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Climate Policy Initiatives, Regulatory Uncertainties and Corporate Strategies

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Abstract

Voluntary agreements (VAs) and emissions trading are new climate policy instruments that need to be integrated in existing policy framework. Surprisingly, guidelines on how to integrate different instruments in a consistent climate policy strategy are vague or lacking altogether. This can create additional and expensive market uncertainty. The optimal use of both new instruments in the European Union will also be determined by some important regulatory initiatives like the Integrated Pollution and Prevention Control (IPPC) Directive and the Green Paper on an Integrated Product Policy (IPP). The IPPC Directive will lead to the general use of Best Available Technologies in process installations while the IPP approach is based on a life cycle assessment that includes environmental impacts during the consumption phase. Both initiatives are discussed and the potential problems and inconsistencies with other instruments are indicated. An important conclusion is that VAs that look further than reducting emissions in the own industry or sector will gain importance.

1. Introduction

Since the 1997 Kyoto Protocol to reduce greenhouse gas emissions, all developed countries and a growing number of developing countries are considering various strategies and instruments to cope with the challenge of a possibly dramatic climate change. Simultaneously, private actors also have set up an impressive number of climate policy initiatives and action programs in which new environmental policy instruments like voluntary agreements between industry and regulators and greenhouse gas emissions trading play a pivotal role. For an overview of voluntary agreements in climate policy, we refer to UNEP (1997) and ten Brink (2002). Recent experiments with emissions trading are BP Amoco's greenhouse gas emissions trading, the Shell Tradable Emission Permit System (STEPS), the World Bank's Prototype Carbon Fund and Eurelectric's GETS2 and GETS3 (Albrecht and François, 2002). With its communication of October 2001, the European Commission clearly opted for greenhouse gas emission allowance trading within the Community (European Commission, 2001a). Emissions' trading have already started in the United Kingdom and Denmark and is currently considered in several other European countries.

In the United States, the attorney generals of 11 states wrote to President Bush to cap power plant carbon dioxide (CO_2) emissions and increase automobile fuel efficiency (Hassol and Udall, 2003). There are indications that the lack of national leadership in the US after the rejection of Kyoto Protocol by President Bush, can gradually be replaced by ambitious program in important states like California. Furthermore, numerous US-based companies already introduced programs to reduce their aggregated greenhouse gas emissions or to improve energy efficiency. Examples of important coalitions are the Pew Center on Global Climate Change with 38 major companies participating and Environmental Defense's Partnership for Climate Action. The latter initiative contributes to use of greenhouse gas emissions trading among the participating firms. The rationale for US-based multinationals to cut emissions is that they fear soon to be forced to do so anyway in foreign markets that, unlike the US, have signed on the international Kyoto Treaty to curb global warming (Claussen, 2002). Apparently, guaranteeing access to rich foreign consumer markets is of greater importance for US-based companies than the position on Kyoto of the Bush administration. Setting up a corporate climate policy program can turn out to be a future entrance ticket to the markets of Kyoto-countries.

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In most developed countries, a growing number of companies is getting involved in negotiated voluntary agreements as well as in emissions trading experiments to reduce industrial energy use or to reduce emissions of the 6 Kyoto greenhouse gases. Some of these countries already have a strong tradition of technical regulation and environmental taxation. As different instruments will be used next to each other, the combination and integration of these instruments in the near future is becoming a real challenge for many companies.

This paper concentrates on possible regulatory inconsistencies or additional uncertainties for companies when using different instruments together. Especially the lack of clear goals and detailed specifications on how to use new instruments will create regulatory uncertainty and additional management costs for industry. Voluntary agreements – probably the most popular category of climate policy instruments – are briefly compared to other instruments in the next section. This followed by a section on combining voluntary agreements and emissions trading. The European Commission clearly opted for VAs and emissions trading but some other new initiatives in European environmental policy will have direct and indirect consequences on both climate policy instruments. In the next sections, we focus on the impact of the European IPPC Directive and the EC Green paper on Integrated Product Policy on climate policy instruments.

