LES INSTRUMENTS DES POLITIQUES DE L'ENVIRONNEMENT

Par Christian Egenhofer
et Patrick ten Brink

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Résumé en français

LES INSTRUMENTS DES POLITIQUES DE L'ENVIRONNEMENT EN EUROPE : VERS UNE CONVERGENCE DES APPROCHES NATIONALES ?

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Les politiques de l'environnement menées en Europe ont connu au cours des deux dernières décennies de profondes évolutions. Jusque dans les années 80, elles ont été marquées par une approche de type réglementaire : dans un souci de protection de l'environnement, la puissance publique édictait des normes techniques, et les entreprises - principalement celles du secteur industriel - se trouvaient contraintes d'engager des dépenses pour adapter leur processus de production à ces évolutions normatives. L'intensification de la concurrence et une plus grande confiance dans la logique de marché ont favorisé l'émergence d'une approche plus économique des enjeux environnementaux, s'appuyant sur de nouveaux instruments (instruments fiscaux, permis d'émission négociables, accords volontaires) ; c'est cette évolution que cette note se propose d'analyser.

1. LES LIMITES D'UNE APPROCHE RÉGLEMENTAIRE DES POLITIQUES ENVIRONNEMENTALES

A l'origine, c'est pour des raisons d'efficacité que les gouvernements de l'Union européenne ont privilégié, dans la conduite de leur politique environnementale, la voie réglementaire : celle-ci était censée assurer une meilleure protection de l'environnement, en identifiant clairement les objectifs et les limites à ne pas dépasser. De leur côté, les entreprises avaient généralement tendance à considérer la réglementation sur l'environnement seulement comme une source de coûts, qu'elles s'efforçaient de minimiser ; les préoccupations environnementales étaient encore trop

limitées pour qu'elles puissent y voir la promesse de nouveaux marchés, ou le moyen de s'assurer un avantage compétitif.

Au cours des années 80 et 90, les responsables politiques et les entreprises ont commencé à s'intéresser à une nouvelle approche des enjeux environnementaux, caractérisée par un recours accru à des instruments de nature plus économique que réglementaire. Parmi ces instruments, on citera les impôts et taxes sur les activités polluantes, les permis d'émission négociables, les accords volontaires et les différents outils d'incitation financière (subventions visant à inciter les pollueurs à modifier leur comportement, pénalités en cas de non-respect des objectifs fixés, etc …).

Ces instruments économiques présentent une caractéristique commune : ils se réfèrent, directement ou indirectement, aux signaux du marché en vue de modifier les comportements. Qu'ils revêtent la forme d'une modification des prix relatifs, de transferts financiers, ou encore d'incitations, ils ont tous pour objectif d'encourager les comportements vertueux chez les acteurs économiques.

Cet intérêt pour une approche économique des enjeux environnementaux a été stimulé par la critique radicale adressée par un nombre croissant d'économistes à l'approche réglementaire qui prévalait jusque-là : celle-ci s'est vu en particulier reprocher sa rigidité, et sa tendance à engendrer des mécanismes bureaucratiques. A l'inverse, les tenants de l'approche économique ont tenté de mettre en évidence l'efficacité accrue, sur le plan économique comme sur le plan strictement environnemental, des nouveaux instruments dont ils proposaient la mise en place.

De solides arguments de nature empirique sont venus étayer leurs analyses : une série de dix études portant sur le contrôle de la pollution de l'air aux Etats-Unis, réalisées entre 1974 et 1980, ont en particulier montré que certains instruments économiques pouvaient parvenir à un résultat identique à celui atteint avec des mesures réglementaires, pour un coût quinze à vingt fois moindre (Tietenberg, 1990, et Clinch, 2000).

Pourtant, malgré les critiques qui lui sont adressées, l'approche réglementaire reste encore très présente dans les politiques environnementales menées au sein de l'Union européenne, que ce soit au niveau des Etats ou de l'Union elle-même. Cette résistance est pour l'essentiel à mettre sur le compte des difficultés que rencontrent les autres instruments, à commencer par l'instrument fiscal, pour s'imposer à une opinion publique réticente.

2. LES PROGRÈS DE LA FISCALITÉ ENVIRONNEMENTALE

On peut dater du début des années 90 l'essor de la fiscalité environnementale : dans les pays de l'OCDE, le volume de recettes dégagées par les diverses taxes liées à l'environnement a ainsi augmenté de 50 % entre 1989 et le milieu des années 90. Opérant une internalisation des coûts d'environnement, cette fiscalité répond au principe « pollueurs-payeurs » ; dans le sillage des pays d'Europe du Nord, la totalité des Etats membres de l'Union européenne s'y sont progressivement ralliés, suivant des modalités très variées. Des mesures fiscales ont ainsi été mises en œuvre concernant le CO_2 (pays scandinaves, Pays-Bas, Italie, Royaume-Uni), le NOx (France, Italie, Espagne, Suède), les engrais et pesticides (Scandinavie) ou encore les déchets et les produits polluants ou non récupérables (emballages plastiques, pneus, piles, huiles, etc...). Au niveau communautaire, la mise en œuvre d'une fiscalité environnementale s'est heurtée au principe du vote à l'unanimité du Conseil des ministres pour les décisions en matière fiscale ; le projet d'une taxe sur l'énergie et les émissions de carbone a ainsi dû être abandonné au milieu des années 90. Néanmoins, il apparaît raisonnable de tabler sur une certaine harmonisation des fiscalités environnementales en Europe, voire, à terme, sur l'adoption d'une taxe climatique applicable au niveau communautaire.

De manière générale, les mesures fiscales sont aujourd'hui considérés comme des instruments efficaces pour réduire la pollution et pour réguler l'utilisation des ressources naturelles. L'utilisation des recettes qu'elles génèrent fait en revanche l'objet de vives discussions : un nombre croissant de responsables politiques plaident, à rebours de la théorie économique, pour une affectation de leur produit à des fonds au profit de l'environnement, afin de les rendre plus acceptables aux yeux du contribuable.

De plus en plus utilisées, les mesures fiscales apparaissent comme un instrument d'avenir pour les politiques de l'environnement. Néanmoins leur importance ne doit pas être sur-estimée : leur part dans l'ensemble des contributions fiscales et sociales dans l'Union Européenne reste faible, et elle n'a progressé en moyenne que lentement (5,84 % en 1980, 6,19 % en 1990 et 6,71 % en 1997). Par crainte d'un effet négatif sur la compétitivité des entreprises, les Etats membres ont avancé avec prudence sur la voie de la fiscalité environnementale. Celle-ci tend en fait à s'imposer, non comme un instrument exclusif, mais comme un outil parmi d'autres au service des politiques de l'environnement, d'autant plus efficace s'il est accompagné, comme c'est le cas notamment au Royaume-Uni, d'autres moyens d'action – mesures réglementaires, accords volontaires ou permis d'émission.

3. LE DÉVELOPPEMENT DES ACCORDS VOLONTAIRES

Les accords volontaires suscitent eux aussi un intérêt croissant depuis le début des années 90. Par contraste avec l'approche réglementaire, trop rigide, comme avec l'approche fiscale, souvent jugée pénalisante pour les entreprises, ils semblent parés de toutes les vertus : simples dans leur conception, susceptibles d'être mis en œuvre rapidement, suffisamment souples pour couvrir la grande diversité des problèmes environnementaux, ils présentent aussi l'avantage de faire appel aux compétences des entreprises pour atteindre les objectifs visés à un moindre coût.

Ces accords recouvrent des modalités très variées. En Europe, ils se présentent pour l'essentiel sous la forme d'accords négociés ; autrement dit, d'engagements pris par des entreprises à la suite de négociations avec les pouvoirs publics. Dès 1996, on recensait dans l'Union européenne plus de trois cents accords de ce type, concernant notamment la gestion des déchets, la pollution et la qualité de l'air, l'utilisation de l'énergie et le changement climatique, les ressources hydrauliques, la qualité des sols et l'ozone. Depuis 1996, leur nombre s'est encore très sensiblement accru, notamment dans le domaine du changement climatique. A côté des accords nationaux, on compte désormais bon nombre d'accords régionaux ou infra-régionaux, en particulier aux Pays-Bas. Ces accords sont généralement le fruit d'initiatives prises par des gouvernements, des organisations patronales, voire des collectivités locales ou des ONG.

Dans certains cas, les accords volontaires se substituent à une réglementation ou à une taxe ; dans d'autres, ils constituent un pont vers une législation future ; dans d'autres encore, ils viennent en complément d'une législation ou d'une taxe déjà en place. Les responsables des politiques de l'environnement considéraient encore il y a peu que le coût des accords volontaires était faible, mais l'expérience a montré qu'on avait souvent tendance à sous-estimer les coûts induits de transaction et d'administration supportés par l'Etat et par les entreprises.

L'efficacité des accords volontaires paraît en fait suspendue à deux conditions principales :

– la définition d'objectifs clairs, ambitieux mais réalistes. Les accords peuvent comporter des objectifs intermédiaires, ainsi que des clauses de révision ;

– la définition de modalités de suivi de l'accord : un *reporting* annuel ainsi que des comptes rendus réguliers d'exécution sont indispensables, et ils doivent dans la mesure du possible être rendus publics.

Par ailleurs, l'expérience prouve que les accords volontaires ont d'autant plus de chances d'aboutir qu'ils couvrent un secteur d'activité homogène, et qu'ils sont négociés par une organisation professionnelle puissante.

