

Effectiveness and negotiability of environmental regulation

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Abstract

This paper investigates the limitations and possibilities of various regulatory strategies with respect to meeting the joint challenge of ecological and commercial modernization, in a context of loosely integrated polities. The major focus is on the trade-off between (1) regulatory effectiveness, (2) competitiveness and distributive effects across and between national energy industries, and (3) the political legitimation challenges that this poses at the national and international policy level.

The paper concludes that focusing on negotiability and choosing sequential 'soft' regulation does not necessarily imply weak environmental standards in the long run. Rather, the softly initiated evolutionary strategy represents a realistic appreciation of the fragility of global and federal institutions in issues of major industrial concern, and develops a path towards sustainable governance that takes this into consideration.

Introduction

Energy industry in both the EU (European Union) and other advanced industrial countries is currently facing two major challenges simultaneously, namely that of commercial and environmental modernization. By commercial modernization we refer to the process of deregulation and integration of both electricity and gas markets and the challenges this poses to companies and to regulatory authorities. By ecological modernization we refer to the process of finding national and international governance mechanisms that may support environmental management of energy industry, taking into consideration human effects on climate change and strong demands on government to secure low levels of local pollution.

Handling these two challenges simultaneously is a formidable task, particularly as this takes place under weakly coordinated international governance.

- On the one hand, the exposure of energy industry to international market competition implies that national governments may no longer intervene to regulate energy industry on a unilateral basis, without setting the competitiveness of national industry at risk. If one nation sets considerably higher environmental standards for its industry than its industrial competitors, this may undermine the industrial profitability of the avant-garde nation's industry and transfer energy production to less strictly regulated nations.
- On the other hand, even relatively loose political cooperation to overcome the fallacy of unilateral governance under international market competition is hard to achieve. Differences in resource bases apparently imply that most common environmental policies would have distributive effects that prevent certain nations from accepting them.

Thus, in the context of the fairly loosely integrated EU, and even more, of course, in the context of the international climate negotiations regime, there appears to be strong forces, both at the commercial and at the political levels, that oppose strong environmental regulation of the energy industry. Politically negotiated top-down environmental policies are clearly running into trouble. New and more flexible regulatory mechanisms are, therefore, being created to enable environmental regulation without too strong negative effects on the competitiveness of the energy industry. These new mechanisms rely strongly on bottom-up and/or subsidiarity (national or regional autonomy in implementation). In some cases, environmental regulation may also offer unique opportunities for industrial innovation so that optimal coordination between industrial development

and regulatory intervention may potentially take place in a win-win atmosphere. There are, in other words, options that, if explored creatively, might take us out of the present non-decision dilemma.

To further the search for constructive options in this situation, this paper investigates the limitations and possibilities of various regulatory strategies with respect to meeting the joint challenge of ecological and commercial modernization in a context of loosely integrated polities. A major focus is on the trade-off between (1) regulatory effectiveness, (2) competitiveness and distributive effects across and between national energy industries, and (3) the political legitimation challenges that this poses at the national and international policy level.

The following section outlines an analytical framework, phrased in strategic game-theoretical terms. Then follow three sections focusing on strategic aspects of three distinct regulatory strategies. The first concentrates on government-initiated flexible mechanisms such as quotas and tradable permits; the second on market-based instruments such as green electricity markets and consumer initiatives; and the third on negotiated regulation, where industry agrees to self-regulation in a dialogue with the state.

Our analysis indicates that the attempt to simultaneously modernize both in commercial and in ecological terms is difficult. Internationalization and commercialization of energy markets under weak international governance, such as the EU, easily fails in developing collective solutions such as strong 'polluter pays' regulation. This may subsequently lead to a retreat to national protectionist environmental strategies at a minimum common denominator level.

The paper argues that the emergence of new, alternative forms of 'softer', non-authoritarian regulation points at possible ways out of the deadlock as they allow us to strike new and better balances between effectiveness and negotiability. The way this balance is struck is idiosyncratic to each regulatory strategy and is dependent on distinct characteristics such as their facilitation of negotiation and effect on distribution among the participants in the regulatory game.

One of the ways to do this can be to develop general agreements on emission targets between nations and to then delegate to each nation, in dialogue with national industry, to find the mechanisms by which these targets can be met. In this way, the paper argues, international environmental policy makers may push for fairly ambitious goal-setting, while appeasing corporate interests by leaving room for them in the implementation phase.

Finally, the paper argues that, in an evolutionary perspective, environmental regulation and the normative pressure that it entails

may shift consumer preferences in a green direction. If adequately channelled into the market context, this might move the bottom-line economics in a green direction, from where new environmental regulation would take it further. Furthermore, when companies see their interests served by strategic and economic opportunities offered by green products and green technologies, they may come to support further green regulation and also pursue greening policies at the business level, e.g. by profiling greenness as part of their competitive strategy. This dynamics potentially also pushes competitors in the same direction.

Strategic aspects of environmental regulation under weakly coordinated governance

Commercial modernization and the move from planned to market economy entails a parallel need for reforming environmental governance towards market-oriented environmental policy instruments. Taxation according to the 'polluter pays' principle, which adds a cost to polluting energy production proportionate to its negative externalities, is a classic first-best solution. The problem is that this policy instrument requires strong and coordinated governance throughout the whole market system. When an integrated energy market is imposed under a weak environmental governance structure, first-best environmental regulation, such as the 'polluter pays' principle, is highly difficult to achieve.

Core elements of the problem of environmental regulation of energy industry under international competition may be formulated in terms of a simple strategic game where the parties have two options. They may choose between a first-best principle for environmental regulation applied to the whole market area (we shall here assume a uniform tax based on the 'polluter pays' principle) or they may pursue nationalistically defined environmental policies. Applied to a competitive international energy market, such protectionist environmental policies are likely to lead to sub-optimal solutions for the market system as a whole, as they will tend to maintain inefficient forms of energy production and environmental governance will be managed locally, in each national market segment according to different standards, leading to complex interaction effects between environmental regimes in different regions.

To start out with, we shall assume identical interests between the state and dominant parts of its energy industry and analyse the strategic interplay under assumptions of equal distribution of energy resources and technologies across nations throughout the whole market area. We will subsequently modify these assumptions in two

steps. First, we shall discuss the strategic interplay under unequal distribution of energy resources. Second, we shall also leave the assumption of identity between state and industrial interests and elaborate on the strategic consequences of a two-level analysis of negotiation – an international and a domestic level – which recognizes the possibility of domestic conflict about what the ‘national’ interest requires. We are here following the tradition of Putnam (1988), Scharpf (1997), and others.

Coordination under equal resource distribution

The implementation of ‘polluter-pays’-based environmental regulation of the energy system, under symmetric resource endowments between weakly integrated nations, is foremost a question of coordination. The assumption that systems are similarly fuelled implies that competition takes place on an equal basis and that general first-best environmental regulation, according to the ‘polluter pays’ principle, will have the same implication for all parties concerned.