2. Voluntary Agreements and Other Instruments

Thousands of voluntary agreements (VAs) with an environmental policy objective exist in industrialized countries and interest of policymakers in this instrument is still growing. Several factors are always mentioned to explain this evolution. VAs are expected to provide increased flexibility compared to command and control regulation; industry sees VAs as a means to prevent the enactment of new laws, new regulations and new green taxes; other stakeholders consider VAs as an opportunity to play a more active role in environmental policy, and finally; governments use VAs when regulatory structures are not adapted to specific policy goals (Barde, 2002).

The economic and environmental efficiency of voluntary agreements and other climate policy instruments are the subject of a growing body of research. It is difficult to come to general conclusions because there is no standard type of voluntary agreement that can be compared to the standard types of emissions trading, technical regulation or green taxes.

The increased popularity of VAs in climate policy – especially with energy-intensive industries – suggests that this instrument is preferred above less flexible approaches like mandatory technical standards or market-based instruments like taxes and emissions trading. In this context, it is essential to note that in countries like the Netherlands and Germany the participation in climate VAs exempts these industries from other possible climate policy measures (e.g. energy or CO_2 taxes).

Non energy-intensive industries mostly hold on a more passive stance but this will probably change. As most VAs have relative targets over long periods – e.g. a 20 percent reduction of energy use per unit produced by 2010 – they have in common with energy or carbon dioxide (CO_2) taxes that absolute reductions in tonnes of CO_2-equivalent emissions cannot be guaranteed. So it is always possible that output growth more than compensates efficiency gains per unit produced, leading to an increase of total emissions by the sectors in the VAs. However, the Kyoto Protocol foresees absolute reductions of emissions for each developed country. When emissions by industries with climate policy VAs increase and national emissions are capped, absolute reductions by the other sectors outside the VAs are simply unavoidable. An alternative is however provided by the international flexibility mechanisms in the Kyoto Protocol. As a result, sectors currently without a VA to manage their greenhouse gas emissions can face stricter targets in the future development of climate policy. There are strategic benefits associated with early VAs in climate policy and energy-intensive industries are probably more aware of these opportunities.

Emissions trading with an absolute cap on emissions is the only instrument that can guarantee fixed emissions reductions for the participating industries. With emissions trading, the price of an emission permit is difficult to predict. This complicates the participants' decision to choose for buying permits or for investing in internal reductions of emissions.

Emissions trading has the disadvantage of setting up a complex new market that needs to operate under all circumstances. This is a real challenge, especially for countries without emissions trading experiences at the national level. It is often argued that VAs do not need this type of bureaucracy and therefore offer inexpensive solutions for complex problems. This is not completely true. Negotiating a VA can be a relatively inexpensive process but without effective goal assessment, continuous monitoring and enforcement, the instrument will never be acceptable for many stakeholders. The cost of monitoring and enforcement can be relatively low for industries with homogeneous firms that all use the same set of technologies. However, for industries with heterogeneous producers like specialty chemicals for which unique technologies are used, standard goal assessment and monitoring of VA targets will become very difficult. Given the asymmetical nature of technical information at the company level, one can expect high and recurrent assessment costs for this type of industries.