De plus en plus, les politiques de l'environnement menées en Europe s'efforcent de lier les accords volontaires avec d'autres instruments - mesures de taxation, permis d'émission, subventions ou mesures réglementaires. Les accords volontaires peuvent sans doute contribuer à donner plus de souplesse et d'efficacité aux politiques poursuivies, mais ils sont manifestement inadaptés dès lors qu'il s'agit de viser une date ou un objectif précis. Leur succès, à l'avenir, paraît intimement lié aux résultats des accords en cours.

4. L'ESSOR RAPIDE DES PERMIS NÉGOCIABLES

Les permis d'émission se sont développés aux Etats-Unis dès les années 70 ; leur diffusion en Europe s'est toutefois longtemps heurtée aux réticences des opinions publiques, qui envisageaient sans grande aménité le principe même d'un « droit à polluer ». Néanmoins l'inscription de la notion dans le protocole de Kyoto, en 1997, a fait évoluer les esprits, et depuis un nombre croissant d'Etats, comme le Danemark ou le Royaume-Uni, et surtout d'entreprises, comme BP ou Shell, ont lancé des dispositifs comportant des permis négociables pour limiter leurs émissions de gaz à effet de serre.

Le modèle traditionnel de permis définit un plafond d'autorisation d'émissions qui s'impose aux entreprises, lesquelles ont alors le choix, soit de réduire leurs émissions, soit d'acheter des permis pour un supplément d'émission. Celles qui restent en-dessous du plafond peuvent soit conserver le surplus pour l'avenir, soit le vendre à d'autres entreprises, qui préféreront se porter acquéreurs de droits supplémentaires sur le marché plutôt que de modifier leur processus de production.

Cet outil présente un certain nombre de caractéristiques intéressantes : lorsqu'il fonctionne suivant un système de quotas définissant un plafond d'émissions, il permet presque certainement d'atteindre les objectifs environnementaux fixés ; par ailleurs il garantit que ces objectifs seront globalement atteints au moindre coût. De manière générale, les entreprises européennes considèrent cet outil

sous un jour favorable, en raison notamment de sa flexibilité ; leur position dépend cependant du caractère gratuit ou non des permis, et de la référence éventuelle à des objectifs relatifs, plutôt qu'à des plafonds.

Dans le cas de quotas négociés, le problème le plus controversé est celui de la fixation des permis, qui peut obéir à deux types d'approches. Dans la première approche, chaque participant reçoit un permis basé sur ses émissions précédentes. Dans la seconde, chaque participant doit se porter acquéreur de permis par un dispositif d'enchères. Les deux approches impliquent un rationnement. La première est plus favorable aux entreprises, pour lesquelles elle n'entraîne aucun coût. Mais la seconde présente d'incontestables avantages techniques : l'organisation d'enchères périodiques garantit la transparence et l'égalité d'accès aux permis, permet d'éviter des négociations délicates sur le nombre de permis accordés à chaque firme, et avantage les émetteurs qui se sont engagés dans des politiques volontaristes de réduction des nuisances environnementales de leur activités de production.

Les entreprises industrielles, et notamment celles du secteur énergétique, soutiennent que les systèmes d'enchères alourdissent leurs coûts, et nuisent par conséquent à leur compétitivité sur le plan international. Ils assimilent ce système à une taxe, et s'y opposent avec la dernière vigueur. Pour répondre à ces critiques, il a été suggéré de re-distribuer les recettes des enchères ; toutefois la neutralité fiscale (les recettes nouvelles étant compensées par la baisse d'autres recettes) suppose une affectation des ressources qui déplaît aux Parlements, dessaisis de leur pouvoir de contrôle.

Ce débat apparaît de toute façon passablement académique : les entreprises concernées sont de grandes firmes internationales soumises à la concurrence, dont la compétitivité serait sévèrement compromise si elles devaient supporter des coûts supplémentaires liés à l'acquisition de permis. De fait, tous les grands dispositifs de permis négociables actuellement en cours d'élaboration relèvent de la première approche, qui se réfère à la situation de départ des acteurs économiques. Cette approche peut en revanche être adaptée, en définissant par exemple des règles d'allocation des permis qui favorisent les entreprises mettant en œuvre des technologies sobres ou faiblement polluantes.

En conclusion, si les permis d'émission ont connu ces dernières années un rapide essor, il n'est pas certain qu'ils constituent une solution généralisable, en dehors du domaine du changement climatique. Une question se pose avec acuité : celle de leur place dans le cadre d'une politique de l'environnement combinant plusieurs types d'instruments. Visant à restreindre les quantités, les permis

d'émission sont difficilement compatibles avec une politique de prix fondée sur la taxation, ou avec une réglementation définissant des normes technologiques. En revanche, la compatibilité avec les accords négociés ouvre des perspectives à une politique de l'environnement qui combinerait ces deux instruments.

5. CONCLUSION : LA CONVERGENCE DES APPROCHES ET LA COMBINAISON DES INSTRUMENTS

Les politiques de l'environnement en Europe se sont donc tendanciellement éloignées d'une approche strictement réglementaire, pour recourir à des outils s'inscrivant dans des logiques plus variées. Cette évolution s'est accompagnée d'un net changement dans l'attitude des entreprises : auparavant passives face aux enjeux environnementaux, préoccupées surtout par la maîtrise de leurs coûts de production, elles s'en sont progressivement saisies pour s'ouvrir de nouveaux marchés, créer de nouveaux produits et prendre un avantage concurrentiel (cas de BP et Shell). Cette évolution à long terme se produit à un rythme variable selon les pays, suivant le contexte politique, économique et culturel qui leur sont propres, et suivant la nature particulière des problèmes d'environnement auxquels ils sont confrontés.

Parallèlement à cette ré-orientation des politiques environnementales, on constate une tendance à la combinaison des instruments utilisés. Cette tendance a été encouragée, dans le cas du changement climatique, par le Protocole de Kyoto, qui définit trois types d'instruments, mais laisse les pays signataires libres de choisir celui qui leur paraît le mieux adapté à leur structure de production et à leur contexte réglementaire.

Même si ces tendances générales ont affecté l'ensemble des Etats membres, il est clair que les politiques de l'environnement, dans l'Union européenne, restent marquées par une très forte hétérogénéité. Cette hétérogénéité est dans une large mesure inévitable : elle renvoie à la diversité des situations économiques et des traditions juridiques nationales. De fait, le simple bon sens commande d'admettre que toutes les solutions ne sont pas transférables d'un pays à l'autre. Le travail d'harmonisation des politiques nationales entrepris par les instances communautaires doit donc éviter l'écueil d'une réglementation lourde et uniforme qui contraindrait à l'excès les Etats membres ; il gagnerait en tout état de cause à être complété par une « harmonisation en douceur », menée à l'initiative des Etats eux-mêmes, qu'une pratique régulière du benchmarking a généralement convaincus de l'intérêt qu'ils auraient à renforcer la compatibilité des différentes politiques menées au niveau national.

The case for Pluralism: Different national approaches to environmental policy in Europe

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EXECUTIVE SUMMARY

Environmental policy has undergone in Europe and OECD at large a transformation regarding the use of instruments. In addition to regulation - traditionally the preferred tool - other instruments including economic instruments such as taxes and tradable permits but also voluntary agreements (VAs) have become more popular. There is diversity of approaches and instrument applications across the Member States as well as the common developments. It is increasingly clear that while Member States' specific circumstances dictate the final choice, design and application of different instruments, Member States are increasingly looking at their options against the background of other Member State practice. Furthermore, the commitments to address climate change is leading to a new impetus in the use and development of instrument and instrument mixes.

While traditionally, regulation was the prime instrument, coupled by some environmental taxes (notably fuel taxes) and charges (notably for waste and water), more environmental taxes and charges have been used, emissions trading schemes are becoming "acceptable" options, and voluntary agreements are increasingly applied and becoming increasingly mature instruments. In addition, there is a growing move towards environmental tax reform (ETR) as countries change their tax base, reducing labour related taxes and increasing taxes and charges on environmental pollution, resources and services. This shift has been influenced by a diversity of motivations including economic (e.g. cost-effectiveness), financial (revenue-raising), socio-political (e.g. political acceptability), environmental (e.g. implementation and enforcement) or legal (e.g. competencies).

This shift of government policies is also reflected in a shift of position by the regulated firms. While firms' strategies under command-and-control regimes consisted of cost avoidance strategies, the shift towards incentive-based instruments is mirrored by companies exploiting the environment in form of markets for new products or gain a competitive edge. Nowhere can this be better demonstrated as in climate change where companies such as BP and Shell have launched cap-and-trade emissions trading schemes. The rationale for this is partly to prepare the firms for an increasingly carbon-constrained world, i.e. first mover advantage in a broad sense.

The long-trend shift is advancing very unevenly among countries depending *inter alia* on the political conditions, the legal system, regulatory context, economic structure, cultural context, national preferences, the nature of the environmental problem, different environmental priorities. For example, while tradable permits have played a minor role in the EU, first taxation and then negotiated agreements have flourished. In the US, tradable permits were one of the instruments tested first and taxes and true voluntary agreements are less used.

At the same time as we have seen a shift towards incentive-based instruments, we witness increasingly a shift towards combining instruments. More and more

environmental policy integrates instruments into a portfolio of instruments that when combined offer a more optimal instrument package and result. The traditional discussion of "which instrument is best" is moving increasingly towards one of "which package of instruments is best".

Integration of instruments into a portfolio or "policy mix" has the advantage of being able to capture the different advantages of the various instruments. Hence, policy mixes are designed to "optimise" the incentives to mitigate pollution.

