically feasible abatement options are capable of realizing the largest emission reductions at least social cost (Csutora and Zilahy 1998, Ürge-Vorsatz and Füle 1999, Creyts et al. 2007, Stern 2008). According to recent studies there is even space for "win-win" solutions as a number of options exist which can result in huge GHG reductions at a "negative cost", meaning that those solutions are both beneficial from environmental and economic points of view. However, organisations often ask for external governmental support in order to implement those measures (Zilahy 2004) and individuals also regularly seem slow and inconsistent in transforming their positive environmental attitudes into environmentally aware consumption habits and reducing their levels of consumption (Rubik et al., 2009, Thøgersen and Crompton, 2009, Nemcsicsné Zsóka, 2005).

This chapter puts forward a model which allows a more effective choice of consumer-oriented environmental policy tools for GHG emission reduction and mitigation. As a first step, the marginal social cost curve is constructed for GHG mitigation options. Then, based on the marginal social cost curve and the marginal private cost curve, different – green, yellow, and red – zones of action are identified. GHG mitigation options chosen from those zones are then evaluated with the help of a profiling method which addresses barriers to implementation. Profiling may help in designing an implementation strategy for the selected options in order to overcome those barriers and make consumer policy more effective and acceptable to society. Opportunities for consumer policy are evaluated using several policy tools based on the literature and practical examples.

## 2. The marginal social cost curve and the three zones of action in GHG mitigation

It is very important — regarding the climate-related environmental impacts of consumer behaviour segments — which have the highest added value, or, differently formulated, which products can provide the biggest efficiency gains. According to the research of Tukker and Jansen (2006) – who reviewed 11 studies focusing on the life-cycle impacts of total consumption at the level of society – the greatest environmental impacts are caused by a small number of product categories. "Food, housing and related energy use, and transport are in total responsible for some 70% or more of the total lifecycle impacts of all products and services used for final household and government consumption, whereas these categories are responsible for only 55% of the final expenditure" (Tukker and Jansen, 2006, pp. 175). Raaij and Verhallen (1983) also found the residential sector responsible for a considerable quantity – about 30% – of total energy demand in The Netherlands. Obviously, energy saving initiatives can provide considerable benefits for the environment.

The so-called 20-20-20% energy targets of the European Union (including Hungary) to be met by 2020 suggest a reduction in EU greenhouse gas emissions of at least 20% below 1990 levels; 20% of EU energy consumption to come from renewable resources; and a 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency (http://ec.europa.eu/environment/climat/climate_action.htm). This energy policy is quite ambitious for several countries and makes efficient GHG mitigation measures necessary.

The maximisation of social welfare is the main guiding principle in the allocation of social resources. This means that actions to mitigate climate change can be justified only if they; a) contribute to an increase in social welfare (Stern, 2008); and, b) if resources are used in the most efficient way at the least possible cost.

The model we propose is based on a cost-efficiency approach. This means that we focus on reaching the maximum possible energy savings through using a given set of resources. Hence, the horizontal axis of the curve reflects climate change impacts which are considered proportional to energy saving potential. As further benefits like the external societal benefits of energy savings, inter-sectoral impacts, or benefits for future generations are estimated in controversial ways and result in a very wide range of outcomes, we decided to exclude benefit estimation problems from our analysis.

**The Marginal Social Cost Curve** for mitigation options presents the costs of mitigation options in an explicit way, covering only financial costs in our model. The reason why we omit indirect costs related to GHG mitigation options (concerning their analysis, see Zilahy et al. 2000) is uncertainty about their magnitude due to estimation techniques. The construction of the marginal social cost curve of mitigation is the following (see Csutora and Zsóka 2011, p. 73-74):

1. Construction of the baseline scenario representing the "without policy" option. If no policy is adopted, the increasing income and energy demand of society will result in an increase in GHG emissions.
2. Identification of mitigation options (e.g., improving insulation, replacing windows, switching to Compact Fluorescent Lamp (CFL) *or* light-emitting diode (LED) bulbs, photovoltaic cells, etc).

3. Evaluation of the mitigation potential for each option as well as the assessment of the marginal social costs of that option. Construction of the marginal social cost curve for selected mitigation options. Construction of mitigation scenarios that integrate multiple mitigation options.

As a first step, abatement potential and costs are calculated for each significant abatement option. Then all the options are arrayed from lowest to highest costs in order to construct the **Marginal Abatement Cost Curve** of GHG reduction options (for an example of this, see Figure 1).