3. Combining Voluntary Agreements and Emissions Trading

With respect to the combination of VAs with emissions trading, the best way to integrate both instruments is still subject to discussion. In most actual emissions trading schemes or proposals, it is acknowledged that both instruments need to be considered simultaneously. However, practical guidelines are mostly lacking. An exception is the UK system for emissions trading in which firms within a VA can use emissions trading to help them fulfil their obligations. Firms with absolute caps in their VAs will be able to trade the credits that they generate when performing above their baseline emissions target. This type of trading will have to operate retrospectively as the firm's true credit can only be measured at the end of the VA period (DETR, 2001). For companies within VAs with output-related efficiency targets – the 'unit' sector in the UK scheme –, any under- or over-achievement of output related targets will need to be converted to tradable allowances denominated in CO_2-equivalent tonnes. This conversion will be based on each companies' output and energy efficiency figures at the end of the compliance period. The amount of credits from output-related VAs will be restricted since strong output growth for the firms in the VA can lead to an absolute increase of emissions. Therefore, a 'gateway mechanism' is established to ensure that there can be no net sale of allowances from sectors with output-related targets to the sectors with absolute targets. This type of sale would only be allowed to the extent that allowances had previously moved from the sector with absolute targets to the sectors with output-related targets. This gateway will be kept under review and will be closed in 2008 (DETR, 2001).

In the proposal of the European Commission, 'almost all [voluntary] environmental agreements in place are stated to be adapted to the emergence of new elements, such as the introduction of an EU-wide emissions trading scheme (EC, 2001a, p.7).' The Commission suggests that the targets set under VAs can serve as a useful basis for the allocation of allowances by Member States. How this type of allocation will allow to realise the national reduction targets in the Kyoto Protocol, is not mentioned. Furthermore, VAs with relative targets should also be converted into tradable quantities of emissions in a given period. The Commission foresees that this conversion should be done by using output forecasts. In contrast to the UK approach, working with output forecasts will make it possible to trade credits before the end of the compliance period of the VA.

The main complication is that emissions trading works with an absolute cap on total emissions while VAs aim at improving relative energy use, i.e. emissions or energy use per unit produced. The UK as well as the EC scheme will integrate both instruments by creating additional bureaucratic structures next to the already very complex emissions trading market. But does it make sense to sell on the same market allowances that are the result from real emissions reductions next to credits that are based on emissions and output forecasts? It seems that two different commodities are sold on the same market. Even when one considers both credits as one homogeneous commodity, the latter type of credit increases uncertainty on the market. What will happen when the forecasts later prove to be wrong and the credits should not have been sold? A too high supply of allowances will disturb other market participants' decisions to sell or buy allowances or to abate emissions or not? Who will be hold responsible for this possible market disturbance? Cre-

ating additional uncertainties will reduce the attractiveness of emissions trading schemes for companies.

The proposed conversions in the UK and EC schemes are to a large extent arbitrary. Better alternatives should start from the consideration that relative or absolute targets both require efforts made by the companies. These efforts will bring economic costs on the short and long run. It is important however to realize that the impact of the efforts will be determined by other factors that cannot be controlled by the individual companies. Final output changes depend on macroeconomic conditions that aren't easy to forecast. Only monopolists can voluntarily restrict sales to increase the price of their products. In other market forms, voluntary reductions of sales and hence profits are difficult to imagine. Other factors that determine output changes are structural changes in the international economy, the arrival of new competitors, changes in consumer preferences, changes in economic and trade policy (e.g. the liberalisation of the European energy and electricity market) etc. As a result, the impact of internal energy efficiency investments largely depends on external factors. VAs with relative targets focus on internal measures while VAs with absolute targets and emission trading schemes with fixed caps indicate that external factors can be managed by the involved firms. Otherwise the industry would not commit itself to absolute reductions. When firms cannot control market forces – a typical condition for perfect competition; the most preferred theoretical market situation in literature on economics – what is the rationale behind imposing absolute targets in climate policy instruments?

This indicates a fundamental problem for corporate climate policy initiatives. The Kyoto Protocol is based on capped aggregated emissions for each country while emissions of most industrial sectors depend on international conditions.