The plusses and minuses in Table 1 presents the welfare gains for each strategy combination seen from the side of both parties. As illustrated in Table 1, gains and losses are similar and symmetric. Both parties have incentives to cooperate to develop a system of environmental regulation, according to the ‘polluter pays’ principle, from which they both individually profit (+/+ in square 1). Given the assumption that the ‘polluter pays’ principle is applied systematically throughout the whole market area, this would also constitute the most effective solution from the point of view of the integrated market system as a whole.

However, without coordination, both parties have incentives to fall back to nationalistically defined environmental policies that lead to a

Table 1 Environmental regulation in a two-party game with equal endowments

	<i>Part 2 ‘Polluter pays’ regulation, calibrated to the international market</i>	<i>Part 2 Nationalistically orientated environmental policies</i>
Part 1 ‘Polluter pays’ regulation, calibrated to the international market	1 + / +	2 - - / + +
Part 1 Nationalistically orientated environmental policies	3 + + / -	4 - / -

far less preferable solution (–/– in square 4) when both parties' strategies are combined. In this case, both parties would end up with less attractive policies, out of fear that one-sided general application of the 'polluter pays' principle would lead to exploitation from the other party. This could, for example, take place through environmental policies that would allow environmental dumping from less strictly environmentally regulated countries. Such exploitation might, for example, result from nationalistically defined environmental policies that would distort competition. The example of Finnish–Danish trade relations under one-sided application of Finnish 'polluter-pays'-based CO₂ taxation is a case in point. Danish coal-fired generation without a CO₂ tax could easily underbid similar Finnish electricity generation that suffered a substantive CO₂ tax and which thereby came under threat.

The example illustrates the worst case scenarios (–/++ and ++/– in squares 2 and 3) for part 1 and 2 respectively, resulting in Finland abandoning the one-sided application of the 'polluter pays' principle, thereby bringing the game back to the square 4 suboptimal equilibrium.

In this case – where one can identify an equilibrium in joint application of the 'polluter pays' principle calibrated to the integrated market – we are facing a simple coordination game, which may be solved through mutual trust and cooperation and where centralized intervention is only needed for credible coordination. Under these strategic conditions, responsible collective governance may, therefore, be reached under voluntary convention without strong authoritative pressure applied by super-national organization.

Zero-sum conflicts under unequal resource distribution

The large difference in the fuelling of European energy systems, however, moves the challenge of consistent, market-oriented environmental regulation beyond the simple coordination problem. Under unequal resource distribution, the parties enter into a strategic situation where even collectively oriented strategies are clearly suboptimal to some actors, at least in the short run. We are here maintaining our assumption of symmetry between state and industrial interests.

There is extensive variation in the composition of EU electricity generation in terms of fuel sources (Figure 1). In Germany, UK, and the southern European states of Spain, Portugal, Greece, and Italy, thermal generation is predominant with generation based on fossil fuels. This stands in contrast to France, Belgium, and Sweden where electricity generation is predominantly nuclear based. In countries such as Denmark, Austria, the Netherlands, and Finland, a mix exists, yet with strong reliance on fossil fuels and thermal generation.

Figure 1 EU (European Union) sources in electricity generation: 1996
Source EU (1998)

With this diverse composition, the ensuing emissions and environmental impacts of electricity generation varies extensively among European countries. For example, CO₂ emissions per capita (Figure 2) vary by a factor of 1 to 4, with Luxembourg as the most polluting and Portugal as the least polluting country per capita (Figure 2).

Given the large differences in resource endowments, the burdens of collective environmental regulation for some national energy systems may prevent common solutions. While the parties in a coordination game – where the gains are equally distributed – have incentives to end up in an equilibrium of the ‘polluter pays’ regulation calibrated to the international market, there is no such equilibrium under large inequalities in resource endowments and following inequalities in technological systems and environmental emissions. Given the unequal resource endowments¹ in fuel base and generation technology, the commercial effects of the strategy combinations that we discussed in the previous section will, therefore, affect the parties in a different manner from that in the previous coordination situation

¹ Our distinction between weak and well endowed refers to the fuel base and generation technology: well-endowed nations have ‘green’ production facilities at low cost, while weakly endowed have polluting fuel bases and technology at medium or high costs.

(Table 2). The commercial effects presented in the table may be summed up as follows, listed square by square.

The square 1 combination of joint ‘polluter pays’ strategies calibrated to the integrated market from both parts suffers from highly biased commercial effects, providing the less-endowed party with

Figure 2 EU (European Union) CO₂ emissions per capita: 1997
Source EU (1999)

Table 2 Environmental regulation in a two-party game with unequal endowments

	<i>Part 2 Weakly endowed 'polluter pays' regulation, calibrated to the international market</i>	<i>Part 2 Weakly endowed regulation oriented at protecting national actors and resources</i>
Part 1 Well endowed 'polluter pays' regulation, calibrated to the international market	1 + +/--	2 -/+
Part 1 Well endowed regulation oriented at protecting national actors and resources	3 ++/--(-)	4 0/0

clear disincentives to enter into this position. While the better endowed party will harvest extensive gains from price increases and an increased market share (++)), the less-endowed party may stand to lose large market shares (--) due to prohibitive tax burdens. In spite of its distributive effects, this is clearly the most beneficial strategy combination seen from an environmental point of view, for the market system as a whole.

The square 3 combination of an open, 'polluter-pays'-oriented strategy calibrated to the entire market system from the less-endowed party and protective nationalist strategy from the well-endowed is highly unlikely, because the interest to open up markets and go for collectively oriented regulation is likely to come from the better endowed party. For the weaker party this is a worst case, although hardly much worse than in square 1 (therefore [-1]), since the well-endowed actor would anyhow be in a strong competitive position. The stronger party will, therefore, not have strong needs for protection, and therefore have little gains from its protective strategy.

The square 2 combination of 'polluter pays' orientation from the well-endowed party and protective, nationalistic environmental regulation from the less-endowed party allows the weaker party to maximize its commercial interests by protecting its home market, therefore +, while the stronger party, with an open 'polluter-pays'-oriented strategy calibrated to the international market, will expose itself to environmental dumping from the weaker actor, therefore -.

Finally, the square 4 combination of mutual nationalistic protective environmental regulation strategies represent the equilibrium position in which both parties will end without authoritative pressure. This is a closed and protective economy position, which is clearly sub-optimal to both parties (0/0), but where they have no better alternative combination of strategies that is acceptable to both sides.

Even with credible coordination, therefore, the parties cannot reach common collectively orientated regulatory solutions because the country that harvests gains when commercial considerations are also taken into account seeks such solutions only one-sidedly. Under such conditions, and under the assumption of symmetry between state and industrial interests, distributive effects of 'polluter pays' regulation undermine collective action and countries find themselves locked into nationally protected strategies.