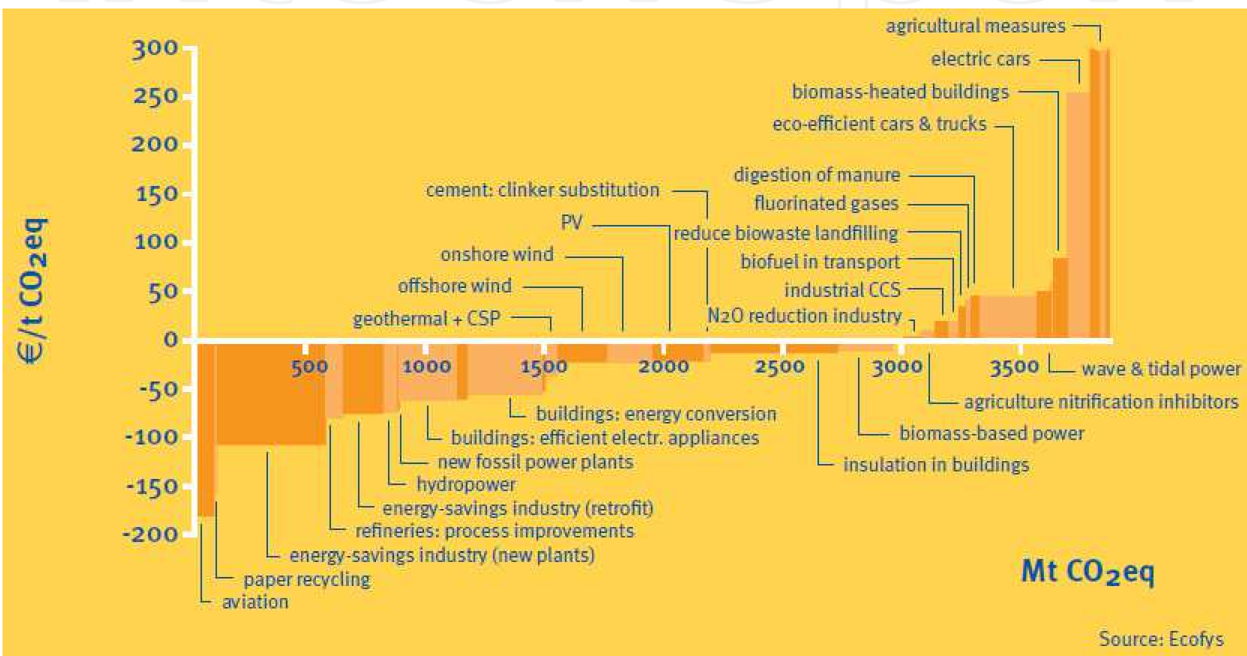


Fig. 1. Cost curve scenario for the EU27 in 2030. Cumulative abatement is relative to the FTRL reference emission in 2030. Technologies are aggregated into clusters for clarity. (Source: Wesselink and Deng, 2009).

Marginal abatement cost curves (MACs) reflect the relationships between the tons of greenhouse gas emissions abated and the unit price of abatement. The *total social cost* of abatement is the area under the positive side of the MAC curve minus the area under the negative side of the curve.

According to the McKinsey report (Creyts et al. 2007), almost 40 percent of abatement could be achieved at *negative social cost* in the United States (ergo, the return on investment is positive over a lifecycle) making these options “no-regret.” Similarly, for the EU27, Wesselink and Deng (2009) analysed cost scenarios. As Figure 1 shows, half of the options can be found in the negative social cost zone. Both reports concluded that buildings and appliances are the areas with greatest abatement potential for improving energy efficiency.

A similar calculation has been made for Hungary, the result of which is a marginal social cost curve for mitigation GHG options, illustrated in Figure 2.

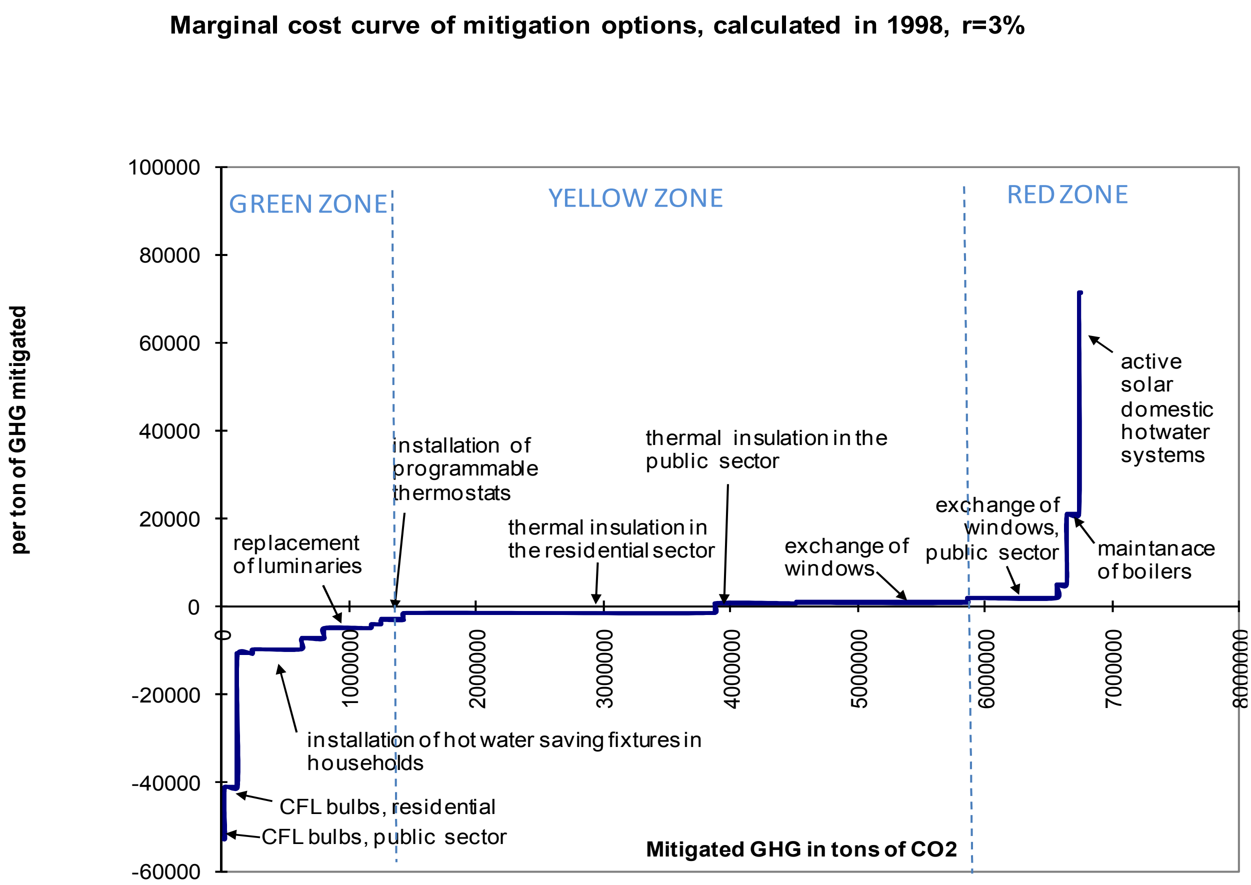


Fig. 2. Marginal social costs of energy-savings options (based on Csutora and Zilahy 1998)

Despite the several "no regret" options, implementation is often restricted by the fact that negative marginal social costs do not necessarily result in negative private costs (see Figure 3).