4. The Impact of the IPPC Directive on EU Climate Policy

With the Integrated Pollution Prevention and Control (IPPC) Directive of 1996 (Council Directive 96/61/EC), the European Union has a set of common rules on authorizing or permitting for industrial installations. Pollution from various sources should be minimized by basing operational permits or authorizations for industrial installations on the concept of Best Available Technologies (BAT). "Integrated" in IPPC means that the permits must take into account the complete environmental performance of the plant, i.e. emissions into the air, water and soil, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, risk management, etc. The assessment of plant energy efficiency provides a clear link between the directive and climate policy goals. The directive will have important consequences for 30 industrial sectors and applies to all new installations as well as existing ones (EC, 2002a). Since the BAT concept can imply rather radical and hence expensive environmental improvements, a long transition period of eleven years has been granted. With respect to energy efficiency, the common level of effort provided by the IPPC Directive is a baseline or bottom line which European industries should not be able to go below (EC, 2002b). The IPPC Directive will lead to an EU-wide harmonization of the minimal level of industrial energy efficiency. According to the EC (2002b), this common level of effort for energy efficiency is not expected to be very problematic. The potential energy savings from the IPPC Directive are estimated by Haworth *et al*.(2000). In their survey the authors identified potential energy savings options in processes covered by the IPPC Directive. They found a potential of 12-14% primary energy savings across the whole range of IPPC installations at a total capital cost of € 35 billion. Net-benefits of energy savings for industry were estimated at € 14 billion. From an economist's perspective, the high capital costs and low expected benefits explain why many sectors do not invest in possible energy savings. Implementing the IPPC requirement to invest in new energy efficiency technologies would not be a cost-effective strategy when in non-IPPC sectors or in other countries much less expensive options to reduce energy use are available.

The IPPC Directive is not designed as a part of a climate policy strategy but will interfere with other climate policy instruments. There is a good chance that the end of the directive's transition period falls together with the negotiations on post-Kyoto emissions reductions targets. These future targets are expected to be a continuation of the actual targets for the period of 1990-2012. Let us assume that the new target for the European Union by 2030 is a reduction of greenhouse gas

emissions by 30% compared to the 1990 level. With business as usual scenarios predicting a further increase of greenhouse gas emissions for the EU, the needed absolute reductions will be much more challenging. What is in this context the value of giving in 2010 an IPPC permit to an energy intensive company or industry? The permit is based on the technologies used in the company but it is very questionable whether even the best available technologies will lead to a 30% reduction of energy use and emissions in the company or industry. We can end up with a situation in which industries that first received an IPPC permit to operate because they use the best available but expensive energy efficiency technologies become a subject to climate policy programs. These programs aim at further reductions of internal energy use or at buying permits for emissions in excess of predetermined allocations. When participating in emissions trading turns out to be very expensive for the IPPC permitted industries, one can even expect legal challenges to the trading scheme: why first give an authorization to produce with the best available technologies and then impose the participation in an expensive trading scheme? As an alternative to emissions trading, this possibility of legal conflicts will not rise with VAs. Of course, a great number of new VAs negotiated after IPPC implementation can be an indicator of the availability of remaining energy efficiency improvements.

The IPPC Directive has important implications for European VAs as well as for emissions trading within the European Union. At the end of the transition period for the directive that started in October 1999[1], the BAT concept will determine the technical standards for the largest industrial companies in the EU. This implies that future VAs with an emissions reduction target below the reductions that would result from the application of BAT, loose all relevance. The future assessment of the environmental effectiveness of VAs will not be limited to comparing actual and business-as-usual emissions; emissions in the VA also need to be lower than emissions under the BAT scenario. From 2010 on, the next generation of European VAs for climate policy will become BAT-VAs. Technological process regulation will become more prominent in European environmental policy.