International coordination under competing subnational decision-making

The previous discussion in both the positive sum coordination and the zero sum cases has been based on the concept of single-level

negotiation, where each state represents its unitary vested interests at the international negotiation table. However, as widely recognized in the international negotiations literature (Putnam 1988 and Scharpf 1997, among others), the national positions at the international bargaining table are frequently shaped by domestic coalitions and the pressure they exert on national government. We may, therefore, speak of a two-level game, where the national game shapes the positions taken in the international game, but where the latter may, under given circumstances, also influence the other.

In environmental politics, two important domestic fractions are traditionally industrial and environmental interests. The former are typically well organized for political lobbying and command large resources to protect their vested interests. The latter may also have fairly well-organized front-runners, but usually acquire much of their influence only when able to mobilize broad popular support. The two domestic fractions, therefore, have rather different cost-payoff structures, as illustrated in Figure 3.

Given the way the two fractions are constituted, their relative strength is likely to vary with the mode of policy-making. Industrial interests are likely to dominate under routine politics or so-called 'low policy mode' because of their organizational capabilities and resources. However, as governments in political democracies are responsible to parliament, the decisions of the corporate channel may,

Figure 3 Payoffs in the national game over environmental policy under routine sectoral policy-making

in principle, always be challenged in the democratic arena. This may happen if the environmental fraction is capable of mobilizing the general public to give the issue high attention on the political agenda as a matter of general public debate. Under democratic decision-making, and most prominently in the form of a referendum, the general interests, because of their numerical weight, have a dominant say.

To translate sub-national strategic configuration into positions in international negotiations, we shall refer back on the matrix of strategic choice in Table 2, with the inclusion of environmental and general interests. For the sake of analytical clarity, we have included environmental interests as a separate category. As was the case of Table 2, we are assuming unequal resource endowments among the participating parties.

A deeper analysis of democratic and corporate decision-making would require the study of strategic options for subnational interests. Given our focus on decision-making between national interests, we are here limiting ourselves to noting the likely national outcomes of respective routine politics and highly mobilized political decision-making. This rather complex table may perhaps be best summarized square-by-square and line-by-line. The commercial aspects described in line 1 are identical with Table 2 and will not be elaborated on here. Focusing on environmental interests (line 2), therefore, we find the following pattern.

Table 3 Environmental regulation in a two-party game with unequal endowments

	<i>Part 2 (weakly endowed) 'Polluter pays' regulation, calibrated to the international market</i>	<i>Part 2 (weakly endowed) Regulation oriented at protecting national actors and resources</i>
Part 1 (well endowed) 'Polluter pays' regulation, calibrated to the international market	1	2
■ Industrial interests	++/--	--/(+)
■ Environmental interests	+/(+)	---/--
Part 1 (well endowed) Regulation oriented at protecting national actors and resources	3	4
■ Industrial interests	++/--	0/0
■ Environmental interests	0/0	--/(-)

The strategic combination in square 1 of the 'polluter pays' regulation calibrated to the international market, we will assume, provides environmental effects that are beneficial to both parties as far as CO₂ is concerned (+/+). In addition comes the abatement of local pollutants that are most beneficial to the weakly endowed part (part 2), marked by an extra (+).

The strategic combination in square 4 of mutually protective strategies, we assume, will entail suboptimal environmental regulation for both parties as it implies weak policy coordination and higher CO₂ emissions than necessary under an integrated energy market regime (-/-). The weak regulation of local pollutants is obviously most negative to the weakly endowed part (part 2), marked by (-).

The strategic combination in square 2 of the 'polluter pays' regulation calibrated to the international market from the well-endowed party and nationalist protective environmental policy from the less endowed may, under certain conditions, entail environmental effects that are more negative than the mutual protective strategy combination in square 4. This is because the regulatory openness of the less polluting party invites dumping strategies from the more polluting party 2 system. We have, therefore, scored this combination with a negative ranking -/(-).

Finally, the strategic combination in square 3 of the 'polluter pays' regulation calibrated to the international market from the less-endowed party and protective from the well-endowed implies environmental effects that are less detrimental than in square 2 because much of the assumed environmental benefit will accrue from export of cleaner energy from the well-endowed party into lesser endowed parties' markets. However, the square 3 strategy combination will undermine synergies from operating the two systems in conjunction and, therefore, scores lower than in the square 1 situation with the joint 'polluter pays' regulation, thus 0/0.

It may be argued that the general interests are more oriented to environmental policy than to industrial policy, in which case the balance in favour of a collective strategy even for less-endowed countries would occur under environmental mobilization. The dominant strategy of the well-endowed party is anyhow collective. Thus, democratic decision-making will tend to reproduce collective strategies under the above conditions.

Routine 'low politics' decision-making may, to simplify, be seen as solely based on the industrial aspects above. We may, therefore, as already argued in the previous section, conclude that with the above evaluation of commercial strategies, the dominant strategy for the weakly endowed country is the protectionist strategy, which

entails a less effective environmental policy seen from the market system as a whole.

The choice of arena, high policy/democratic or low policy/lobby politics may, in other words, be decisive for the outcome of national positioning in international negotiations.

Regulatory models and mechanisms

The preceding discussion basically assumed the use of one regulatory instrument as the first-best choice, namely the 'polluter pays' taxation calibrated to the international market. We then discussed the preconditions for using this instrument against regulation oriented at protecting national actors and resources.

Slacking our rather strong assumptions about the instrumentation opens up an array of new possible trade-offs between national industrial vested interests and effective environmental regulation. We shall here explore some of the 'new' regulatory mechanisms that carry with them an expectation of a better trade-off between regulatory effectiveness and negotiability of environmental regulation under market competition and weak governance.

We have elsewhere (Midttun 1999) presented a typology of approaches to environmental regulation that may also serve as the basis for this enlarged discussion of policy instruments. This typology divides the instruments into well-known hierarchic and market-based approaches along the horizontal dimension. Along the vertical dimension we have added an authoritative and non-authoritative dichotomy, which, together with the traditional market-hierarchy dichotomy, generates a two-dimensional matrix with four polar values (Figure 4). In this figure, the squares I and II of public service and government-imposed regulation belong to the traditional regulation debate over market versus hierarchy. The two squares III and IV of non-governmental hierarchic governance and market-endogenous regulation represent 'new' alternatives that deserve closer inspection in the light of the above discussion of state failure. A fifth form, V, negotiated regulation, represents an intermediary position.

Squares I and II represent traditional types of regulation that have been discussed in the previous section. Public service (I) implies a mode of governance where environmental concerns are directly embedded in the service management through instruction. The public owner may, in other words, impose a complex goal function with both environmental and wider welfare elements as a mandate on the administrative management of the firm. The administrative management is then, in turn, authorized to specify operative procedures to fulfil the mandate within the framework of a monopoly right to

Figure 4 Dimensions of regulation

supply the service. Given the current re-orientation of energy industry towards market economy, this form of governance is abandoned and will not concern us much in this paper.