As this policy mix becomes more pronounced, the intensity of balancing different – often conflicting – objectives increases, and the task of selecting an "optimal instrument mix", which are compatible, and efficient, while not being wasteful (i.e. high administrative or transaction costs) or including "unnecessary" instruments, becomes more important. Under a command-and-control approach, the main factor that mattered was environmental effectiveness, coming down to select the appropriate technology or emission standards. Economic instruments all raise issues of effectiveness, efficiency and equity. Effectiveness concerns, i.e. the level of pollution control are mainly aired regarding negotiated agreements and indeed the objective of early agreements was questionable. But this issue has been in part addressed in the meantime. The efficiency question naturally is at the heart of the debate of economic instruments.

There is a well-developed body of literature and much political debate about equity, i.e. the effects of income on households when it comes to taxation. There is relatively little analysis and even less discussion on equity and tradable permits, although we expect that this will dominate the debate as tradable permit schemes get implemented.

While there are broad trends, the practice across the Member States continues to be very varied and reflecting each countries' particular situation and history. While some applications in some countries are not transferable to others, given that their effectiveness is linked to institutional, legal, cultural and economic context, there is a wealth of experience across the EU of interest of practical value to other Member States. Indeed, we are already seeing a continued practice of comparison and benchmarking of practice and effects across Europe, which is leading to some "soft harmonisation" in some areas complementing the "strict harmonisation" or EU regulations. Continued efforts are being made to enable voluntary agreements to be comparable and compatible across Member States, Member States are learning from practice with ETR and adopting the appropriate lessons, and examples of practice are used to fuel national debates each time a new instruments or package of instruments is being considered domestically.

At the current times, the climate change commitment and the work on the various related instruments is the focus of policy instrument development – both at the domestic level and EU level. This has become a new impetus for environmental tax reform, the application of VAs, linkage of taxes to VAs and tradable permits with the ultimate aim of developing an optimal policy mix.

THE CASE FOR PLURALISM : DIFFERENT NATIONAL APPROACHES TO ENVIRONMENTAL POLICY IN EUROPE

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1. INTRODUCTION

The way environmental policy is conducted has changed profoundly. Traditionally, environmental policy has been based on regulation, prescribing technology standards mainly to industry. Firms regarded environmental costs as overheads and relied on cost avoidance and risk management. From the mid-1990s onwards, this situation has changed. Increased competition and a stronger belief in markets made people interested in new instruments, sometimes referred to as economic or incentive-based instruments.

This paper analyses the transformation that environmental policy has undergone in Europe and examines the performance of the most popular economic instruments such as taxation and more recently, tradable permit schemes as well as voluntary agreements (VAs). It explores both the diversity of approaches and instrument applications across the Member States as well as the common developments. It is increasingly clear that while Member State specific circumstances dictate the final choice, design and application of different instruments, Member States are increasingly looking at their options against the background of other Member State practice. Furthermore, the paper shows that the commitments to address climate change is leading to a new impetus in the use and development of instrument and instrument mixes.

Chapter 2 presents an overview of the historic trend in the application of instruments to address environmental objectives – from regulation to the economic instruments of environmental taxes and charges, emissions trading schemes, and voluntary agreements.

Chapter 3 focuses on the relatively new instrument – that of voluntary agreements – and discusses the application, trends and key issues for this still controversial instrument.

Chapter 4 explores the use of environmental taxes and charges, noting not just applications, but also the context, notably their linkage to the broader role within environmental tax reform.

Chapter 5 turns to tradable permit schemes, charting the rapid growth in interest in these instruments.

Finally the conclusions presents an overview of the trends in the use of the various instruments and the trend towards the development of "optimal policy instrument mixes".

2. LONG-TREND SHIFT FROM REGULATION TO ECONOMIC INSTRUMENTS AND VOLUNTARY AGREEMENTS

Environmental policy in the EU (and the OECD at large) has for long been relying on direct regulation also referred to as command-and-control instruments. In the last decade or so, this approach has been giving way to a new balance of environmental instruments. This trend towards combination has recently been accelerated through the Kyoto Protocol, which has introduced three genuine economic instruments, among them tradable permit schemes.

Originally, regulation was governments' preferred approach to environmental management for reasons of effectiveness. The feeling was that regulation offers better protection since the environmental objectives are clearly specified in terms of physical limits that cannot be exceeded (i.e. in emission limits or standards). Sometimes it is said that the preference also reflects the important role that engineers played in environmental decision-making.

The regulators' (i.e. governments) preferences have been mirrored by the regulated firms' preferences, which have for long seen environmental regulation as a cost factor and have chosen to minimise cost of complying with command-and-control regulations. Firms relied primarily on problem avoidance and risk management rather than exploiting the opportunities in form of markets for new products and processes or to gain a competitive advantage from environmental decisions (Reinhard, 2000). As long as costs for environmental protection remained relatively limited and/or exposure to international competition was low, the need for instruments providing incentives to exploit the opportunities environmental legislation offered was small.

Box 2.1. Regulation as traditionally preferred instruments

Explicit environmental policy is rather recent and has seen its rise as late as in the 1970s. In the early days of pollution control, throughout the 1970s and much of the 1980s, environmental policy in OECD countries focused mainly on management of environmental resources and the creation of institutional capacity directing the environmental performance of firms. Command-and-

control regulations based on technology-based standards typically specify the method and the actual equipment that firms must use to comply.

Command-and-control instruments revolve around standards that can take different forms such as ambient (e.g. air quality), technology (e.g. best-available technology known as BAT[1]) or emissions standards (e.g. emissions ceiling) although in practice they are often the same. This allows firms to produce a certain level of pollution. Non-compliance resulted in penalties, mostly fines in some cases (e.g. Germany) liability for correction of environmental damage. In addition, command-and-control approaches can also aim at energy efficiency standards (e.g. fuel efficiency, insulation requirements of a specific product). More recently, governments have started to experiment with renewable energy quotas, which if they are tradable, interestingly constitute a mix of regulation and economic instruments.

During the 1980s and the 1990s not at least due to increased international and a general trend towards "markets" - best exemplified by Thatcher and Reagan -, economists, politicians and business became interested in a new balance, what was subsequently dubbed "regulatory reform of environmental policies". This trend towards the increased use of economic instruments and more generally, the broadening of environmental instruments has also been mirrored in the EU. For example, the Fifth EU Environmental Action Programme sketching the EU's environmental priorities for most of the last decade, consequently revolved inter alia around attempts to broaden the range of instruments. The EU regulatory reform agenda was further influenced by successive EU Treaty revisions of 1992 and 1997 to include sustainable development as an EU objective and mandating the integration of the environment into other policies.

Box 2.2: Categories of economic instruments[2] `

• Charges and taxes put a price on pollution and natural resources. While taxes are paid into the general budget, charges are payments for which the payer receives a benefit in return. In practice, however, the distinction is blurred. Charges and taxes can aim either at emissions or products.

• Deposit refund systems levy a surcharge on the price of potentially polluting products which is returned if the pollution is avoided by e.g. returning the product.

• Cap-and-trade emissions trading schemes put a limit on emissions for a certain product or process. Polluters hold property rights for all allowances under the ceiling. Individual emissions rights (i.e. allowances) are allocated either by auctioning or distribution free of charge (grand fathering). Grand fathering often is based on benchmarking to avoid punishing the ones which have abated in the past.

• Baseline-and credit or simply credit-based schemes are another variant of emissions trading. In this case polluters have to earn credits by over-complying with a target.

• Financial enforcement incentives take the form of non-compliance fees (penalties), which are more or less proportional to the savings reaped by non-compliance. A special form are performance bonds, which are payments to authorities in expectation of compliance, which are refunded once compliance is achieved.

• Subsidies cover forms of financial assistance to provide incentives to the polluter to alter its behaviour. Subsidies can take the form of grants, soft loans, tax allowances or R&D subsidies.

• Subsidy reform aims at reducing the distorting effects of government policy that keep pollution control costs artificially low through direct subsidies or tax incentives.

• Environmental liability relies on a careful definition of property rights over the environment. This allows consumers and producers, in case they are hurt by pollution to ask for compensation by the polluter either by public or private law. This instrument is only applicable where both the source of the damage can be easily identified and the damage can be easily assessed.

• Voluntary agreements include many different approaches including codes of conducts and responsible care programmes, voluntary measures such as voluntary restraint agreements or unilateral commitments, implementation of (accredited) environmental management systems (e.g. EMAS), voluntary auditing, voluntary environmental reporting as well as more formalised negotiated agreements.

• Renewable energy quotas constitute obligations to either produce (if targeted at electricity producers), supply (if targeted at electricity suppliers) or consume (if targeted at electricity consumers) a set amount of electricity produced from renewable sources. Increasingly this instrument is linked to tradable permit schemes.

•Green government purchasing attempts to create markets for more environmentally friendly, i.e. green products. Similar to renewable energy quotas it aims at overcoming market barriers for environmental beneficial products.

• Information programmes play an indispensable role in the successful application of incentive-based instruments, which will only reach their full potential if accompanied by programmes aiming at informing the end-users and citizens in general about environmental standards and performance. Examples of such instruments include energy efficiency labelling requirements, eco-labels as well freedom of information acts, environmental management systems and Environmental Impact Assessments.

Source : Egenhofer (2002).

Economic instruments (Box 2.2) all have in common – contrary to direct regulations, which prescribe a specific mandatory action to economic agents – that they use directly or indirectly market signals to influence behaviour. These signals take the form of a modification of relative prices or a financial transfer or other incentives to get environmental performance rewarded by the market. There is a debate whether to include voluntary agreements into the category of economic instruments (see footnote[2]).

In terms of relative weight it is mainly taxes and charges, voluntary agreements and more recently, tradable permit schemes that are most important.