The IPPC Directive also influenced the European proposal of EU-wide emissions trading. In Annex III of the emissions trading proposal, we find that 'quantities of allowances to be allocated shall be consistent with the technological potential of installations to reduce emissions (EC, 2001a, p.34).' This criterion implies a technology-based emission permit allocation scheme according to the IPPC philosophy to use BAT as a tool to harmonize the environmental performance of European industry. For an emissions trading scheme, this type of allocation has important disadvantages. The efficiency of emissions trading depends on reliable information on future allocations of tradable credits to participants. Important investments in emissions reduction technologies or process changes are based on the difference between expected emissions under the business-as-usual scenario and allocated tradable permits. Expectations on future permit prices are essential in the decision to buy permits or to invest in abatement. Given the perspective of a technology-based future allocation of tradable permits or credits, market behaviour of emissions trading participants will be significantly altered. The technology-based allocation in Annex III suggests that without the availability of new technologies to further reduce emissions, the future allocation will be higher than in the case with new technologies. The additional uncertainty can be an incentive to monitor technological innovations and invest in lobbying strategies to challenge the cost-effectiveness and environmental impact of these new technologies for the own industry or company. The technology-based future allocation that is the result of the IPPC Directive can significantly limit the expected benefits from emissions trading in the European Union.

As a result of the EU emissions trading proposal, the IPPC Directive will be amended to ensure that, where emissions of a greenhouse gas from an installation are covered by the emissions trading scheme, the IPPC permit relating to that installation does not set a limit on its emissions of that greenhouse gas. The European Commission acknowledges that this emissions limit would

[1] The 15 EU Member States needed to adjust their national legislation in line with the directive before the end of October 1999. In July 2002, several Member States still not confirmed to the European Commission that this has been done. The most serious delays have occurred in Ireland, Belgium (the Walloon region), Luxembourg, Spain and Greece (EC, 2002a).

reduce the benefits of the emissions trading scheme (EC, 2002b). It is so far not clear how IPPC efficiency targets for installations will be treated. These targets also influence final emissions.

The European Commission opted for an ambitious body of technology process regulation that will be coordinated by a specific bureaucracy, the European IPPC Bureau. Other principal players will be licensing authorities in 15 EU countries, the Directorate-General Environment, Member States' and industry experts on BAT, environmental organisations and the public that will have access to all information. Since the IPPC Directive requires continuous technology monitoring and the diffusion of information, its operational costs will be relatively high. Setting process energy efficiency targets to be reached by each industry within a given period would be a much less expensive approach.

Furthermore, the 'IPPC approach' suggests that the contribution of industry to the goals of environmental policy should be limited to operating under specific technological constraints on global environmental impact. This is a limited perspective that excludes important incentives for technological innovations that can benefit other sectors (e.g. consumers).

5. The European Goal of Integrated Product Policy

In February 2001, the European Commission adopted a Green Paper on an Integrated Product Policy (IPP). The central objective of IPP is to improve the environmental performance of a broad range of products throughout their life cycle. The ideas in the communication are put forward to stimulate public discussion on the prospects for greening products and the appropriate tools for reaching this goal. The rationale for IPP is the large untapped potential to improve the environmental impact of a broad range of products and services (EC, 2001b). Possible instruments for IPP are economic instruments based on the price mechanism, producer responsibility, eco-labels, environmental declarations, public procurement, product information, eco-design guidelines, standards and product panels (EC, 2001b).

For Commissioner Margot Wallström (2000), IPP with its focus on different environmental media and isolated stages of the product life cycle like energy use in the course of product use, could prove a powerful complement to traditional environmental policy making. With respect to the implementation level of IPP, Wallström aims to apply voluntary economic or regulatory instruments with a shared responsibility for all relevant stakeholders. Key challenges are gaining experience, the integration of IPP in different policy areas and new types of stakeholder involvement (Wallström, 2000).

The business community seems to support the IPP approach as a contribution to Sustainable Development. An advantage of IPP is its use for long term business planning and the incentives for continuous innovation. Key concepts for the implementation of IPP will be integrated environmental management, effective voluntary initiatives of business and industry, shared responsibility, respect for market forces and consistency (Kleibeuker, 2001). American business chambers and councils are less positive with respect to IPP. They fear that some of the proposed IPP policies are a recycling of programs that have been shown to be largely ineffective in the past and that could also disadvantage non-EU companies. From the US perspective, IPP could create new market distortions without being clear about the science underlying specific environmental targets (USCIB, 2001).