Under competitive organization of the service (II), non-commercial goals are externalized to a regulatory agency outside the boundaries of the firm. The agency must then set explicit and general rules that provide incentives to the parties to fulfil non-commercial public goals under competitive firm behaviour. This square represents the conventional first-best approach to market-oriented environmental governance of the energy system, which has also been assumed in the previous section.

The first of the 'new alternative', expanded menu of environmental governance, square III: private hierarchy, implies that non-public organization with influence and authority to govern take regulatory initiatives to further collective goals. This may, for example, occur as trade associations are concerned with industry's reputation and take action to improve it. In such cases, trade associations may sponsor

and administer environmental codes of practice. Nash (1998) presents the US Chemical Manufacturer's Responsible Care Initiative, the American Petroleum Institute's programme, Strategies for Today's Environmental Partnership, and the American Forest and Paper Association's Sustainable Forestry Initiative as examples.

In principle, private organizations, such as industrial organizations, if dominated by an industrial coalition, which sees its interests served by strong environmental policies, might substitute government regulation by undertaking sanctions against excessively polluting members of the industrial community. This could be done irrespective of public authorities in the polluting industry's home country. However, such negative sanctions are perhaps unlikely except in extreme cases. The basis for acceptance of strong policies at the industrial association level is not likely to be stronger/better than at the government level.

However, industrial organizations are more likely to be involved in coordinating positive environmental governance measures. Attempts to develop industrially coordinated environmental certificates trading is a recent example where avant-garde industrial firms with the industrial association seek to establish markets and trading instruments, for example, the RECS (Renewable Energy Certificate System) initiative,² in spite of failure to establish such instruments at the government level.

The second of the new squares, IV: market-endogenous regulation, highlights the existence of a self-regulatory potential in industrial development. Consumers may voice concerns that – communicated through mass media – may trigger self-reinforcing regulatory action by producers. Sometimes, the process may be more complex and also involve NGOs (non-governmental organizations) as mediating actors.

Analytically, Hayek (1948) has eminently discussed this mode of regulation. Expanding on Von Mises' critique of planned economy and using the Mengerian concept of spontaneous order, Hayek focused on the self-regulatory character of market systems. Rejecting the option of a rational and comprehensive state regulation as unrealistic, he placed himself within an evolutionary tradition, viewing regulation as emergent rules and developments.

Endogenous market regulation may potentially support strong environmental policies against the interests of both energy industry and national government. When, for example, consumer interest is mobilized against polluting practices, industry may find itself in a

²The RECS is a private industrial initiative to promote trade in renewable energy certificates and to stimulate (internationally harmonized) national markets for renewable energy certificates (see www.recs.org).

squeeze, where the threat of customer boycott may override industrial policy interests.

Facing the increased complexity of environmental regulation, negotiated regulation (V) has become a popular mode of regulatory intervention. This is regulation at the interface between central authority and non-authority-driven regulation. This mode of regulation allows industrial interests to accommodate regulation to specific characteristics of their production system, to meet environmental targets flexibly, with minimal pain (Arentsen 1996). However, on the domestic scene, these negotiations have often been conducted in 'the shadow of hierarchy' (Scharpf 1989), that is, under threat of authoritative regulation if negotiations fail.

Several of the new post-Kyoto mechanisms have strong elements of negotiated, market-endogenous and/or private hierarchy governance. By use of 'softer' and more flexible mechanisms, the international climate policy negotiations seek to find ways out of the legitimation crisis for strong authoritative environmental regulation of the energy system under market competition with only weak regimes in place to handle coordination of international governance.

In the following sections, we shall explore these new alternative regulatory strategies in more detail with reference to the strategic dilemmas spelled out in the previous sections.

Flexible use of market mechanisms in environmental governance

Internationally, both at the level of the EU and at the level of the wider climate negotiations, participating parties have recognized the strategic problems associated with the 'polluter pays' taxation calibrated to the whole market economy under weakly coordinated multi-state decision-making contexts. This has triggered a search for regulatory mechanisms that can strike a better balance between effectiveness and legitimacy.

By allowing each state to formulate its own distribution of environmental obligations under a common agreement that sets national emission targets/quotas, each state is allowed to solve its environmental obligations through domestically targeted instruments. This model does, to some extent, also compromise between environmental and industrial interests. The environmental interests are important supporters of the global framework conditions, while the industry-dominated domestic decision-making takes over the design of national mechanisms for implementation.

In terms of our analytical scheme (Figure 4), flexible mechanisms work in an interface between square II competition under government-imposed regulation, squares III and IV market-endogenous

regulation, and square V negotiated regulation. The overall goals and the overall system/mechanism design are set by international agreements based on government authority. Then distribution and burden sharing is, to a large extent, negotiated at the national level, and, finally the price setting is market endogenous.

In terms of effectiveness, the flexible mechanism construct will hardly reach the standards of general 'polluter pays' taxation if the latter is applied consistently throughout the whole market area and across borders. First, the distribution of general initial obligations is probably not symmetric with the emission levels and environmental impacts of energy industries. Second, the distribution of the initial portfolio of permits within each country may be skewed and may depend dominantly on industrial negotiating power and not on allocation following efficiency criteria. Nevertheless, the result is probably better than square 4 solutions in the Table 3 matrix (mutual nationally protective strategies) as the collective environmental target is set via the design at the international level. This implies a collective welfare advantage compared to a business-as-usual development.

Another example of a mixed, complex form of regulation is the tradable pollution scheme. One precondition for using a tradable permit system is, however, that the pollution category is administratively feasible to control. It is primarily larger stationary sources (e.g. industries and utilities) that are of interest, as the tradable permit system needs a control system that relies on precise monitoring of pollution quantities.³ The household and transportation sectors with numerous small sources are less suitable targets for tradable permit systems.

Another precondition for a system of tradable permits to be effective is that firms or countries must have distinct marginal pollution abatement cost curves for there to be an incentive to trade. Firms or countries that have low abatement costs and are able to reduce their pollution levels below their permitted levels will be allowed to trade the permit/their excess amounts (referred to as a trade of credits). Conversely, firms or countries with high pollution abatement costs will have an incentive to buy permits if their pollution abatement cost curves are higher than the cost of permits.⁴ Given a biased

³Quantity monitoring is a further precondition for the establishment of a well-functioning sanction mechanism. The latter is typically based on economic fines, which to be effective must be set higher than the permit price (Svendsen 1998).

⁴The key difference between centrally authorized taxation and trade schemes is the property right aspect of tradable permits in which there is transferability of permits, credits, or quotas. The trade aspect is what makes it an economic instrument since a non-tradable quantity restriction would be an example of 'command-and-control', the regulatory procedure whereby an environmental quality standard is set and is to be obeyed.

initial distribution of permits, therefore, the trading across national borders serves to increase the efficiency and effectiveness of environmental policy.