Policy makers became sympathetic to the application of incentive-based instruments due to mixture of push and pull factors. Among the push factors were that regulation had not been as effective as perceived in theory. It proved expensive and lengthy to bring offenders to court, thereby revealing that regulation does not necessarily lead to effective compliance. Procedures for permits and licensing increasingly have become cumbersome, pushing up administrative costs. Costs were also increased by a lack of flexibility, i.e. forcing some firms to apply expensive technologies to comply with a given standard. In addition, the use of technical standards tends to freeze the development of technologies in the absence of financial incentives to exceed a control target.

The pull factors included the prospect for less bureaucracy and better environmental performance due to more effective implementation. For politicians, particularly interesting was the revenue raising function of some economic instruments – in the cases of taxation and tradable permits, if allowances are auctioned. Economic instruments were also seen better than uniform technology standards to deal with different environmental goals of the EU member states and was seen as a means to follow national or even regional environmental preferences. The strongest two arguments in favour of economic instruments are that they theoretically minimise costs to society – economic instruments equalise the incremental amounts that firm spend to reduce pollution – and their dynamic efficiency, i.e. incentives to innovate and improve environmental performance (OECD 2001).

The theoretical findings are by and large founded by empirical evidence, which suggest that society's economic benefits of the application of economic instruments are considerable. One survey of ten empirical studies of air pollution control in the US found that the ratio of actual aggregate costs of command-and-control regulations to the aggregate costs of least-cost benchmarks ranged from 1.07 for sulphate emissions in Los Angeles to 22.0 for hydrocarbons emissions at all domestic Du Pont plants (Table 2.1). What theory often does not capture, however, are the distributional effects (i.e. equity) of economic instruments. Typically potential losers attempt to undermine the use of economic instruments.

Table 2.1. THE GAINS FROM LEAST-COST AIR POLLUTION CONTROL

Year of Study	Pollutants covered	Area of the US	Command-and-control policy (CAC) benchmark	Ratio of CAC cost to least-cost policy
1974	Particulates	St Louis	State Implementation Plan (SIP) regulations	6.00
1981	Sulphur dioxide	Four Corners: Utah, Col., Arizona, New Mexico	State Implementation Plan (SIP) regulations	4.25
1982	Sulphates standards	Los Angeles	California emissions standards	1.07
1986	Nitrogen dioxide regulations	Baltimore	Proposed RACT (technology requirements)	5.96
1983	Nitrogen dioxide regulations	Chicago	Proposed RACT (technology requirements)	14.40
1984	Particulates	Baltimore	State Implementation Plan (SIP) regulations	4.18
1984	Sulphur Dioxide Particulates	Lower Delaware Valley	Uniform percentage reductions	1.78 22.00
1983	Airport Noise	US	Mandatory Refit	1.72
1984	Hydrocarbons	US DuPont plants	Uniform percentage reductions	4.15
1980	CFC emissions ex. aerosols	US	Proposed emissions standards	1.96

Source : Clinch (2000), based on Tietenberg (1990).

Despite the broadening of the range of policy instruments and the undeniable shift of balance, environmental policy in the EU still relies heavily on regulation both at Member State and EU level, although to very different degrees depending on the Member State in question. Implementation of environmental taxes, if energy taxes are included has slowed down on grounds of lack of political acceptability due to equity concerns and trade implications, i.e. fear of loss of competitiveness. At the end of the 1990s, the use of taxes has increased although the share of environmental taxes expressed as the total revenues from total taxes and social contributions is rising only slowly. While the share was 5.84% in 1980, it has risen to 6.19% in 1990 and stayed at 6.71% in 1997 (EEA 2000). Most of the revenues relate to transport and energy. An example of opposition for reasons of acceptability and distributive implications could recently be witnessed in Europe where truck drivers were demonstrating for – and largely obtaining – reductions on fuel taxes, that partly have been levied on environmental grounds.

Table 2.2 PROGRESS AT EU AND MS LEVEL IN INTRODUCING ENVIRONMENTAL POLICY INSTRUMENTS

Instrument	EU level initiatives	Member State initiatives
Regulations	Approx. 315 directives	Approx. 90% of EU directives translated into national legislation
Environmental taxation	Proposal for harmonisation of energy taxation and discussion of pesticide tax	Growth in environmental taxation in Nordic countries leading the way. €6 billions raised in pollution taxes in EU in 1996, a 100% increase since 1990; Green tax reform was introduced in Germany
Voluntary agreements	"Agreements"[3] on energy efficiency in washing machines and TVs and CO_2 emissions with auto industry	More than 300 voluntary agreements agreed from 1990-96, mostly for industry, with about 100 in Germany and 100 in the Netherlands
Emissions trading	CO_2 trading being discussed in relation to implementation of the Kyoto Protocol; Commission proposal in October 2001	CO_2 trading being discussed in many Member States and implemented in Denmark and UK; NOx trading scheme perceived in the Netherlands.
Subsidy reform	Reform of CAP, Common Fisheries Policy, Structural Funds, Cohesion Fund, European Investment Bank	Reform of domestic energy and industrial subsidies underway
Environmental impact assessment	Directive on EIA in 1985 (revised in 1997)	Approx. 7,000 EIAs per annum conducted across the EU
Environmental management systems	Eco-Management and Audit Scheme (EMAS) from 1993	Approx. 3,910 sites registered with EMAS by October 2001
Research and development	Funding in EU Framework Programmes around 2€ billions for the environment	Support for clean technology in many Member States

Source : adapted from Clinch (2000).

Tradable permit schemes have traditionally played almost no role in the EU with some minor exceptions. Europe instead relied to a large extent on negotiated environmental agreements (NEAs), the most often applied form of voluntary approaches or initiatives for environmental protection in the EU, even being dubbed the "European model of voluntary approaches" (Börkey and Lévêque, 1998). NEAs are commitments undertaken by firms and sectors as a result of negotiations with public authorities.

At the EU level of governance, reliance on command-and-control regulations is even more pronounced, mainly for constitutional reasons. Taxation remains subject to unanimity in the EU's Council of Ministers, therefore minimising the chances for EU-wide taxes. Also voluntary agreements have made very little impact at the EU level of governance, again mainly due to institutional reasons with a few exceptions such as the Commission recognised Commitment by the car industry to reduce CO_2 emissions of vehicles.

In conclusion, despite a clear move towards a broadening of environmental instruments, regulation to date remains the dominant instrument applied to

environmental policy. Taxation and voluntary agreements have become increasingly used across the Member States, albeit with large variations across countries. With regard to environmental tax reform (ETR), it was the Nordic countries that were the frontrunners in the early 1990s, though these have been complemented by ETR schemes in many other Member States, notably the Netherlands, Belgium, Austria, Germany, Italy, France and the UK, again with significant variation in extent of reform. While the application of voluntary agreements and taxes (and related ETR) can be and had been done in parallel in most countries, there is arguably a greater increase in the role of VAs in some countries as they are applied to more environmental challenges than taxes / ETR.

At EU-level of governance, to a large part for constitutional reasons, it is regulation that is predominantly applied at the European level of government, while both taxation and voluntary agreements have been almost entirely restricted to member states' use. Tradable permit schemes have traditionally played a subordinate role in the EU. The public at large and especially Green and sometimes Socialist Parties in Europe, traditionally influential in the environmental instrument debate, have been opposed to tradable permits on grounds that they allow those who can afford it to pollute ("licence to pollute"). For the area of climate change this position has largely vanished. Various EU Member States have implemented tradable permit schemes. And the EU is expected to implement as of 2005 an EU-wide emissions trading scheme covering about half of the EU's CO_2. This situation has renewed the interest in implementing tradable permit schemes for other pollutants such as NOx, VOCs or SO_2.

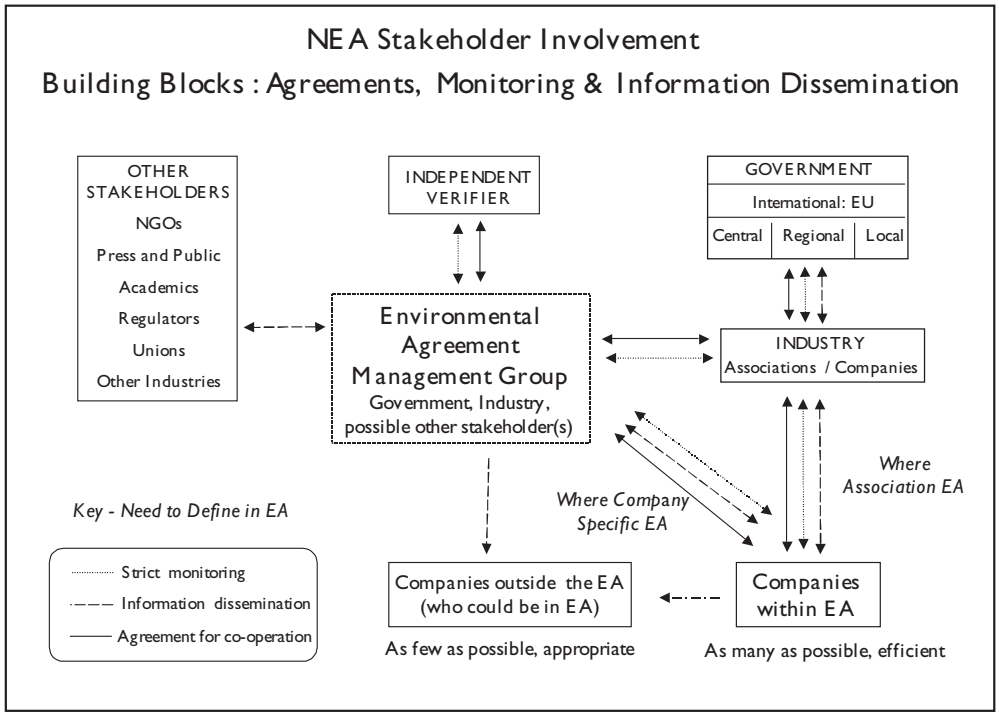
3. THE RISING USE OF VOLUNTARY AGREEMENTS

Voluntary Agreements (VAs) are increasingly being looked to as a possibly appropriate instrument to help address environmental problems covering a broad range of pollutants and natural resources. The interest has developed in the context of increasing concern in the 1990s that command-and-control legislation and regulation can be too burdensome and that the use of economic instruments, such as environmental taxes and charges, can be too costly for industries in the globalisation process. Voluntary Agreements were seen as potentially being an instrument that could be finely-tuned, quick to set up, and that could build on industry's internal knowledge to achieve the environmental objectives at lower costs.