Several European companies already use practices that are very close to the ambitions of IPP. A good example is the EcoEco Savings tool developed by Electrolux. This tool calculates energy savings by households from buying a very efficient Electrolux household appliance (Electrolux, 2001). Given the experience with the slow integration of the IPPC Directive in the national legislations of Member States and a long transitional phase to implement the new IPP legislation, it will probably take a long time before a comprehensive IPP strategy will be a reality in the EU. Furthermore, the vague policy goals and unspecified instruments with IPP complicate companies' investment decisions. One of the options to speed up this implementation process is making use of existing experiences with voluntary agreements.

6. Limitations

So far, VAs as well as emissions trading seem to reduce climate policy to an absolute or relative emission reduction target for energy-intensive industries. The reduction target of each industry can differ or can be identical to the national reduction target as agreed in the Kyoto Protocol. The latter 'linear' approach does not lead to the most cost-effective reduction strategy. The marginal emission reduction costs can strongly differ between industries. Regardless of the type of reduction target for each industry, this limited view on climate policy is not necessarily in line with the long-term goal of improving the sustainability of production and consumption patterns as stated in the Rio Declaration. Can we reduce global emissions by focusing on targets for a limited number of industries in a limited number of countries? In the EU, the majority of greenhouse gas emissions is originated outside industry. However, clear reduction targets for households, road transport and the service sectors are rarely discussed, especially not by politicians with the turbulent fuel tax protests of September 2000 in Europe on their mind[1].

Policymakers that want to finish this stalemated situation should consider that the responsibility of industry is not limited to emissions during industrial production. Energy use by households, in transport and in the service sector (that includes public administration), is the result of technologies, economic structures and institutions that have been developed by industry and legislators in order to meet articulated and non-articulated customers demands. A large part of these structures is the result of specific regulation (e.g. building codes, housing policy, industrial production standards, environmental policy, transportation and communication policy, etc.). Products flow through these structures. Consumption and production goods from industry will be used in other sectors where they lead to energy use and emissions. If we consider the example of air conditioning equipment for buildings, VAs and other instruments like emissions trading for equipment manufacturers will only focus on emissions during the production of air conditioners. They can induce technological innovations that reduce energy use during this production phase. It is however quite obvious that everyone who buys an air conditioner will increase his residential energy use compared to the situation without the air conditioner. As for refrigerators and freezers, there are significant differences in energy efficiency between air conditioners during the consumption phase. These differences can be attributed to different technical standards but this does not need to be the case.

Current types of VAs and proposals for emissions trading do not stimulate the firms that invest in energy savings during the consumption phase. The impact of this type of incentives can be very important for all consumption and capital goods that need energy when used. Buyers of energy-consuming goods will not automatically opt for more efficient and more expensive air conditioners because of the higher initial investment costs and high implicit discount factors for future energy savings. Sutherland (2000) concludes that discount rates for household investments are mostly between 20% and 30% and that high family incomes are associated with lower discount rates. Dixit and Pindyck (1994) use the irreversibility argument to explain why high discount rates characterize rational decision making.

The attractiveness of the more efficient air conditioners can be increased by taxing the least efficient types, by giving subsidies for buying the most efficient types or by agreeing to ban the least efficient types from the market. The first option is very interesting when the producers of the most efficient types can easily increase output at profitable conditions without price implications. Otherwise consumer surplus is lost. The second option is the most expensive solution and agreeing on a ban needs a representative platform where producers can discuss this option with legislators.

[1] Energy taxes on heating oil and transport fuels are already very high in Europe. In September 2000, truckers in Britain, France and Belgium blocked roads, ports and oil refineries. In France and Britain there was a fuel shortage at the pumps and opinion surveys showed widespread public support for reductions in the taxes on gasoline and diesel (Mitchell and Dolun, 2001).

Finally, the current focus in VAs and emissions trading with challenging emission reduction targets in the production phase can detract investment funds from research to improve the energy efficiency during the consumption phase.