Regardless of whether a maximum level of pollution, a targeted level of green energy, or CO₂ emissions reduction are used as examples, the basic logic of the policy instrument is the same. The target of green energy/total allowable emissions is first defined by some regulatory authority either at the national or international levels. Then, permits/quotas are allocated to countries, which in turn redistribute these at the national level to relevant industrial actors. Trade in permits/quotas may occur at the national and the international levels after a marketplace and verification and clearing systems have been established.

Using the example of renewable energy and electricity, percentage quotas would initially be distributed to participating countries by international negotiations. These would then be redistributed to the national electricity and energy sector as supply or consumption quotas through national negotiation processes. This leaves the sector with several options for compliance: first, through physical installation of green energy and renewable capacity; second, through financial transactions and the purchasing of 'green' certificates from a green market pool/independent renewable generators with certification of green kilowatt hours; or, third, through purchase of credits from suppliers with surplus credits.

All these mechanisms serve to increase the overall efficiency and effectiveness compared to nationalistic protective policies, driven by differences in the marginal costs of 'greening' diverse energy systems. By creating a market that balances permits and abatement costs, the trading mechanism is supposed to equate the marginal cost of green energy development across firms or countries or both. Assuming that the market for permits is competitive, this should lead to selection of the most cost-efficient green energy development.

Cost-efficiency and flexibility were issues raised in the instrument debate in climate change negotiations. Flexible mechanisms as outlined in the Kyoto Protocol (clean development mechanism or CDM), joint implementation or JI, and target-based emissions trading systems⁵) were advanced to provide participating countries with

⁵ The Kyoto Protocol incorporated four distinct mechanisms for the achievement of individual and differentiated emission reduction targets for the first commitment period from 2008 to 2012. These measures include (1) a CDM for project-based cooperation with developing countries (article 12 and accounted for in article 3.12) in which Parties not included among the Annex I countries will benefit from project activities that at the same time results in certified emissions reduction; (2) a project-based transfer of credits or JI (article 4) among Annex I

greater flexibility in the achievement of their obligations or QELROs (quantified emissions limitation and reduction objectives). By allowing the Parties to undertake, finance, or purchase emissions reductions outside their individual national territory, one increases the cost-efficiency of greenhouse gas reduction.

Although tradable permit schemes tend to ease distributive conflicts that arise in negotiations due to diverse resource endowments, they do not altogether do away with them. The challenges listed below highlight issues that potentially bring us to the same dilemmas.

- Maximum levels of pollution, CO₂ reduction, or mandatory renewable energy levels need to be negotiated.
- Distribution of quotas/permits needs to be determined first through international negotiation, then at the national level among sectors and industries.
- Trade rules and compliance and monitoring systems need to be developed and implemented across borders.
- Green/renewable energy definitions need to be negotiated.
- New versus existing levels of green energy production need to be negotiated.

Nevertheless, under the assumption that some regulatory initiative is unavoidable given internationally stated commitments, trade schemes seem to offer advantages to industrial interests as compared to alternative regulatory strategies. This is because of the flexibility given to firms in their methods of compliance with more stringent environmental regulation. Furthermore, contrasted with the 'polluter pays' taxation, which levies a tax on all emissions, the cost imposed on the industrial sector through a trade scheme concerns only the cost of the actual targeted emissions reduction and does not involve extra costs on all emissions (Svendsen 1998).

Hence, the flexible mechanisms may attract the support from industrial interests and thereby facilitate agreement on environmental regulation. Finally, the flexible mechanisms have international transferability, which makes them more compatible with the trend towards de-regulation and competitive international energy markets.

(footnote 5 continued)

countries (authorized by article 6 and accounted for in articles 3.10 and 3.11); (3) a target-based emissions trading system as a supplement to domestic actions (article 17), asking the Parties to define relevant principles, rules, and guidelines, as well as for verification, reporting, and accountability for emissions trading; and (4) burden-sharing arrangement or a so-called option of 'bubbling', i.e. meeting the commitments individually or jointly, for example, within a framework of a regional economic integration organization (article 4).

Endogenous market regulation

Market-endogenous regulation, squares III and IV in the matrix, is defined as non-governmentally initiated regulation and may take many forms. It may result from industrial initiatives at self-regulation, consumer initiatives triggering industrial change, and NGO-mediated consumer–industry interaction. This mode of regulation differs from the previous, which although may include market elements, typically takes as a point of departure international agreements that specify national targets and national governmental design of domestically targeted instruments.

As far as consumer-triggered industrial change and NGO-mediated self-regulation are concerned, technologies and channels of communication typical of the industrial information society facilitate self-regulation. Media may act as catalysts of collective interests by giving them symbolic manifestation and thereby improving the visibility of green issues. However, the media may also act as an arena for reputation building, which is of industrial concern in a competitive economy with multiple suppliers of rival products and services.

Non-authorized self-regulation intrinsically relies on voluntary market-based interaction and does not recur upon the monopoly of legal and coercive power that resides with the state or supra-state entities. However, political or private institutions, or both, may have a catalytic role by designing certification procedures for products, spreading information about them, and exerting normative pressure on the population to make use of them.

As far as the electricity sector is concerned, competition and market orientation increasingly leave the consumers free to change suppliers and to specify conditions for their electricity supply. The supply of green electricity on the market now allows consumers to voice personal preferences as far as environmental performance is concerned. In this context, electricity has become a commodity, which can be differentiated and sold for its merits and benefits like other commodities on the market, and green marketing takes advantage of this by appealing to people's environmental awareness.

To create a customer-driven market for renewable energy through voluntary green electricity purchases, however, there are strong informational requirements. Even though green marketing approaches do not warrant any direct government involvement, public policy may nevertheless facilitate and stimulate this development through information and certification procedures (Wiser, Pickle, and Goldman 1998). Policy measures that may stimulate consumer-driven green electricity are (1) fuel source disclosure requirements, (2) green power certification, (3) customer education of green power options,

(4) government purchases of renewable energy, and (5) customer incentives to purchase renewable energy. Common to all these policies is that they predominantly seek to enhance information and facilitate customer choice.

Disclosure of objective and verifiable standards on alternative products seems to be highly relevant if a market is to regulate itself. Greening electricity in Sweden may serve as an example of NGO-mediated consumer–industry interaction. The SNF (Swedish Association for Nature Conservation) was central to the process of developing green electricity standards and green electricity certification procedures and served as a third-party endorsement. This endorsement from an NGO adds not only credibility but also standardization in a market where consumers are increasingly bombarded with environmental claims on products, in addition to being baffled by the complexity of environmental issues.

Motivations that drive industrial initiatives for self-regulation are numerous. For one, neglecting environmental and social costs of products and processes is a potential liability.⁶ The legal proceedings against Exxon ensuing the Exxon Valdez oil spill (1989) exemplify the magnitude of environmental liabilities and potential payments to remedy environmental damages. The bill confronting Exxon is approaching 20 billion dollars and a decade after the accident, the legal claims for damages/compensation have still not been finalized.⁷

Other motivations for industrial self-regulation, e.g. green energy, include improvement of commercial image, maintenance of stakeholder goodwill, and differentiation of products so as to accommodate consumer preferences for environmentally sound products and processes. Expanding on this, self-regulation may from a competitive perspective be analysed and interpreted as a strategy driving

⁶ An environmental liability is an obligation to pay future expenditures to remedy environmental damage that has occurred because of past events or transactions, or to compensate a third party that has suffered from the damage (Schaltegger, Müller, and Hindrichsen 1996, p. 88).