Implementing these options is desirable for society, but not for individuals. In our model we use a traffic light analogy (see Csutora and Zsóka 2011, p. 75-76):

- "**Green zone options** pay back for both society and for the individual. Such initiatives and activities are likely to penetrate the market without intervention, although this penetration may take time depending on the technology involved.
- **Yellow zone options** pay back for the society, but not the individual. This is the major arena for policy intervention. These options definitely need public policy support and investment but such effort will pay back for the society.
- **Red zone options** neither pay back for the society nor for the individual. They can only be promoted under very special circumstances, (e.g. as spin-off technologies).

The existence of green, yellow and red zones suggests a gap between the energy saving potential and the implementation of options which fall into the different zones. This makes further assessment necessary from the point of view of designing consumer policy. A profiling method is used to identify barriers and opportunities for dealing with these different scenarios, especially for the case of yellow zone options.

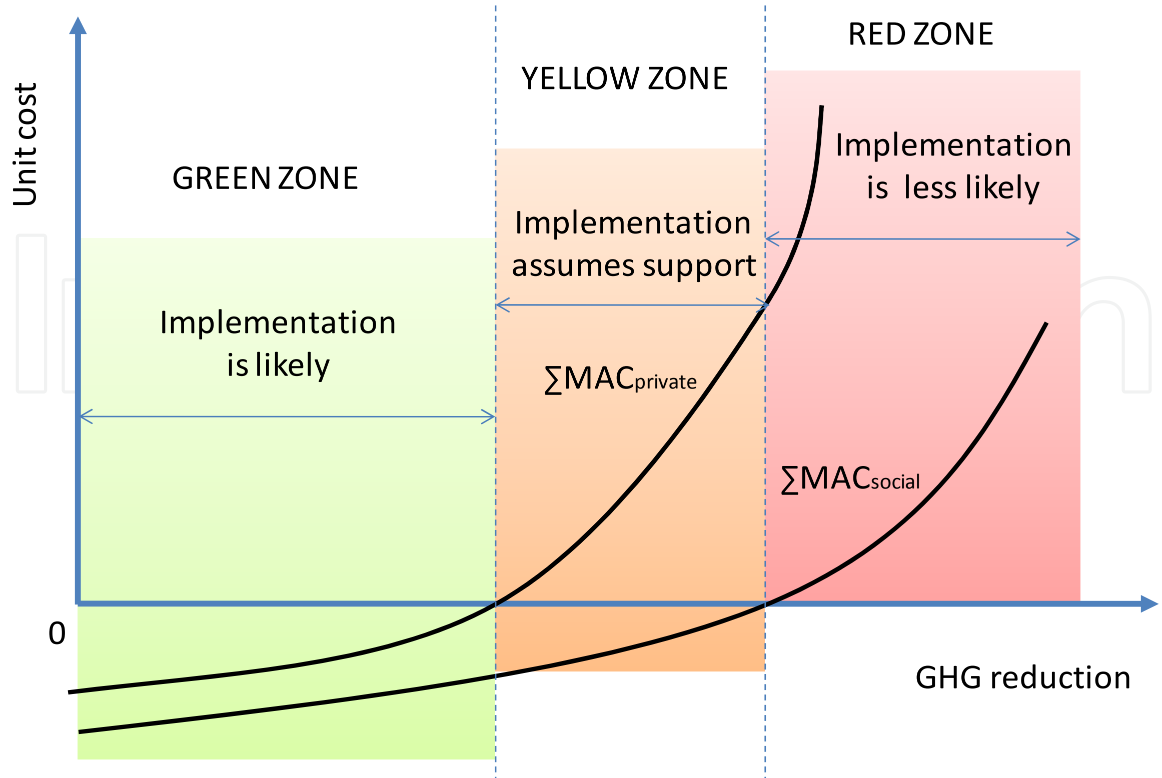


Fig. 3. Implementation likelihood of GHG reduction options based on marginal social and marginal private costs (Csutora and Zsóka, 2011, p. 75).

## 3. Use of the Profiling Concept for assessing GHG mitigation options

The **Profiling Concept** originates from risk management (see hazard profiles reflecting public perception of new, unknown, or high scale risks in Slovic, 1987 as well as Slovic and Weber, 2002) and will be used in this case for evaluating the public perception of GHG mitigation options. Furthermore, realising the implementation barriers and the beneficial side of the selected options, the public perception of proposed consumer policy actions can also be anticipated and evaluated. Based on the assessment, an implementation strategy can be formulated for new, innovative GHG mitigation options.

Figure 4 and Figure 5 include the most important elements for assessing introduction of CFL bulbs or LED bulbs as a GHG mitigation option. Both types of bulbs are compared to conventional incandescent bulbs. Specific scores are given in each evaluation aspect for each option, the result of which is an assessment profile for each option. It is very important that scores and assessment are policy-specific and country-specific. The same level of cost might be judged acceptable in richer countries yet prohibitive in developing countries. Attitudes and behavioural aspects are also different in different cultures. Thus no single solution or profile exists — even for the same GHG mitigation option.