When people speak of voluntary agreements, they often think of different things, which can add to the confusion regarding the instrument, its potential and its limitations, and risks and rewards for different stakeholders. People talk of voluntary agreements (VAs), voluntary initiatives (VIs), environmental agreements (EAs), voluntary environmental agreements (VEAs) and negotiated environmental agreements (NEAs). Furthermore when talking of this instrument,

many different names and tools come to mind : codes of conduct and responsible care programmes ; voluntary measures such as self declarations or commitments ; implementation of (accredited) environmental management systems (such as ISO14001 or EMAS) ; voluntary auditing ; eco-labelling ; voluntary environmental reporting ; green purchasing and ethical investment ; public voluntary programmes ; technology support programmes ; multilateral environmental agreements (MEAs) ; gentleman's agreements ; long tern agreements (LTAs) ; covenants ; and negotiated environmental agreements. For the European perspective, it is worth focusing on negotiated environmental agreements, though for simplicity calling them voluntary agreements. These can be more fully defined as those commitments undertaken by firms and sectors, which are the result of negotiation with public authorities and/or are explicitly recognised by the authorities. Traditionally they have been launched by (central and local) government or by industry. Figure 3.1 illustrates such "building blocks" of a NEA (agreement, monitoring and reporting) and the linkages between these.

Figure 3.1 : ARCHITECTURE OF ENVIRONMENTAL AGREEMENTS



Source: adapted from ECOTEC (1999).

Within the EU, more than 300 VAs at the national level were already recorded in 1996 (EEA, 1997) – covering *inter alia* waste management, air pollution and quality, energy use and climate change, water resources, soil quality and ozone depleting substances. Since 1996, this number of VAs in Europe has increased significantly, notably in the application of VAs for climate change. In addition to national VAs there are a also a large number of local and regional VAs, notably in the Netherlands. Box 3.1 gives some examples of where VAs have been used[4]:

Box 3.1: VA Practice

• *Waste* : All EU Member States have launched VAs on waste : e.g. batteries in Germany and in Belgium, end of life vehicles in France, packaging waste in Sweden, transport packaging in Denmark;

• *Emissions to air* : Most EU Member States have VAs dealing with emissions to air: e.g. SO_2 and NOx in the Netherlands, CFCs in Finland, CO_2 emissions (and energy use) from across most sectors in the UK;

• *Emissions to water* : emissions to water from the Portuguese pulp paper sector, detergents use and concentrations in the Czech Republic;

• *Contaminated Land* : Oil contaminated land in Finland and the Netherlands;

• *Natural Resource use and management* : water management in a region of the Netherlands ; land-use planning and forestry in Canada and New Zealand;

• Energy use and energy efficiency – VAs have been launched in a wide range of countries including Germany, Finland, and the Netherlands.

In short, VAs seem to have the flexibility to address environmental challenges across media – with the exception, naturally, of dealing with specific hazardous substances for which strict regulation is required to ensure guaranteed environmental quality.

VAs tend to be initiated either by industry or by governments, though there are examples where local organisations, and NGOs (non governmental organisations) initiate the process. Many VAs are association or multi association VAs (e.g. German Climate Change Agreements), though some are agreements with individual firms (e.g. Dutch LTAs). Similarly while many VAs are concluded at the national level, some countries prefer local and regional agreements (e.g. the Netherlands). There are no formal "agreements" at the EU level, though there are a handful of "recognised" "self-commitments", such as the automotive manufacturers' associations[5] commitments to reduce specific CO_2 emissions.

In some cases, VAs are launched instead of regulation or environmental taxes, in some cases as a bridge to future legislation, and in some cases they complement legislation or taxes (see discussion on instrument mixes further below). The choice of which instrument or mix of instruments is appropriate depends not only on the nature of the environmental problem and the economic, institutional, regulatory, legal and political contexts, but also on the design of the instrument and to what extent the design minimises the potential risks and maximises the potential rewards.

What are the Risks and What are the Rewards from VAs ?

As with any instrument, there are particular risks and rewards associated with VAs, and the aim is to find ways to maximise the rewards, and minimise the risks.

Government : The main benefit for government is for a cost-effective achievement of an environmental objective, through harnessing industry's knowledge of its capacity and measures and potentially avoiding some regulatory costs, and the benefit of "regulatory capacity development" as government learns more about the industry. The main risk is one of "regulatory capture", in that the government "agrees" to an instrument that turns out to be weaker than the alternative foreseen or needed (discussed further below).

Industry : The main benefit can be the avoidance of potential more burdensome regulation or costly taxes and charges. Indeed the threat of these has often been the inspiration for new VAs. The main threat is that of improvement government awareness of the state of affairs within industry which could lead to sanctions (e.g. where unknown current non-compliance) or more usually, a better negotiating position of government in subsequent negotiations or better able to design legislation. There is also the threat of loss of commercially sensitive information, though this issue tends to be treated in a manner that causes little actual concern given VA design considerations.

There are also risks and rewards to NGOs and unions involvement. Many would argue that broader stakeholder involvement is key for credible effective VAs. However, the costs of involvement can be significant, and NGOs can be concerned that explicit involvement (rather than an external commenting role) can give credence to an instrument that might be seen as little more than business-as-usual.

What are the Administrative / Transaction Costs ?

In the past, policy-makers have tended to view VAs as being a low administrative cost instrument. Indeed, for some VAs, it can be the case that industry self regulation can help avoid the need for public regulation and associated costs. However, with practice, it is becoming increasingly clear that VAs

often entail non-trivial administrative costs[6] – notably for negotiation, for monitoring and reporting, for verification and for general involvement in the agreement during its lifetime – and that assumptions of costs have underestimated the true costs of the administrative and transaction activities. For industry, the costs can similarly be non-trivial, especially where considerable attention is paid to communicating with association members and where reporting requirements are extensive. Where, however, the VA is an alternative to an environmental tax, these administrative costs are likely to significantly less than the tax burden.

Are there any Free riders ?

There is a great deal of discussion on the issue of free riders - where some partners to the agreement do less than others and hence some are "unfairly" burdened - a problem for industry and not only for government. While there has been little evidence of this in practice so far, with the increasing stakes in some VAs (notably the UK Climate Change Levy related "Umbrella Agreements"), the incentive to free-ride is greater. To avoid free riding becoming a problem, the risks need to be minimised by a diligent setting of accountability and sanction measures, or clarification of responsibility for dealing with the free-riders.

Is there a real threat of Regulatory Capture ?

A typical view of the VA tool is that it makes the regulatory authority particularly susceptible to regulatory capture – in other words, where the VA instrument is chosen instead of "better" alternatives. In practice, this threat has become reality, at least for the short term. For example, the original German climate change commitment (1995) was weak, not only weaker than the alternative instruments being discussed – energy taxes and waste heat ordinance – but also weak in itself, given the lack of monitoring requirements and arguably undemanding targets. However, with continued government interest, NGO and public pressure, the VA was improved with time, addressing many of the weaknesses, and regulatory capture has at least in part been addressed. Another example of short-term regulatory capture relates to the Danish pesticides VA, which proved to be unable to provide the results promised. The public authorities reacted by implementing a complementary pesticides tax to address this, and overcame what had been seen to become temporary regulatory capture.

Governments obviously understand the dangers of a weak VA, as they do the dangers of weak regulation or insufficient tax rates – all cases arguably of regulatory capture. For VAs, the risk of regulatory capture is minimised when there is a possibility to choose alternative instruments, sufficient time for preparation, design and negotiation, the possibility of developing/improving agreement over time, or indeed where it is possible to develop an appropriate instrument mix.

The VA can be seen as part of a process

VAs should not be seen as one-off instruments, but rather as part of a process. It is clear that in some countries, fully-fledged negotiated environmental agreements are neither appropriate nor possible in the current institutional, legal, regulatory and cultural context. The instrument can evolve itself – e.g. by moving from a unilateral commitment to discussed self-commitment, to a negotiated agreement ; or by reviewing and updating targets, inviting more stakeholders into the process over time, putting in place monitoring systems. The past limited application of an instrument can also lead to an improved application in the future – with a first generation being focused on learning, regulatory capacity building, trust building and communication development between industry and government, and with a second generation focusing on quantitative targets.

To allow VAs to develop, the original agreement could valuably include a clause supporting the future and update of the agreement, e.g. to update targets, develop monitoring systems, increasing stakeholder roles. The key is to ensure that interest is maintained in a regular review and update of the agreement; for this NGOs can play a particularly important role. Clearly the future potential to improve an agreement should not be an argument for agreeing a weaker instrument than could be agreed. As noted above, the German Climate Change commitment is a good example of the process of development of an instrument.