⁷ See Schaltegger, Müller, and Hindrichsen (1996, p. 87) and www.exxonvaldez.org/index.html, the official web site of Exxon Valdez victims. During the first three stages of court proceedings the bill confronting Exxon totalled 16.5 billion dollars: 3.5 billion dollars for clean-up, 1.5 billion dollars in compensation, and the rest as punishment. Further, during the fourth phase of proceedings, a unanimous federal jury found Exxon Corporation liable for the Exxon Valdez oil spill and awarded damages of 5.3 billion dollars to 40 000 people injured by the spill, including Alaskan native people, commercial fishermen, small business people, and land owners, as well as local governments and other entities injured by the spill (September 1994). These numbers do not include the amount spent on litigation, which are surely not insignificant considering a decade of proceedings. Exxon has so far appealed the damage verdicts and the case concerning the 5.3 billion dollars was heard in the US Court of Appeals in May 1999 and was without a final decision as of March 2000.

market growth and as a means of differentiation, thereby reducing the threat from substitute products. From a business perspective, being an early mover with an appeal to thoughtful customers with a social outlook may, therefore, be a viable strategy to gain an upper hand in a growing market.

Corporate self-regulation, however, may also be a strategy for enhancing internal management control of environmental factors and thus be interpreted as an indicator of proactive management. Self-regulating initiatives have resulted in increased operational efficiency, improvement of production processes, waste and emissions reduction, and hence reduced relative costs. In general, this has resulted in a better understanding of the processes where value is added and value is lost (Schaltegger, Müller, and Hindrichsen 1996). Porter (1996, pp. 63–66) similarly perceives pollution as a form of economic waste, such as when scrap, harmful substances, or energy forms are discharged into the environment as pollution. It is a sign that resources have been used incompletely, inefficiently, or ineffectively. Hence, environmental efforts may lead to higher productivity from innovation and as a result of enhanced resource productivity through process or product improvements, or both.

Self-regulating initiatives started at the level of a trade or industry association (square III) potentially have significant effects on actors belonging to the association. Schmidheiny (1992) cited peer pressure felt by members of an industry association as a driving force behind industry self-regulation. One example includes the internal target set by BP Amoco to reduce CO₂ emissions to 10% below 1990 levels by 2010. The Royal Dutch/Shell Group followed suit, pledging to make a 10% reduction of greenhouse gases by 2002 compared with its 1990 levels. Another example is the previously mentioned chemical production industry's initiative in Canada, known as Responsible Care, launched in 1985.⁸ Illustrating peer influence/pressure, the Canadian Chemical Producers' Association has made subscription to the codes and guiding principles of Responsible Care a condition of membership in the association (Labatt and Maclaren 1998). The industry association has here, in a sense, taken an authoritative role in regulating its members.

A current example of self-regulation in the energy sector is the RECS initiative.⁹ This initiative was taken in early 1999 by energy

⁸ This programme comprises codes for management practices along with guiding principles for issue areas such as community awareness and emergency response, R&D, manufacturing, transportation, distribution, and hazardous waste management.

⁹ See www.recs.org/.

sector representatives in the Netherlands (EnergieNed), Denmark (Association of Danish Energy Utilities), and several smaller organizations in England, which were occasional contacts of EnergieNed. In brief, the initiative seeks to develop a platform for information exchange and collective action leading to an international harmonization of trade in renewable energy certificates. The support of the initiative has been growing. Participants for Medio 2001 are from Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, and Sweden. Hence, where government negotiations at the EU level so far have failed at harmonizing renewable energy policies, private energy sector actors attempt to design a system that facilitates certification, trade, and administration of green energy certificates through private negotiations coordinated through industrial associations.

To sum up, self-regulation potentially solves the negotiation and distributive dilemmas as they by definition may be initiated with or without state/regulatory involvement. The previously mentioned green electricity support policies partly move this regulatory strategy back into the formal policy arena, although in a far less imposing way than through taxation and permits. Since the support policies (fuel disclosure, certification, education) that may advance the success of voluntary consumer-driven self-regulation in the electricity sector appear to impose a lesser financial burden on commercial interests compared to, say, a fuel tax, one would not expect strong opposition from corporate interests in the negotiation of such types of energy-related regulatory initiatives.

However, there are limits to self-regulation. First, self-regulation appears to demand publicity and media focus to mediate a pressure on firms to self-regulate, as well as to provide incentives in the form of rewards from self-regulation. Second, many forms of self-regulation assume that we are dealing with companies with a reputation to lose and companies of considerable size that already are closely monitored by consumer organizations or NGOs, or both. One reservation is, therefore, that smaller peripheral firms under low public scrutiny may be too small to attract media focus and may hence be without strong motivation to voluntarily impose restrictions on their business practices.

On the other hand, whereas self-regulation through industrial initiative is likely to be biased to industrial interests, self-regulation driven by consumer initiatives and supported by activist NGOs may be merciless and may reach smaller market players along an entire supply chain. Hence, an industrial sector and its sub-suppliers may get caught between strong possible market reactions and ambitious

policy goals advanced internationally. Especially when market-endogenous regulatory pressure is imposed by consumers and NGOs outside an industry's national territory, the bargaining power of industrial interests at the national level may be significantly undermined, as illustrated by Luukkanen (2000) in the case of the Nordic paper industry, which was virtually obliged by its German customers to make strong environmental adaptations in its production process.

Negotiated regulation

Facing the complexity of environmental regulation in terms of policy jurisdiction and policy coordination across borders, negotiated regulation has emerged as a new mode of regulatory intervention. In our typology of regulatory approaches (Figure 4), negotiated regulation is placed in the centre of the matrix (V) between public authority driven and not public authority driven regulation and, as the words imply, this type of strategy emphasizes negotiation, dialogue, and information exchange between economic actors and public authorities.

On the one hand, negotiated regulation is distinguished from unilateral government regulation by the fact that industry and not the state conceptualizes and implements regulatory measures and instruments. On the other hand, negotiated regulation is distinguished from self-regulation by the fact that government takes part in the goal setting and may also act as a partner in the implementation process.

More specifically, negotiated regulation¹⁰ refers to (1) an environmental agreement between public authorities and an individual industry/firm or (2) an environmental agreement between public authorities and an industry association, where a collective target is set for the entire sector.¹¹ Negotiated regulation has gained increased popularity, and, as pointed out in a report from the EU, there are three main advantages of negotiated environmental agreements (Commission of the European Communities 1996).