Implementation barriers can be divided into four categories: cost, benefit, cooperation, and risk factors. The **cost factor** includes up-front investment costs, the net private cost of implementation (or payback) and the net social costs of implementation. According to Baden et al. (2006), *up-front investment costs* are regarded as major barriers for the private sector because families with lower incomes will not dispose of the capital to invest into specific energy-saving solutions (see Jakob 2007) even if an investment (e.g. additional insulation) would in fact pay back over a reasonable time. CFL bulbs fall into the green zone, but they are still too expensive for some. In Hungary, the widely accepted *payback* period of investments seems to be up to 6 years for the society, even in the case of long-term projects (e.g. retrofit projects such as insulation; see: http://www.napkollektor-info.hu/component/poll/16). Central and local government often drive these investments through providing subsidies – otherwise the market would be too small, even if public awareness of the importance and payback period of those types of investments exists among society.

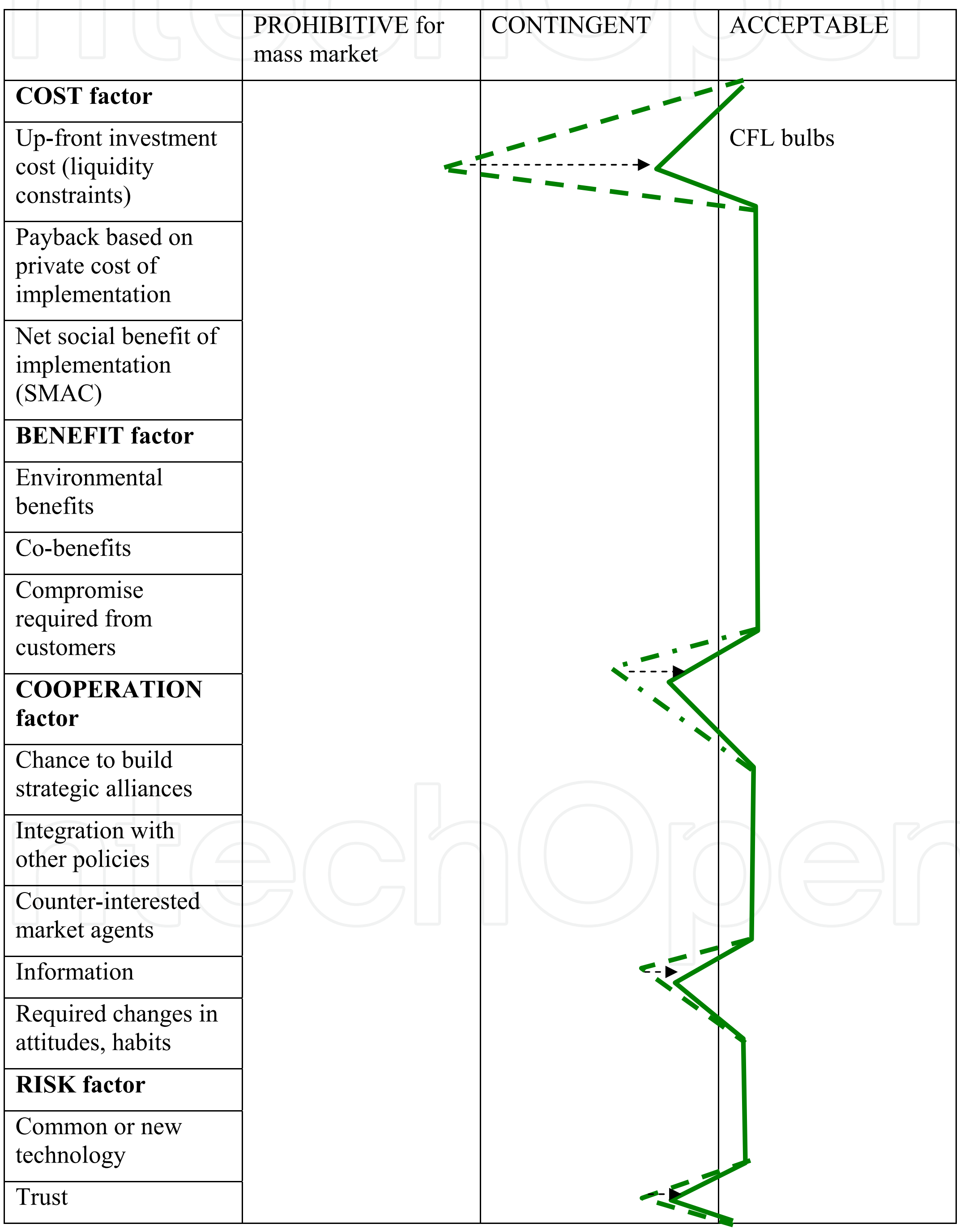


Fig. 4. Changing consumer perception profile of CFL bulbs

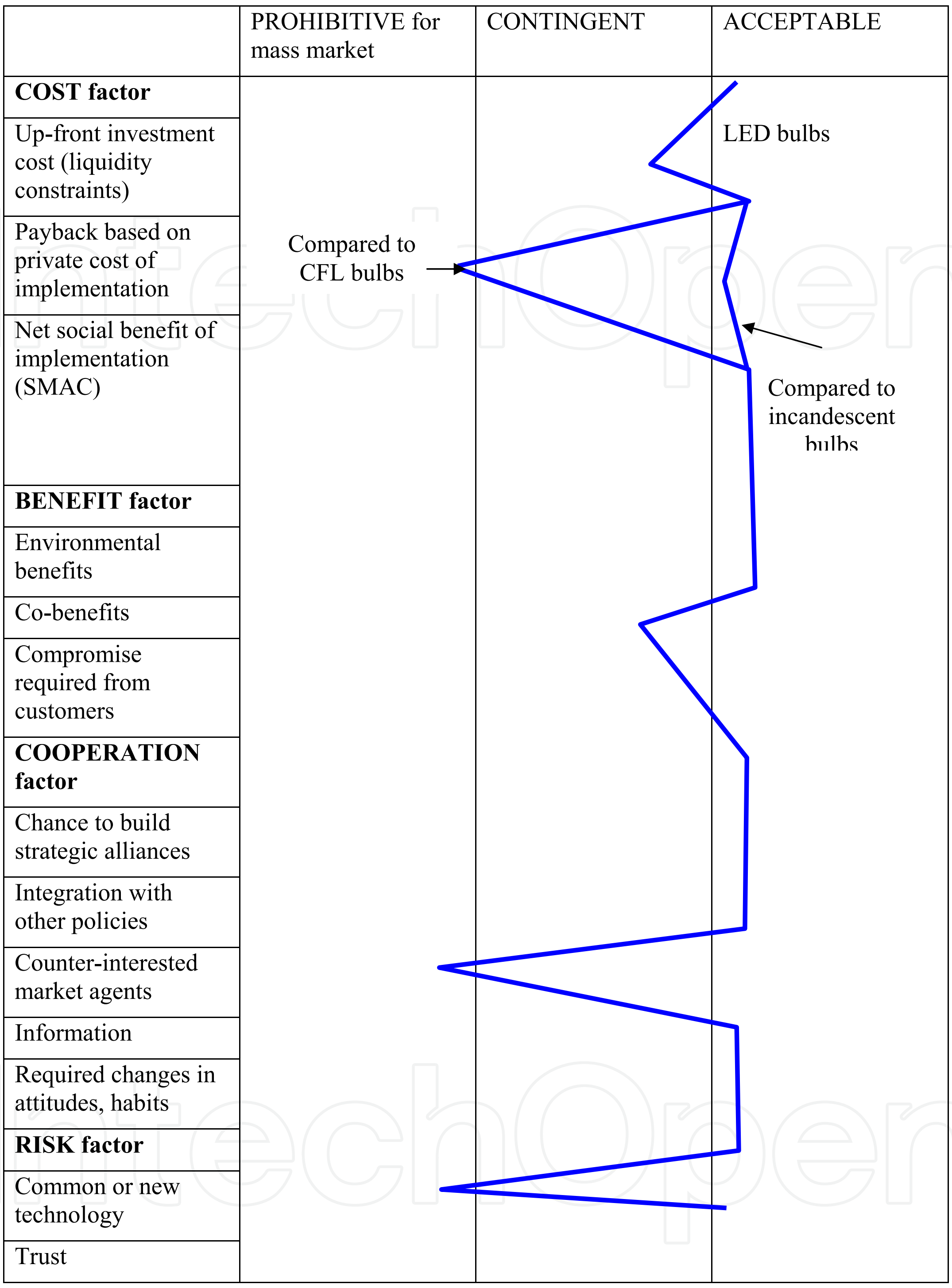


Fig. 5. Consumer perception profile of LED bulbs

**Benefits** can be *environmental benefits* representing the environmental potential of the solution; *co-benefits* are reflected in the longer lifetime of CFL bulbs, for example, or in the increased value of homes, comfort level, or prestige. *Compromise required from the customers* means the non-monetary sacrifices which derive from a poor institutional system and infrastructure, low availability of the product or solution, compromise in product features compared to substitutes, etc. For acceptance of CFL bulbs shape was a major barrier, just following cost, hindering penetration on the EU market. (Bertoldi and Bogdan 2006a). Later, CFL bulbs became smaller and less awkwardly-shaped due to technological innovation, resulting in higher acceptability on the consumer side. Thus the consumer perception profile of CFL bulbs changed showing a reduced peak in the contingent zone. (Figure 4.) A compromise element reduces the potential benefits and can be a real barrier, as market penetration is usually slow even in the case of "green zone" options (Bertoldi and Bogdan 2006a, 2006b).