How to encourage credible, effective agreements

When people talk of credible, effective agreements, discussion invariably turns to the issues of target setting and monitoring. Targets are the key to the voluntary agreement – agreeing weak targets would suggest regulatory capture or simply a lack of true commitment to the environmental issue. While this is easy to state, setting realistic but ambitious targets is non-trivial, especially in the timescales available in negotiation. Targets can be absolute (e.g. reduction in tonnes of emissions or waste) or relative (reduction in gk/unit production or indeed share of market or indeed relative position in the market[7]). Targets can also comprise not just a final target, but also intermediate targets. Targets can also be for an association as a whole or for a single company or installation. Finally, agreements can be signed with a target revision clause, if time proves that the initial target had been too easily met given overestimates of the difficulty. Absolute targets are usually better for the public authority, and relative targets better for business planning. Interim targets are essential to assess /encourage progress in long term VAs.

Regarding monitoring, no VA is credible without monitoring and reporting. Currently there seems very little dissent from the view that annual reporting of monitoring results are required, and that the reports should be made public, allowing the broad range of stakeholders access to the results. Furthermore, the

monitoring system should ensure that sufficient information is available to allow a balanced evaluation of the effect and effectiveness of the VA. Clearly, commercial confidentiality needs to be respected, and care is needed in the design of the monitoring and reporting systems. It is often the case that monitoring can develop over time as trust develops within the VA management group. For example in the Portuguese pulp paper sector agreement, companies supplied details, but only industry aggregate figures were made public (EEA, 1997).

Box 3.2: VAs and the linkage to other policy instruments

• *To taxes and charges* – the UK Umbrella Agreements are linked to the UK Climate Change Levy (CCL), with signatories of the VAs (only IPPC installations) eligible to an 80% reduction in the CCL in return for adopting energy efficiency targets. In Denmark, signatories of the energy agreements are also eligible to a rebate from the carbon-energy tax. Furthermore, in the Danish agreement on the recycling of transport packaging a linked tax on waste for all incinerated/land filled waste was launched;

• *To emissions trading* – there are as yet few explicit linkage of VAs to emissions trading (ET) schemes, with the notable exceptions of the UK Umbrella Agreements, where signatories can access the domestic ET schemes to help meet their targets, and the Dutch Benchmarking Agreement. More linked instruments can be expected in the near future;

• *To "bans" / command and control* – the Danish agreement on the recycling of transport packaging a linked tax was linked to a ban on land filling combustible waste (January 1997);

• *To subsidies* – effectively this is the case for the UK CCL agreement and the Danish agreements, though whether the taxes would have been politically acceptable without recourse to these exemptions/subsidies is unclear. For the Portuguese Pulp Paper agreement, signatories were able to access subsidies from the PEDIP and PEDIP II programmes;

• *To permitting* – signatories of the Dutch LTAs face simplified permitting procedures ;

• *To standards* – the French ELV agreement included the development of a certification scheme for dismantlers & shredders;

• *To guidelines* – in the Danish agreement on the recycling of transport packaging guidelines on plastic recycling were developed in 1998;

• *To labelling* – the automotive manufacturer associations' (ACEA/JAMA/KAMA) commitments are run in parallel with a requirement for dealerships to include specific CO_2 emissions (in g/km) in show room advertising.

How do VAs link to other Policy Instruments ?

An increasingly interesting debate has developed on the linkage of VAs to other instruments in explicit instrument packages to address environmental challenges at hand. It is less often felt nowadays that a single instrument cannot on its own achieve the environmental objective while addressing the real world practicalities of competitiveness, structure of the economy etc. The emphasis on practical decision making is therefore increasingly to move towards instrument mixes. Examples of practice in linking instruments are presented in Box 3.2.

For example, NEAs, when supporting legislation have features which allow for designing in: greater flexibility, cost effectiveness and potential administrative cost savings. Regulatory instruments, in turn, can « *safeguard NEAs against their shortcomings, namely low expectations in their environmental targets, weak enforcement provisions and the lack of credible and efficient monitoring and reporting requirements* »(OECD, 1999). This suggests, as could be expected, that NEAs should not be regarded as an instrument that can do the job alone.

Box 3.3 Lesson on Use

Where, When and Who to use VAs: VAs are more likely to be appropriate in the following circumstances:

• *Homogenous industry :* Where there is a homogenous industry, a VA has a large chance of succeeding. A too heterogeneous industry – e.g. with a range of products and processes, or with a wide selection of large and small players – would be difficult to address equally by a specifically designed VA;

• *Few players or industry with strong association :* Where there are few players or a strong association, it would be more easy for an agreement to be negotiated and implemented;

• *Need for a VA champion :* If there are proactive interested parties on the side of both industry and the public authorities, that would contribute to implementation and continued public interest and pressure;

• *Not where a delay in implementation or a (just) missed target is critical.* As a VA cannot "guarantee" the implementation by a certain date, or meet a particular target, a VA would not be an appropriate instrument where these are critical. Command and control or quotas systems would be more appropriate.

It is, of course, entirely possible that a VA be successful without fulfilling the first 3 of the above "rules", and the likely value-added and success of the VA should be assessed in advance on its own merits and own circumstances.

In conclusion VAs are now becoming a mainstream environmental policy instrument in many countries applied across environmental media, and with high recent interest in the climate change domain. There is a more mature understanding of their strengths and weaknesses and what can be done to address these. This should lead to better VAs, better linkage of VAs to other instruments[8], and of course in some cases to the use of other instruments or instrument packages where these offer a greater value-added.

It is clear, however, that scepticism still remains regarding the use of this instrument, and the extent of their future application depends on whether the current generation of agreements do result in the benefits promised as well as on the political will to address the environmental challenges. While it is not possible to suggest explicit guidelines stipulating exactly where when and who should use VAs, some general lessons from experience are presented in the Box 3.3.

In the coming years, we can expect continued application of VAs, though with increasing interest in assessing their performance. We can expect a continued series of evaluations looking at the effect, efficiency, effectiveness and equity of VAs - as this instrument becomes increasingly mature and sufficient monitoring data becomes available to allow conclusive evaluations to be carried out. This should not only provide a valuable critique of the instrument, which will influence future political interest in the instrument and highlight practical lessons for the further development of existing agreements and in the development of the next generation of VAs.

We could expect further clarity and guidance[9] on the use of VAs, and notably on minimal requirements for monitoring, reporting, evaluation, practice in target setting and involvement of stakeholders. These initiatives should help industry and government in the design of the next generation of VAs. This, together with industry and government commitment and NGO interest, should help VAs realise the potential that they suggest. The guidance should also help make VAs more comparable and compatible across Member States without reducing the ability of the instrument to be specifically designed for the particular environmental challenge and circumstance in the Member States.

Finally, we should expect greater effort at initiatives to develop instrument mixes combining VAs with other instruments to ensure an effective and cost-effective realisation of environmental objectives. This process has already started, and we could expect that the question of whether the VA is set up within an (optimal) portfolio of instruments needs to be addressed as a regular question rather than as an exception. The role and importance of the VA within the mix, will then depend on the particular value-added that the VA will bring to the package.

4. MORE ENVIRONMENTAL TAXES AND CHARGES, MORE ENVIRONMENTAL TAX REFORM

Environmental taxes and charges[10] are a particular form of market based or economic instrument that have become a mature instrument in the instrument mix available to policy makers. Environmental taxes and charges have been increasingly implemented over the 1980s and 90s and continue to be so in this decade. The use of the instrument has been tied in to the increasing rhetorical support for implementing the polluter pays principle (PPP) – as environmental taxes and charges can support the polluter pays principle – though the extend of which depends on the design of the instrument and the extent of the exemptions to the tax/charge. The PPP requires that the environmental costs are "internalised" and reflected in the price and output of the good and service which cause pollution as a result of their production or consumption.

The use of the economic instruments of environmental taxes and charges is increasing in OECD countries, including in the EU. By the mid-1990s, compared to a review that took place in 1989, the use of economic instruments in OECD Member States had increased by around 50 per cent (see EEA 1996; Forum for the Future 1998) and has continued to increase since (OECD, 2001). All countries have introduced "environmental" taxes and charges to a certain extent, though with a large variation in the number and importance of taxes, and indeed with a large variation in the "intentionality" of these instruments – some are truly to offer incentives to reduce pollution or natural resource use, while others are primarily aimed at raising revenue. Historically taxes and charges have been generally applied on an ad hoc basis, with taxes and charges chosen where this instrument was thought to be the most appropriate or politically applicable instrument. The main exception to "ad hoc" application has been tax policy on transport fuels. All countries have taxes on transport fuels, and this has been traditionally driven by revenue raising concerns. In recent years, however, some countries have explicitly changed fuel tax schemes to offer environmental incentives (e.g. Fuel escalator in the UK, tax differentiation between lead free and leaded petrol in most countries). Regarding taxes and charges on other goods and services, examples are noted in the box 4.1[11].

Taxes and charges have also historically been applied one a one by one basis – as a choice for meeting particular objectives. However, in many countries they are increasingly being applied within a general strategy of Environmental Tax Reform (ETR). Since the first ETR in the early 1990s in the Nordic countries, more countries are looking at a broad strategy of shifting the tax base, lowering labour taxes and increasing environmental and natural resource use taxes. This is seen as a key instrument/policy in being able to move towards truly sustainable economies, respecting sustainable development principles,

with the argued benefit of leading to a double-dividend of environmental improvements and more employment. The Nordic examples have been followed by recent interesting and important developments in Germany and the UK also. This is discussed in detail further below.