- 1 They can promote a proactive and cooperative approach from industry.
- 2 Flexibility exists as to compliance and achievement of the environmental objective, allowing for tailor-made solutions in a specific production system and for technical innovation that reduces compliance costs.

¹⁰ Negotiated regulation is referred to as voluntary, negotiated environmental agreements or, as in the Netherlands, long-term agreements/environmental covenants.

¹¹ Practice in different countries with negotiated agreements differs with respect to the following: the degree of volunteerism, participants in the negotiation process in which targets are set, and the degree of formality as far as the implementation of tasks, responsibilities, and time schedules to reach the environmental objectives (Sunnevig 1999).

- 3 An environmental objective may be met more quickly than when actions are instigated through formal legislation at the national or international level.

As argued by Segerson and Miceli (1998), voluntary agreements fall into two categories: those that induce participation by threatening a harsher outcome, i.e. formal legislation and threat of mandatory restrictions (the stick approach), and those that induce participation by providing positive incentives such as cost sharing or other subsidies (the carrot approach).

With the stick approach, credibility in compliance is achieved by the central authority threatening to revert to an authoritative role with threats of new regulation in the area covered by the agreement. This is what the German political scientist Fritz Scharpf (1989) called 'negotiations in the shadow of hierarchy' or under threat of authoritative regulation if negotiations fail.

With the carrot approach, compliance may be stimulated by the use of economic incentives or cost-sharing arrangements. An additional incentive to commit to an agreement may also be possible gains in goodwill either from authorities or consumer markets and to regain public trust and recognition if already suffering from low public credibility.

Analysing the Dutch use of environmental agreements in the energy sector, Arentsen (1996) points out that negotiated regulation underlines the idea of common responsibility and joint private and public action. He finds the strength of public authorities in the ability to analyse problems and to translate this into policy goals and indicate the course of action to be taken. Arentsen finds the strength of the private sector in its ability to translate goals and action into cost-effective measures and technologies.¹²

The same study points out how the negotiated style of regulation may also serve to bring issues onto the political agenda and to formulate

¹² In more detail, Arentsen (1996) described the Dutch process of negotiated regulation as consisting of four steps: (1) investigation in consultation with the target group, what should be done and how it should be done; (2) signing of an agreement on energy-saving efforts, and how these measures are to be implemented; (3) extensive communication of the agreement to the members of the target group and to regional and local authorities; and (4) monitoring the implementation of the agreement. Arentsen also pointed out certain societal prerequisites on which negotiated regulation must rest: that all economic and social interests that participate are well organized; that the interests accept their representatives in the negotiating committees; that there is a minimum level of mutual confidence; that there is a shared perception of environmental and energy problems; that public authorities are willing to take a certain risk of not achieving their goals.

programmes to combat problems. Arentsen also argues that the negotiated regulatory style may have a constructive impact on the regulatory environment in the sense that it enhances information flow between the regulator and the regulated and that it allows a mixture of policy instruments, which together can be effective in attaining policy goals.

Overall, negotiated agreements and their associated advantages appear to have a facilitating effect on negotiations at the national level. Negotiated agreements restructure the regulatory environment in which environmental goals and policies are formulated by involving parties from government agencies and firms/industries. Hence, by allowing industrial initiatives in formulating mechanisms and application, concessions are given to the industrial interests.

With a trade or interest association as a liaison to the regulator, implementation responsibility and follow-up work with geographically diffused member firms may be transferred to the agreeing firm or industrial association, or both. Public implementation and enforcement costs are, therefore, also likely to be reduced. Nevertheless, the complexity of negotiation and implementation may imply considerable monitoring costs. Furthermore, failure of compliance with agreements may necessitate the development of a supplementary authoritative regulatory regime.

Concluding remarks

The point of departure for our discussion on environmental regulation of energy industry under commercial exposure has been the failure to agree on first-best regulatory solutions, here defined as 'polluter pays' taxation. Under commercial exposure in a competitive international market and with diverse national resource endowments, we have argued that radical 'polluter pays' taxation will redistribute resources so unequally between nations and companies that common agreement is highly unlikely.

Therefore, the attempt to simultaneously modernize both in commercial terms and in ecological terms is an extremely challenging task. Internationalization and commercialization of energy markets under weak international governance such as the EU easily fail in developing sufficiently effective environmental governance, such as strong 'polluter pays' regulation, and easily lead to a retreat to national protectionist environmental strategies at a minimum common denominator level. This deadlock is outlined in Figure 5 as the discrepancy between the two points A (unattainable collective tax optimum) and B (lowest common denominator solution under negotiation of general taxation, when national interests are based on highly diverse resource bases).

Figure 5 Regulatory mechanisms and trade-offs in environmental policy

The emergence of new, alternative forms of ‘softer’ regulation points at possible ways out of the deadlock as they allow us to strike new and better balances between effectiveness and negotiability (illustrated by the point C in Figure 5). The way this balance is struck is idiosyncratic to each regulatory strategy and dependent on distinct characteristics of the regulatory approach. Particular characteristics that appear to enhance acceptability of environmental regulation at the national level are flexibility in compliance; adaptation of technological solutions to unique production systems and industrial structures; industrial participation in goal-setting; and development of policy instruments that allow participation in implementation strategies.

A decoupling of policy implementation from the authoritative public agency domain, while still maintaining overall environmental goal setting coordinated by international forums, is, for example, intended through the tradable permits approach to international climate change mitigation. This seems to enable consensus around more ambitious environmental governance than the lowest common denominator in negotiations of general taxation (the point B solution). Further, this dual approach of establishing agreement of general emissions limitation at the international level and leaving the compliance mechanisms up to national design seems well suited to accommodate both environmental and industrial interests in the domestic policy game. While environmental interests may mobilize around the general compliance levels, the industrial interests get their say at the implementation level.

Hence, it appears that a more flexible design of the implementation process contributes to regulatory agreement and may, therefore, also facilitate agreement in international environmental negotiations between states with different resource endowments. As already mentioned, negotiations at the national level seem to be facilitated if industrial interests are integrated in decision-making on issues like national distribution of environmental targets and decisions on burden-sharing arrangements. At the international level, it may, therefore, be argued that focus should be on contextual matters of core interest to economic agents and environmentalists such as the general target setting, initial international distribution of targets, harmonization of framework conditions, and agreement on priorities and time frames for achieving environmental obligations.

The regulatory strategies discussed in this paper are not mutually exclusive but should rather be seen as complementary. Some of the strategies discussed are clearly most negotiable and viable at the national level, for example, negotiated agreements between government authorities and industrial firms/associations. However, negotiated agreements may function well as part of a national compliance strategy to fulfil international environmental commitments. Furthermore, the involvement of national interests in decision-making must be supplementary to the international agreements when handling environmental problems with global impacts. National and local decision-making must necessarily be central when introducing environmental regulation for more site-specific and local or regional issues.