Studying the payback of LED bulbs (Figure 5) leads to interesting conclusions. LED bulbs *do* pay back when they replace incandescent bulbs. Once you have bought and installed CFL bulbs, however, they are not worth replacing with LED bulbs. LED bulbs cannot save enough energy to justify the early jettisoning of CFL bulbs. CFL bulbs are characterised by having a long life, *so high market penetration rate of CFL bulbs may create a market barrier to LED bulbs.* Thus countries with low market share of CFL bulbs may have higher potential for achieving a higher penetration rate of LED bulbs. LED bulbs can be considered a green or yellow label option in areas when they replace conventional bulbs but a 'red' option when they replace CFL bulbs.

The **cooperation factor** includes barriers and opportunities for cooperating in order to penetrate the market with a solution. The *chance to build strategic alliances* is a real potential in the case of LED bulbs as the automotive industry promotes their spread through the building of highly positioned cars with LED lighting systems. Indirectly, this measure makes the technology more widespread and (step-by-step) cheaper. Ürge Vorsatz (2001) found that the high penetration rate of CFL bulbs in Hungary, when compared to other EU countries, is a result of the integrated forceful marketing efforts of competing manufacturers trying to bite out the biggest possible market share in a new market. "To address the market barriers, a residential CFL campaign was launched by ELI-Hungary in co-operation with manufacturers, retailers, wholesalers and NGOs. The campaigns addressed awareness and information barriers to the adoption of CFLs by residential customers. In 2003 the foreseen CFL sales doubled as compared to 1999, of which 60% was produced by the three major lamp manufacturers" (Bertoldi and Bogdan Atanasiu, 2007, p. 10).

*Integration with other policies* is also very important and may exert positive or negative impact on the spread of new technologies. "Inadequate or inefficient policies often create more barriers rather than ease them" (Hinostroza et al. 2007, pp. 31).