Box 4.1: Taxes and Charges in the EU

• *CO_2 taxes* : While ten years ago few thought that CO_2 taxes would be widely adopted, this is now starting to be the case. The first CO_2 tax was levied in Denmark in 1992, and there are now CO_2 taxes in Finland, the Netherlands, Italy, Norway, Sweden, and in the UK (The Climate Change Levy)[12] ;

• *Air Pollution* : NOx charge (France, Italy, Spain and Sweden); SO_2 tax (Denmark, Norway, Sweden) ;

• *Agricultural Inputs* : Pesticides (Belgium, Denmark, Finland and Sweden) ; Fertilisers (Denmark, Netherlands and Sweden and earlier (now abolished) in Austria and Finland) ;

• *Other Goods* : Batteries (Belgium, Denmark, Italy and Sweden, with a take back scheme in place in Austria and Germany); Plastic carrier bags (Denmark and Italy); Disposable containers (Belgium, Denmark, Finland and Sweden and deposit refund scheme in Austria and Netherlands); Tyres (Denmark, Finland and Sweden); CFCs and/or halons (Denmark); disposable cameras (Belgium); Lubricant oil charge (Denmark, Finland, Italy, Spain and Sweden); Oil pollution charge (Finland and France) ;

• *Waste* : User charge (all Member States; Waste tax (landfill in the Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands and Sweden), Hazardous waste tax / charge (Belgium, Denmark, Finland, France and Germany);

• *Water* : User charges (all MSs); Water tax/Water abstraction tax/charge (Denmark, the Netherlands); Waste water tax / charge (most MS) ;

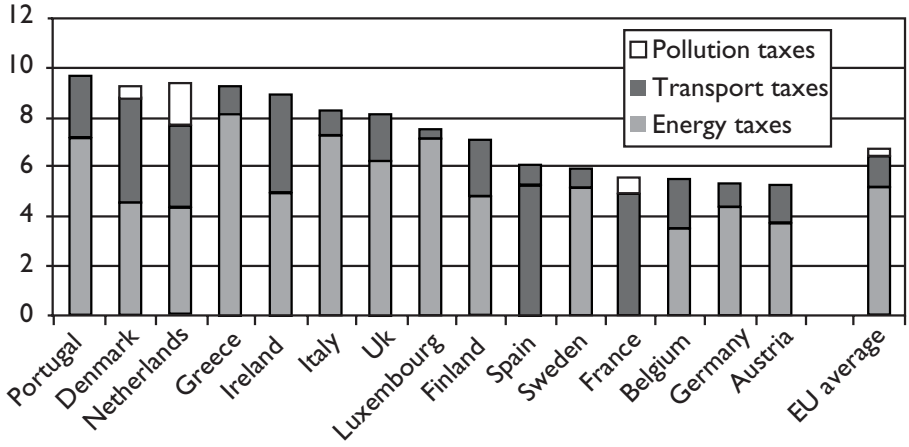
• *Others* : « Aggregates » tax (covering of sand, gravel and crushed rock) (Belgium (Flanders), Denmark, Sweden, Italy, Greece, Austria, France and the UK from April 2002).

In addition, taxes/charges also exist on, or are seriously proposed for : air transport (noise charge) chlorinated solvents, disposable tableware, light bulbs, PVC, phthalates, junk mail, packaging tax, paper tax, tax on mines, tax on natural sites, eco-tax on tourism, vehicle scrapping charges, electronic and electric waste, nuclear waste management charge, and atmospheric emissions levied on incinerators.

To put the importance of this instrument into context, it is worthwhile looking at the level of revenue being raised by these instruments. True environmental taxes and charges - where there is a prime incentive to address pollution and natural resource use, rather than simply raising revenue – account for only a very small percentage of tax revenue in the EU Member States – though rising significantly over the last few years[13]. Energy and transport taxes, which can affect the environment, but whose principle rationale is raising revenue, account for between 4 % and almost 10 % of total tax revenues. These tax revenues, while important are clearly secondary in importance to taxes on income, corporation taxes, social security charges, and in some countries other taxes on "bads" such as tobacco and alcohol.

The other key indicator of importance, is, of course, the environmental effect of the taxes and charges – where these are intended as offering environmental incentives rather than simply applied as revenue raising instruments. The overall evaluation of economic instruments is that they have, in general, been offering significant incentives to reduce pollution and natural resource use. Particularly effective examples include: the NOx tax in Sweden (and to a lesser extent in Denmark), the nutrient surplus tax in the Netherlands, the Danish non-hazardous waste tax, Danish batteries tax, and Swedish pesticides tax. In some cases, their effectiveness is lower, usually reflecting the lower levy rate[14], less good design, or exemptions to the rates. Importantly, it is often the use of the revenue that leads to the environmental improvements (e.g. Dutch waste water tax) and indeed the linkage of the tax or charge to other complementary instruments

Figure 4.1 : REVENUES FROM ENVIRONMENTAL TAXES AS % OF TOTAL REVENUES FROM TAXES AND SOCIAL CONTRIBUTIONS IN 1997.



Source : European Environment Agency 2000.

(see discussion on instrument mix below). Only in some cases does the price signal on its own has an important effect[15].

While traditionally the economists argue that the revenues from environmental levies should go to the exchequers (as this should in principle lead to a more efficient allocation of expenditure), there has been increasing interest in recycling the revenues and "earmarking" revenues for a particular purpose[16]. This at one level can be regarded as a result of public acceptability needs (showing that the levy has a specific and acceptable purpose makes it more likely to be accepted, than a general tax that might be seen as purely another tax burden). At another level it is a useful measure to ensure that required investments are made as spending on certain activities is secured. Examples of the choices taken

Box 4.2: Examples of how revenues from taxes and charges are used

• *CO_2/energy tax* : Go to the national exchequer and linked to reductions in labour related costs ;

• *SO_2 tax* : Part of the revenue from Danish tax is refunded to finance investments in emissions reductions ;

• *NOx tax :* Revenue recycled to industry or total taxes kept constant at a national level (eg Swedish NOx tax) ;

• *Manure and Fertiliser* : In the Netherlands the revenues go to the state budget, in Finland the revenues support exports and in Sweden they go to the state budget but are earmarked for improvements in agriculture ;

• *Aggregates :* UK Aggregates tax : the revenue is earmarked and will be recycled in part to businesses via the reduction of national insurance contributions (NIC's) and via a new Sustainability Fund delivering environmental benefits to local communities affected by quarrying ;

• *Landfill Tax* : In France the revenues are recycled mainly to municipalities via funds/investments and some private sector and research activities. In Austria they fund the clean up of contaminated sites and used for investments at landfill sites. In the UK they are used to offset reductions in national insurance contributions and help pay for some environmental projects ;

• *Disposable containers* : Revenues from such taxes in Finland, Denmark, Sweden go to National exchequers ;

• *Batteries* : In Belgium the revenues fund the Belgian batteries collection and recycling scheme (BEBAT).

by different Member States are presented in the Box 4.2 – underlining the fact that there is no "agreed correct single way" across Member States of dealing with the revenues. Further detail on the level of revenue is given in Table 4.1 in the section on environmental tax reform. While revenue recycling and earmarking can have real merits, care is needed to avoid too great a responsiveness to public and commercial interests adversely affecting the design of the instrument such that the potential environmental effectiveness and efficiency of the instrument are not realised and the polluter pays principle forgotten.

The Increasing Interest in Environmental Tax Reform (ETR)

One of the most important developments in the field of environmental taxes and charges has been the increasing recognition of the importance of ETR. Increasing numbers of countries are implementing environmental tax reforms, with governments adopting the approach that new taxes do not necessarily imply an additional tax burden – when seen nationally. Many have chosen to levy

Table 4.1 : IMPLEMENTED AND PROPOSED TAX SHIFTS IN EUROPEAN COUNTRIES.

Country	Tax Shift		Revenue Shifted
	From	To	(% of total tax revenue)
Finland 1990	Partly taxes on labour	CO_2 emissions	
Sweden 1991	Reduction of labour taxes of around 4.3 percentage points & social security contributions	Environmental and energy taxes including CO_2 tax and SO_2 tax	1.9 % (environmental & energy taxes 18 bil SEK; 2 bil EUR)
Denmark 1992/3, 1995 & 1998 [17]	Personal Income, Employers' Social Security Contributions, Investment Incentives	Various (electricity, water, waste, cars), CO_2 and SO_2	2.5 % (2.5 bil DKK; 340 mil EUR in 2000)
Spain 1995	Personal Income	Motor Fuels	0.2 %
Netherlands 1996	Personal Income, Corporate Profits, Employers' social security contributions	Energy and CO_2 Regulatory Energy Tax	0.8% (2.2 bil NLG; 1 bil Euros in 1998)
UK 1996	Employers' Social Security Contributions	Landfill	0.2 % (450 mil UKL; 640 mil Euros in 1996)
Finland 1997	Personal Income, Employers' Social Security Contributions	CO_2 and Landfill	0.5%
Italy 1998/1999	Reduction of Employment Charges	CO_2 on mineral fuels	0.1 to 0.2% [18] (around 600 mil Euros)
Germany 1999	Social Security Contributions (pension insurance) paid by employers & employees	Energy (mineral oils, natural gas and electricity)	0.6% (estimated) or a reduction by 0.8 % points (8.4 bil DM; 4.3 bn EUR in 1999)
France 1999	Plans to reduce taxes on labour and employment	Generalised pollution tax (known as TGAP) [19]	NA
Austria 1999	Employers' Social Security Contributions	Energy and vehicle taxation	up to 4.8% (up to 50 bil ATS; 3.6 bil Euros)
UK 2001	Social Security Contributions	Energy/CO_2 emissions under the Change Levy	
UK (April 2002)	National Insurance Contributions	Aggregates tax (sand, gravel, crushed rock)	Expected to raise 609MEUR in 2002

Sources : ECOTEC[20] (2001), OECD (2001).

new taxes while adopting a policy of revenue neutrality – whereby increased tax revenue from environment related taxes are offset by reduced taxes in other areas. Here there is a general approach to reduce income taxes and/or social security charges. One of the arguments here is to encourage a "double dividend" with improvements in environment given the tax/charges and support for employment given the reduction in tax burdens (cf. Carraro and Siniscalco, 1996). Table 4.1 presents an overview of the tax shift.