7. How to Manage Complex Interactions and Uncertainties?

In this section we first discuss the optimal industry contribution towards reducing or limiting greenhouse gas emissions. In the next subsection, we draw some conclusions from the overview of interactions between different instruments.

7.1. Is There an Optimal Approach Towards Corporate Climate Protection?

The example of the air conditioner illustrates that focusing on reduction targets for specific sectors is not enough. The 'climate responsibility' of industry is not limited to the efficiency of internal business practises. A 'horizontal product perspective (HPP)' can be revealed; a product leaves a specific company to be used in different sectors like households because of the institutional framework that makes this product attractive. The owner of a house will buy an air conditioner because this product is priced below his willingness to pay. If the regulator had imposed other building codes with much stricter insulation and material requirements that make air conditioning equipment unnecessary, the owner would not be willing to pay for the air conditioner and the producer would need to seek other markets or to develop other products. The difference between this 'horizontal product perspective' and various types of life cycle assessments (LCA) is the involvement of the regulator[1]. In the future development of climate policy, regulators probably will have to make choices which markets cannot make; what type of production and consumption patterns should be pursued and stimulated in the coming decades? In specific cases, some product categories will be banned from the market or replaced by more efficient types.

Industry should prepare itself for this possible evolution by close monitoring the impact of its products during the complete life cycle. This will make it possible to consider various trade-offs with respect to changes in product design and other characteristics. Product redesigns to lower the environmental impact during the consumption phase can have important price consequences. On very competitive markets, manufacturers will only opt for environmentally more efficient products when the resulting product price increases do not impact the competitive position of the company. When its competitors do not apply to a similar sustainable approach, their lower priced products can gain market share when consumers remain indifferent with respect to the environmental impact of the product they buy. A voluntary agreement that brings together competitors, regulators and eventually consumer groups can be the best option to overcome competitive concerns. The goal of this VA would then be to minimize the total environmental impact of important consumer products over their life cycle. The voluntary agreement can serve as an appropriate platform with all involved stakeholders. There is already a number of VAs that emphasize this type of product regulation. A good example is the ACEA[2] Voluntary Agreement (Zapfel, 2002). This agreement is however the result of negotiations between the regulator and car manufacturers. This is not the ideal stakeholder platform with consumers, suppliers, independent experts, NGOs, etc.

The instrument of voluntary product regulation supported by VAs is one of the possible operational translations of the recent European proposals for an Integrated Product Policy (IPP). A long transitional period is essential to gain experience with voluntary product regulation and to introduce the desired changes in production and consumption patterns.

The ongoing experiences with VAs can be essential for streamlining the stakeholder consultation process in matters like long-term economic changes. So, although existing VAs solely

[1] An LCA is a tool to compare the total environmental impact of different products. Industries decide themselves how to use these results for future production options. Regulators do not prescribe how to interpret the results of LCAs : clear environmental targets are currently lacking.

[2] The agreement between the European Commission and the European Automobile Manufacturers' Association (ACEA) was approved in 1995. The main result of the agreement is the reduction of average CO2 emissions to 120 g/km for newly registered cars by 2005. An intermediate target for 2003 is 170 g/km.

focus on improving energy efficiency, their consultation process with numerous stakeholders is probably the best platform to discuss challenging options like which products should be replaced by completely different types within a decade. A first step of transforming conventional VAs into VAs to develop voluntary product regulation can consist of balancing investments in product redesigns leading to future emission reductions to investments in immediate reductions of emissions. The former option will reduce emissions in the consumer sectors while the latter only considers emissions during production. A balance is needed because not all industries have the financial means to internally reduce emissions and simultaneously develop the sustainable consumption goods for the future.