Dynamic aspects of environmental regulation

Experiences from the dynamic process initiated by 'soft' negotiated deregulation of European electricity industry show that the interplay between initial negotiated agreements and subsequent market dynamics may take the reform far beyond the initial requirements. When companies see their interests served by fully taking part in the new commercial economy, they may come to take the reform further by themselves and thereby push others in the same direction. Extending this experience by analogy to the environmental field would mean considering soft negotiated regulation as only a first step. In the longer run, one would hope that this will trigger spin-off effects that would push for environmental performance far beyond the original minimum requirements.

More systematically, the sequential impact of even soft environmental regulatory intervention can be schematically presented in a game tree, where the implications of regulatory choices and their consequences are displayed in a sequential order (Figure 6). The

Figure 6 Dynamic aspects of regulation

game tree has two kinds of nodes: nodes where choices are being made (represented by a star) and nodes where nature chooses its moves (consequences of regulatory choices), designated by circles.

Assuming that strong regulation is highly improbable in the short run, insistence on direct strong regulatory action is likely to lead to failure (b1), which means that we forsake the high positive effects that such a strategy might have if successful (b2). Choice of softer negotiated regulation might be more likely to succeed (c2), but would in turn yield smaller yet considerable positive effects (d1). However, in the next round, the soft regulatory intervention might trigger preference shifts or technological shifts, or both, and thereby create a new basis for the next round regulation.¹³ At the next decision point (E), strong regulation has a far larger chance being implemented F

¹³ We assume here that nature moves twice by determining the success or failure of soft regulation in C and by determining the preference shift / technological shift in D.

(f2), as industrial interests might have prepared themselves already, or may be compelled by the market forces to adjust their policies.

Furthermore, leading firms that have already 'greened' might welcome strong regulation at this point to secure compliance from smaller firms. It is, therefore, possible that we might end up with strong regulation (f2) but only through the initial soft regulation path (C-D-E-F).

As shown in the game tree exposition, temporary suboptimal environmental policy solutions may, in a long-term perspective, contribute to moving primary commercial interests in a green direction. We may thereby come to see a shift in direction of the trade-off from the traditional zero sum to possibly a positive sum situation.

This shift may also be facilitated by consumers, who in response to environmental issues increasingly demand green policies and come to change their expectations in a green direction. Primary commercial concerns of energy industry may change accordingly, as greening implies economic gains and pays off as a commercial strategy. Thus when consumers demand and expect green energy, the environmental dimension increasingly becomes internalized in the economy through consumer demand. We may then come to see the energy and environmental policy fields moving hand in hand, rather than pulling in opposite directions. Going back to our earlier trade-off diagram (Figure 5), this would imply moving up from C to a C* position (Figure 7).

Figure 7 Trade-offs under dynamic considerations

A similar transformation from a zero to a positive sum situation may take place if environmental regulation includes positive stimuli for technology development. If greening policy supports and brings about technological breakthroughs where companies are able to increase their competitiveness, then greening policies may also give them technological and commercial advantages. Eventually, such development may approach a first-best 'A' level of environmental welfare at a much higher level of negotiability and competitiveness. At this point industrial interests might even accept a polluter-pays-based taxation, which leading industrial interests may already have prepared for, but where they, as already mentioned, might want to see similar standards imposed on marginal competitors.

Focusing on negotiability and sequential 'soft' regulation does therefore not necessarily imply weak environmental standards in the long run. Rather, the softly initiated evolutionary strategy represents a realistic appreciation of the fragility of global and federal institutions in issues of major industrial concern and develops a path towards sustainable governance that takes this into consideration. Furthermore, many of the soft regulatory mechanisms explicitly incorporate the technological and commercial skills embodied at the firm level, which the bottom-up environmental strategies seek to unleash.

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References

Arentsen M. 1996

Dutch climate policy: CO₂ reduction by negotiation systems in the Netherlands—conditions of success and perspectives

Paper presented at *Fachtagung 7, the Conference on Climate Protection as a Strategy: innovative approaches to reducing energy-related CO-emissions*

Organized by the Free University of Berlin, Berlin, 25–26 October 1996.

Commission of the European Communities. 1996

Communication from the Commission to the Council and the European Parliament on Environmental Agreements

Brussels: Commission of European Communities [COM(96) 561 final].

EU (European Union). 1998

Annual Energy Review 1998

<http://europa.eu.int/en/comm/dg17/stat.htm>

EU (European Union). 1999

Annual Energy Review 1999

<http://europa.eu.int/en/comm/dg17/stat.htm>.

Hayek F A. 1948

Individualism and Economic Order

Chicago: Chicago University Press

Labatt S and Maclaren V W. 1998

Voluntary corporate environmental initiatives: a typology and preliminary investigation

Environment and Planning C: Government and Policy **16**(2): 191–209.

Luukkanen J. 2000

Green Paper with Green Electricity

Paper presented at *Energy Markets in the Making: strategies for the new millennium*

Organized by Free University of Berlin, Danish Technical

University, Norwegian School of Management, University of Sussex, University of Maryland, University of Twente, 18–24 November 2000, Salzburg, Austria.

Midttun A. 1999

The weakness of strong governance and the strength of soft regulation: environmental governance in post-modern form

Innovation **12**(2): 235–250

Nash J. 1998

Industry self-regulation for environmental improvement: pretence or reality

Paper presented at the *7th International Conference of the Greening of Industry Network*

Organized by the Greening of Industry Network, 15–18 November 1998, Rome, Italy.

Porter M. 1996

Green and competitive: ending the stalemate

In *Business and the Environment*, pp. 61–77, edited by R Welford and R Starkey
London: Earthscan Publications Ltd.

Putnam R D. 1988

Diplomacy and domestic politics: the logic of two-level games

International Organization **42**(3): 427–460

Schaltegger S, Müller K, and Hindrichsen H. 1996

Corporate Environmental Accounting

New York: John Wiley & Sons.

Scharpf F W. 1989

Politische steuerung und politische institutionen

In *Macht und Ohnmacht politischer Institutionen*, pp. 17–29, edited by H.H. Hartwich
Opladen Westdeutscher Verlag

Scharpf F W. 1997

Games Real Actors Play: actor-centered institutionalism in policy research

Boulder, Colorado, USA: Westview Press.

Schmidheiny S. 1992

Changing Course

Cambridge, MA: MIT Press

Segerson K and Micelp T. 1998

Voluntary environmental agreements: good or bad news for environmental protection

Journal of Environmental Economics and Management **36**: 109–130

Sunnevåg, K. 1999

Voluntary agreements and the incentives for innovation

Paper presented at *Seminar on Voluntary Agreements*

Organized by Cicero, Frishsenteret, SNF, 16 September 1999, Oslo, Norway.

Svendsen G T. 1998

Public Choice and Environmental Regulation: tradable permit systems in the United States and CO₂ taxation in Europe

Cheltenham: Edward Elgar Publishing Inc.

Wiser R, Pickle S, and Goldman C. 1998

Renewable energy policy and electricity restructuring: a California case study

Energy Policy **26**(6): 465–475