*Counter-interested market agents* can make it difficult to push through beneficial solutions. In several countries – including Hungary – the workers in plants manufacturing conventional bulbs could temporarily slow down the market penetration process of CFL bulbs through use of lobbying power and protests against them. Of course, the new EU regulation which gradually phases out traditional light bulbs by 2012 (http://ec.europa.eu/news/energy/090901_en.htm) helps accelerate the spread of new technologies and has lead to the liquidation of some producers who stick to manufacturing traditional bulbs.

*Lack of information* on options, potential and cost effectiveness can also function as barrier to market penetration of new technologies. The same applies to lack of awareness (see Jakob 2007) even when information is available – for example in the case of LED bulbs. Lack of a sufficient marketing budget often makes producers unable to disseminate information about new solutions. Lack of information was identified by Ürge-Vorsatz (2001) as being the number one hidden barrier behind false perceptions about high costs.

New technologies may *require changes in attitudes and habits* which can also be a considerable barrier when considering, for example, the unusual shape of CFL or LED bulbs and the tendency for humans to insist on the familiar.

The **risk factor** includes *perceived risks involved in new solutions* when compared to common technologies – e.g. financial and technological risks (see Jakob 2007) – as well as the question of *trust*. There is a risk that the bulbs will have a shorter lifetime than promised by the manufacturer. Being a new technology, the actual lifetime of these bulbs has not been tested in real life yet.

Based on the scores for each factor, a consumer policy profile of the selected GHG mitigation options can be drawn. As explained, Figure 4 and 5 show two examples which are significantly different in their profiles. Designing policy implementation involves pushing the curve into the acceptable zone. Pushing the string at a certain point influences other profile factors as well. For example, special purpose CFL bulbs were invented to fight consumer disapproval of odd bulb shapes, thus requiring less of a compromise, although at a cost.

Thus eliminating the factors which keep the regarded solution in the prohibitive zone is not the only approach the policy may take when addressing barriers to implementation. The policy may rely on and take advantage of features where the option was given a high score. The costs of consumer policy can be significantly reduced if there are economic agents who find co-benefits in the proposed solution and are willing to invest in promoting it. Figure 5 suggests that LED bulbs have a consumer perception profile very similar to that which CFL bulbs had in the past. This similarity calls for similar policy actions to be taken for LED bulbs.

## 4. Application of consumer policy tools

As a next step, consumer-oriented environmental policy tools are analyzed with regard to their effectiveness in evoking GHG reductions. In the authors' opinion, most consumer policy tools work best for mitigation options which fall into the yellow zone. This is especially true for tools that represent major intrusions into existing market structures. For example, **environmental taxation** may correct externalities (e.g. the price of energy which does not include the impact of climate change) in order to close the gap between the marginal social cost curve and the marginal private cost curve. If this option is unacceptable for political reasons, products with less impact on climate can be supported.

**Environmental labelling** works best in the red or yellow zone as it builds on the added value of environmental quality to the consumer. It is the only tool able to address issues and reach consumers even when the cost of product is high related to substitutes, either in private or in social terms. For example, hybrid cars are expensive compared to the energy saved, and no cost payback can be expected. Still, as they represent environmental or prestige value for a certain segment of environmentally aware consumers, they have achieved a premium price position and a small but significant market share. Active solar systems and photovoltaic cells are other examples of this kind, as mentioned above. The role of voluntary environmental labelling is important as it can succeed in situations when all other tools fail, but it will not be able to make an impact on a mass market mainly consisting of uninterested consumers. Of course, products positioned in the "green" zone are not always priced higher than other products so labelling may work in the green or yellow zone as well. Of course, compulsory labelling may have a wider scale impact on consumer behaviour. Directive 2010/30/EU sets compulsory minimum efficiency requirements for household appliances to motivate producers to improve product design in order to lower the energy consumption during the use phase (http://ec.europa.eu/energy/efficiency/labelling/labelling_en.htm).

Table 1 summarises the effectiveness of consumer policy tools in different zones of action, illustrating the effectiveness of each consumer policy tool (using zero to three X's for each zone to indicate level of efficiency).

| | Green zone | Yellow zone | Red zone |
|---|---|---|---|
| Environmental labelling | X | XXX | XXX |
| Taxation | X | XXX | XX |
| State aid policy | X | XXX | X |
| Substance bans | XXX | X | |
| Voluntary agreement | | XX | |
| Product design guidelines | | XXX | |
| Information dissemination | XXX | XX | X |
| Extension of producer responsibility | | XXX | |
| Public procurement | XXX | XXX | |
| Standardization | XXX | XX | |

Table 1. Effectiveness of consumer policy tools in different zones of action

Getting the price right is probably the single most effective measure available to stimulate markets for greener products (see Green Paper on Integrated Product Policy, published by the Commission of the European Communities, 2001). Tools, such as **differentiated taxation** according to the environmental performance of products**, extended producer responsibility** or **green public procurement** work best in the yellow zone where there is a significant discrepancy between marginal social costs and marginal private cost as private costs do not reflect the total price of externalities. Using these tools in the red zone is not justifiable, except for in the rare cases of spin-off technologies which show the potential to reduce both environmental burden and costs in the long run. According to the French Sustainable Development Strategy for 2010-2013 "France sees a strong role for eco-labels in making greener products more credible and attractive to consumers, aiming to double sales of products carrying the French or EU eco-label by 2012. Green products must also be incentivised by EU agreement on reduced VAT rates, extended bonus-malus schemes to reward the best and punish the worst, and green public-procurement requirements". (http://ec.europa.eu/environment/etap/). The same idea has been formulated by the Danish EPA regarding products carrying the Nordic Swan label and the European eco-label (http://www.mst.dk). These strategies are in the spotlight of policy making, waiting for the decisions to be made for their implementation. In Hungary, the holders of the Hungarian eco-label are given the opportunity to claim back part of the tax (a so-called product fee) imposed on products like packaging, tyres, batteries, refrigerants, etc.