Voluntary product regulation will require a shift in the conventional use of command and control regulation. A long learning process with monitoring organisations and commitment from many governmental departments will be essential. There are some clear benefits from voluntary product regulation:

1. Market uncertainty is significantly reduced when the environmental characteristics (e.g. energy use) of preferred products of the future are clearly defined. When some manufacturers currently need to make a choice between an inefficient but low-cost electronic appliance and a very efficient but more expensive type, stable energy price expectations and the absence of measures that reward energy efficiency during the consumption phase can make the inefficient type of the most profitable choice. With the involvement the company in a process of voluntary product regulation, the manufacturer knows what level of efficiency will be required in the future and what the willingness to pay by future consumers can be.
2. When minimum levels of technical efficiency become a precondition for future market access, technological innovations that reduce energy use by consumers become essential for maintaining access to the richest consumer markets. Innovations to reduce the production cost of inefficient types are not rewarded anymore. R&D budgets will be more in line with sustainability goals.
3. The evaluation of the environmental effectiveness of the new legislation is straightforward: the new products meet the standards or not.

7.2. Integrating Different Instruments

The IPPC Directive and the IPP approach can become powerful tools to develop a complete European body of legislation that covers production processes as well as the complete environmental impact of consumption and production goods. The IPP approach – although still rather vague – makes it interesting to reduce emissions in other sectors than in the producing industries. In comparison to the IPPC Directive, the IPP perspective is much broader and not limited to the production phase. With IPP, products with a production process that has important negative impacts on the environment will disappear from the market unless they have more than compensating environmental benefits during the consumption phase. Consequently, the successful implementation of future IPP legislation will reduce the importance of IPPC.

The IPPC Directive will complicate the establishment of a well-functioning emissions trading market once the authorization system is applied in all Member States. Another consequence is the requirement to compare the targets of VAs with possible emissions reductions when using BAT. This will improve the assessments of the environmental effectiveness of VAs. The lack of a uniform assessment tool is one of the critical points in the actual debate on VAs. Doing better than with the use of best available technologies is of course a real challenge. Only with changes in product mixes or with efforts to reduce emissions during other phases than the production phase, it will be possible to meet this challenge. As a result, the IPPC Directive will make industries with VAs opt for the already discussed horizontal product perspective or more conventional applications of life cycle assessments.

8. Conclusions

Voluntary agreements and emissions trading are relatively new instruments in climate policy. Especially the energy-intensive industries favour VAs. Since these agreements do not guarantee absolute emissions reductions, other sectors in the economy can be confronted with challenging reduction target. A passive climate policy attitude can have negative strategic consequences. New climate policy instruments need to be integrated in a policy framework that already consists of command and control regulation and other economic instruments like taxes and charges. Surprisingly, guidelines on how to integrate different instruments in a consistent climate policy strategy are vague or lacking altogether.

The optimal use of both new instruments in the European Union not only depends on theoretical arguments but will also be determined by some important regulatory initiatives like the Integrated Pollution and Prevention Control (IPPC) Directive and the Green Paper on an Integrated Product Policy (IPP). The IPPC Directive will lead to the general use of Best Available Technologies in process installations while the IPP approach is based on a life cycle assessment that includes environmental impacts during the consumption phase. The IPPC Directive implies that future VAs will have a reduction target that is more ambitious than the reduction from implementing Best Available Technologies. As it is not obvious to do better than with the best available technologies, VAs that look further than reducting emissions in the own industry or sector will be important in the future. This new type of VAs will also consider emissions reductions in the sectors that use or consume the produced products. Industries should focus on these potentials.

We illustrated that the European scheme for emissions trading is complicated by the goal of the IPPC Directive. The EC proposal for emissions trading foresees that the allocation of permits should be based on the technological potential to reduce emissions. Market uncertainty can be the result of this allocation mechanism.

A final conclusion is that VAs will play an important but different role in the future of European climate policy. VAs can help to operationalize the goals of IPP and offer a unique stakeholders' discussion platform that will be essential to define the targets of voluntary product regulation. The latter is needed as an important step to more sustainable production and consumption patterns.

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