Public procurement accounts for 19% of GDP in the European Union (http://www.epractice.eu/en/library/5280576) suggesting that green public procurement represents a huge market for environmentally friendly products. Since 2008, environmental criteria have been set for at least 18 product groups – including several energy-related ones (http://ec.europa.eu/environment/gpp), – and there are ongoing consultation processes such as the one on the proposed Green Public Procurement (GPP) criteria for indoor lighting and tissue paper which is currently ongoing (http://ec.europa.eu/environment/consultations/gpp_en.htm). Green Public Procurement is a voluntary tool, although there are numerous EU directives supporting it and accelerating the market penetration of more energy efficient products. Directive 2010/31/EU on the energy performance of buildings requires member states to ensure that "after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings" (http://ec.europa.eu/environment/gpp/eu_related_en.htm).

**Extension of producer responsibility** influences both the design phase of products in a more preventative direction, as well as making the take-back of end-of-life products easier for consumers (see different stages of the 94/62/EC Directive on Packaging and Packaging Waste http://europa.eu/legislation_summaries/environment/waste_management/l21207_en.htm or the 2002/95/EC Directive on Waste Electrical and Electronic Equipment, http://ec.europa.eu/environment/waste/weee/index_en.htm, etc). This tool is very important in the yellow zone.

**State aid** policy – being part of the price correction mechanism – can be used as a second best solution when taxing polluting products is not acceptable to society or to politicians. Taxing energy, for example, evokes a lot of concern regarding social justice and low income families. Higher market penetration of "green zone" options should not be promoted by subsidies. As these options pay the individual back, other measures would be more effective such as making credit and loan opportunities easier available, providing information, making widespread use of marketing tools, product standards or labelling. However, it should be noted that consumers tend not to replace household items (e.g., light bulbs, washing machines, etc.) until they become unusable, which makes the penetration of even "green zone" options rather slow.

**Substance bans** may work in the green zone only if a good substitute is available at a reasonable price. The ban on mercury in glass thermometers is a good example. Digital thermometers are available and affordable substitutes. Nonetheless, mercury based thermometers would probably remain on the market without a strict regulation to phase them out. Asbestos insulation or Mercury-Cadmium batteries are other examples of the same kind.

**Voluntary agreements** as supply-side policy tools also work best in the yellow zone as they embody company measures based on a mutual agreement procedure between them and regulatory authorities for the sake of the environment. For green zone options there seems to be no need of such agreements while at the other end of the spectrum, red zone options can not be managed using voluntary agreements.

**Product design guidelines** also include climate-related legislative elements, like the Directive 2009/125/EC on ecodesign requirements for energy-related products. The aim of the Ecodesign Directive is „to reduce the environmental impact of products, including life-cycle energy consumption by providing EU-wide rules for the design of energy-related products" (http://ec.europa.eu/environment/gpp/eu_related_en.htm). The Directive inter alia promotes the development and application of technical or performance-based specifications for green public procurement.

Standardization also belongs to the group of supply side measures, making the organisational background and production activities of companies more suitable from a climate-friendly perspective and indirectly creating more sustainable consumption.

This list can be extended and there is a space for analysing the effectiveness of different consumer policy tools more deeply case by case, utilising practical examples.

## 6. Conclusions

Keeping climate change under control increasingly appears to be one of the most urgent and ambitious challenges for mankind now and in the future, making innovative solutions and sacrifices necessary. Consumer-oriented environmental policy tools are becoming widespread, especially in the more developed countries, in order to tackle the problem through reducing GHG emissions. The above chapter aimed to present a model which is appropriate for evaluating the effectiveness of consumer policy tools which can be implemented to put GHG mitigation solutions into action. Political support is very important, but it can be expected only when the social costs of GHG emission abatement are low and the climate change strategy can be implemented in a cost-efficient way.

As a framework for the analysis we constructed the marginal private and the marginal social cost curves, and identified three zones of action for GHG emission reduction. Then we introduced the profiling technique to identify barriers and opportunities for selected options. In the authors' opinion, special attention should be paid to options with high environmental potential and negative, zero, or slightly positive social costs. These are the typical "yellow" and "green zone" options which are most likely to be implemented although some barriers may hinder and slow down this process. We illustrated the profiling method using the example of different light bulbs.

Our suggestion for consumer policy is to use the profiling method in order to both compare the selected GHG mitigation options based on the identified barriers and to find the most relevant tools to demolish those implementation barriers. Pushing or pulling the profile string can be achieved by using appropriate consumer policy measures which can provide parallel solution for even more than one implementation problem simultaneously, moving the selected option into a more favourable position; a zone where action is easier and the option becomes more acceptable to society. Consumer policy tools can be classified based on their GHG emission abatement applicability and effectiveness for options which fall into different zones.

One future direction for research is a thorough analysis of consumer policy tools for several "green," "yellow" or even "red zone" options in order to find out how exactly the existing barriers to implementation can be dismantled in order to realise more effective climate strategies.

## 7. Acknowledgements

The research was financially supported by the project called TAMOP-4.2.1/B-09/1/KMR-2010-005.

## 8. References

Baden, S., Fairey, P., Waide, P., de T'serclaes, P., Lautsen, J. (2006). Hurdling Financial Barriers to Low Energy Buildings: Experiences from the USA and Europe on Financial Incentives and Monetizing Building EnergySavings in Private Investment Decisions, *Proceedings of 2006 ACEEE Summer Study of Energy Efficiency in Buidings*, American Council for an Energy Efficent Economy, Washington

Bertoldi, P. and Bogdan A (2006a). Residential Lighting Consumption and Saving Potential in the Enlarged EU, European Commission – DG Joint Research Centre, Institute for Environment and Sustainability, European Commission Joint Research Centre

Bertoldi, P. and Bogdan A: (2006b). Electricity Consumption and Efficiency Trends in the Enlarged European Union, - *Status report 2006*-, European Commission Directorate-General Joint Research Centre Institute for Environment and Sustainability

Commission of the European Communities (2001). Green Paper on Integrated Product Policy COM 68 final, http://eur-lex.europa.eu/LexUriServ/site/en/com/2001/com2001_0068en01.pdf

Creyts, Y., Derkach, A., Nyquist, S, Ostrowski, K. and Stephenson, J. (2007). U.S. Greenhouse Gas Abatement Mapping Initiative, McKinsey & Company.

Csutora, M. and Zilahy, G. (1998). Economic Analysis of Greenhouse Gas Mitigation Options in Hungary, Budapest University of Economic Sciences, Ph.D. Conference

Csutora, M., Zsóka, Á. (2011). Maximizing the efficiency of greenhouse gas related consumer policy, Journal of Consumer Policy, Volume 34, Issue 1 (2011), Page 67-90, DOI:10.1007/s10603-010-9147-0, www.springerlink.com/content/94j20g7223060p35/

Hinostroza, M.; Cheng, C.; Zhu, X.; Fenhann, J.; Figueres, C.; Avendano, F. (2007).; Potentials and barriers for end-use energy efficiency under programmatic CDM, Working Paper No. 3, CD4CDM Working Paper Series, UNEP Risø Centre on Energy, Climate and Sustainable Development, Roskilde, available at: http://www.cd4cdm.org/Publications/pCDM&EE.pdf

Jakob, M. (2007). The drivers of and barriers to energy efficiency in renovation decisions of single-family home-owners, CEPE Working paper series 07-56, CEPE Center for Energy Policy and Economics, ETH Zürich

Nemcsicsné Zsóka, Á. (2005). Consistency and gaps in pro-environmental organisational behaviour, PhD dissertation, Corvinus University of Budapest

Raaij, W. van, Verhallen, T. (1983). A behavioral model of residential energy use, Journal of Economic Psychology, 3, 1, 39-63.

Rubik, F., Scholl G., Biedenkopf, K., Kalimo, H., Mohaupt, F., Söebech, Ó., Sto, E., Strandbakken, P., Turnheim, B. (2009). Innovative Approaches in European Sustainable Consumption Policies, Schriftenreihe des IÖW 192/09, Berlin

Slovic, P. (1987). Perception of risk, Science, 236, 280-285

Slovic, P. and Weber, E.U. (2002). Perception of Risk Posed by Extreme Events, The Conference on Risk Management Strategies in an Uncertain World, Held In April 12-13, 2002, Palisades, New York, 1-21

Stern, N.: (2008). The Economics of Climate Change, American Economic Review, 98, 1-37

Thøgersen, J. and Crompton, T. (2009). Simple and Painless? The Limitations of Spillover in Environmental Campaigning, *Journal of Consumer Policy*, 32, 141-163

Tukker, A. and Jansen, B. (2006). Environmental Impacts of products, A Detailed Review of Studies, Journal of Industrial Ecology, 10 (3), 159-182

Ürge-Vorsatz, D. – Füle, M (1999). Economics of Greenhouse Gas Limitations, Hungary Country Study, UNEP Collaborating Centre on Energy and Environment and Riso National Laboratory, Denmark

Ürge-Vorsatz, Jochen Hauff, (2001). Drivers of market transformation: analysis of the Hungarian lighting success story, Energy Policy, 29, 10, Pages 801-810, ISSN 0301-4215, DOI: 10.1016/S0301-4215(01)00013-1.,

Wesselink, B. and Deng, I. (2009): Sectoral Emission Reduction Potentials and Economic Costs for Climate Change, ECOFYS.

World Research Institute (2010). Global Climate Trends 2005, http://earthtrends.wri.org/pdf_library/data_tables/cli5_2005.pdf

Zilahy, G. (2004). Organisational Factors Determining the Implementation of Cleaner Production Measures in the Corporate Sector, Journal of Cleaner Production, 12,4, 311-319

Zilahy G., Nemcsicsné Zsóka Á., Szeszler, Á., Ürge-Vorsatz, D., Markandya, A., Hunt, A. (2000). The Indirect Costs and Benefits of Greenhouse Gas Limitation: Hungary Case Study, Handbook Reports, UNEP Collaborating Centre on Energy and Environment and Riso National Laboratory, Denmark

URL-sources:

http://www.napkollektor-info.hu/component/poll/16

http://ec.europa.eu/environment/climat/climate_action.htm

http://ec.europa.eu/news/energy/090901_en.htm

http://ec.europa.eu/energy/efficiency/labelling/labelling_en.htm

http://ec.europa.eu/environment/etap/inaction/policynews/577_en.html

http://www.mst.dk/English/SustainableConsumptionandProductionintheNordicRetailSector/WhatCanPolicymakersDo/SelectedPolicyInstruments/DifferentiatedVAT/

http://ec.europa.eu/environment/gpp/eu_related_en.htm

http://www.epractice.eu/en/library/5280576

http://ec.europa.eu/environment/gpp

http://ec.europa.eu/environment/consultations/gpp_en.htm

http://europa.eu/legislation_summaries/environment/waste_management/l21207_en.htm

http://ec.europa.eu/environment/waste/weee/index_en.htm