Some countries have formalised the process by designating "green tax commissions" or inter-ministerial committees to make proposals for ETR, acting also as a forum for discussion on, *inter alia*, design, rates, the likely impacts. Such green tax commissions were set up in Denmark, the Netherlands, Sweden and Norway which generated proposals for new taxes and facilitated their implementation. Other countries also set up similar bodies, though the performance has been varied.

How are taxes and charges linked to other instruments ?

In practice, most instruments are either linked explicitly to other instruments within a portfolio instrument mix or package, or work together with (sometimes against) existing or new instruments that have been launched outside of an explicit portfolio. The linkage of instruments can be crucial in delivering environmental benefits. This also makes an assessment of the contribution of a particular instrument to changes in environmental pollution or natural resource use difficult (the allocation problem). In some cases the existence of certain instruments in an instrument mix is the only practical way of getting the instrument packages launched. Some taxes and charges are linked to standards, to other levies, deposit-refund schemes, voluntary agreements, awareness campaigns, R&D, funds, to subsidies and to exemptions (see Box 4.3). Some are directly linked / launched together, others interact.

Box 4.3: Examples of how taxes/charges are linked to other instruments

• UK Climate change levy is linked to the voluntary agreements (CCL or « umbrella agreements »), to regulation (IPPC Directive), to exemptions (80% reduction from CCL for the signatories of VAs), and the national emissions trading (ET) scheme[21]. Arguably the whole package, key to the implementation of the UK Climate Change Strategy, would not have been possible with VAs, and without the 80% tax exemption ;

• The Danish Energy tax is linked to the voluntary agreements – again with exemptions for signatories ;

• Swedish NOx tax –link to revenue recycling package under fiscal neutrality ;

• Danish Abstraction Charge – explicit link to awareness raising campaign (effect influenced by sewage charges) ;

• Dutch waste water charges: link to use of revenue ;

• German waste water charges: link to standards, which play an important role in the final effect ;

• Austrian fertiliser levy: link to « extension services » to facilitate response to the levy ;

• Austrian Landfill tax: linked to subsidies for clean up of contaminated sites ;

• Swedish packaging: link to legislation and voluntary agreement.

Again, there are no explicit rules suggesting a particular linkage of instruments, and they need to be evaluated on a case by case basis. The important aspect is to look during the instrument package consideration / design stage[22] at the appropriate policy mix – both for explicit new linkage of instrument and how the new package of instruments is influenced by existing instruments and policies. See also chapter 6.

To summarize, environmental taxes and charges are an increasingly mature instrument of environmental policy, and growing in use in many EU Member States, mainly at national level, and for certain Member States at regional and local level. The continued increase in their use can be expected. With a continued commitment to address climate change, further energy and CO_2 taxes can be expected.

Within the EU, there has been resistance to Community wide taxes – highlighted by the failed effort to launch a carbon-energy tax in the mid 1990s. However, there is, and will need to be some "soft harmonisation" of taxes and charges, notably on tradable products (e.g. on pesticides), and arguably also in other areas as the internal market develops. While there is much doubt as to whether community wide taxes will become acceptable in the short or medium term, there is some optimism in some quarters that an EU-wide climate change tax could still be launched. Whether this will occur under the current EU voting rights regime is far from clear.

The "earmarking" of revenues from levies to particular uses is becoming increasing practice, notably for the smaller levies. This is part to respond to stakeholder / public interest in no new taxes (or rather no new tax burden), partly as a mechanism to ensure certain activities are financed, some of which can significantly offset the tax burden. We can expect more earmarking in future for certain taxes and tax bases, and hopefully careful design studies on where[23] and how this should take place to ensure that this is an effective tool and that the potential effectiveness and efficiency of the taxes and charges are not adversely affected.

There is increasing support for and implementation of environmental tax reform in many Member States, and adopting a policy of fiscal neutrality for new taxes. The relates to the need to respond to public interest in not seeing an increased tax burden. It also relates to the interests in moving the national tax base away from labour and onto activities that lead to environmental pressure and natural resource use and move towards a more sustainable development path.

We can expect more ETR, notably when linked to carbon/energy taxes in the context of climate change commitments, but also as a general approach towards taxing pollution and natural resources as part of the polluter pays and user pays principles. This is likely to take place in "stops and starts" with occasional blocks to progress, but it is clear that continued and significant further steps are required before the tax base offers the appropriate signals to encourage sustainable development of EU economies.

While a lot of discussion on the impact of environmental taxes and charges focuses on the incentive and signalling effect of the increase in cost and price, the use of revenue from the tax can be equally important in terms of impact, indeed in some cases more so. The design of the instrument is crucial to its likely effectiveness. The choice of how to use the revenue – whether to earmark or not, whether to adopt fiscally neutrality, what mechanism there should be to recycle the revenues and where to, and on what final measures the revenues can be used – is a key policy design decision.

There is also increasing interest in developing optimal instrument mixes, hence moving away from the "traditional" debate of which instrument is best. Now the debate is increasingly becoming one of which combination of instruments is best. The linkage of taxes/charges to, *inter alia*, voluntary agreements and to emissions trading is particular interesting and will be an important area for the development of instrument policy in the coming years.

5. TRADABLE PERMIT SCHEMES ARE RISING QUICKLY

In the past European governments have shunned tradable permit schemes mainly in light of the public's perception that they are a "license to pollute". Experience with tradable permits have therefore remained to be largely confined to the United States, which has seen significant applications of tradable permits schemes since the 1970s. Among them was the highly successful US SO_2 trading programme, which has become the reference point of emissions trading globally (cf. Klaassen, 1996). For Europe it needed the "imposition" of the emissions trading provisions of the 1997 Kyoto Protocol by the US to bring tradable permits gradually on the EU agenda. Ever since, there has been an increased interest in the EU for tradable permits or emissions trading both at the EU and Member State level. Many Member States, among them Denmark and the UK, companies such as BP and Shell, the EU electricity sector and industrial associations such as Entreprises pour l'environnement and the EU alike have launched and to some extent already implemented emissions trading schemes for greenhouse gases (cf. Haites & Mullins, 2001; IEA, 2001). Although major tradable permit schemes deal with greenhouse gases, the instrument in general seems to be gaining more interest. The Netherlands are close to implementing a NOx tradable permit scheme and in the UK a quasi trading scheme for SO_2 was implemented though company "bubbles" for the then National Power and PowerGen. A similar quasi emissions trading system on NOx is being discussed.

Emissions trading or the use of a system of tradable permits to reduce a pollutant, offers several attractive features. First, as an economic instrument it harnesses the market. At the company level, trading has the practical benefit of focusing the attention of a company's management on ways to reduce GHG emissions through low-cost abatement opportunities that in the past were ignored because there was no incentive to reduce emissions. Second, its economic value lies in its ability to equalise marginal costs among all controlled sources. Emissions trading thereby ensures that environmental goals are met at least cost. To cite an example, the proposed EU wide greenhouse gas emissions trading scheme is expected to reduce the costs of compliance with the Kyoto target by 20% compared to a policy without trading. Emissions trading – if based on

Box 5.1. National GHG Emissions Trading Schemes: Some examples

• *Denmark* : The Danish scheme for tradable CO_2 emissions permits (cap-and-trade scheme) is the first of its kind in the European Union, in operation since 1.1.2001. It is limited to the electricity sector, which is responsible for about 40 % of total Danish emissions. The cap is initially set at 23 million tonnes (Mt) or 70 % of emissions during the reference period 1994-98, and will annually be

reduced, decreasing to 20 Mt in 2003 when the scheme ends. Allocation was done on the basis of grandfathering according to historical and technical criteria that favour more energy-efficient producers. In case of non-compliance, a fine of DKK 40 (about 5.40 Euro) is levied for every excess tonne of CO_2 emitted.

• *The UK Emissions Trading Group* : The Group was set up in June 1999 by the Confederation of British Industry (CBI) and the Advisory Committee on Business and the Environment (ACBE) comprising companies and the government. The scheme, to be launched in April 2002 will be open to all companies operating in the UK willing to commit themselves to binding carbon or greenhouse gas (GHG) limits agreed by government under its rules. Overseen by an Emissions Trading Authority, and three categories of participants would be allowed to trade: i) Firms that agree with declining annual – absolute – emission limits set by government (the « absolute » sector), ii) Firms that accept an output-related or specific target (the « unit » sector), and iii) Firms that deliver specific carbon or GHG emissions-savings projects. In order to prevent permits from the unit sector swamping the absolute sector in periods when output is relatively high, the scheme attempts to limit sales from the unit sector to the absolute via a « gateway ». Trading among the unit sector is unrestricted (« cap and trade »). Trade between the « absolute » and « unit » sectors is accepted as long as there is no net flow from the "unit" to the « absolute » sector.

• *France* : This scheme has been developed jointly by Entreprises pour l'Environnement (EpE), a grouping of major French companies and the government. It is industry's contribution to the French National Plan for tackling climate change and thereby focuses on large industrial emitters. Targets, either absolute or specific, would be negotiated at the level of each industrial sector, subject to meeting the national target. The sector target would then apply to companies belonging to this sector. Each sector would then be assigned a decreasing target based on a company's current situation up to the Kyoto target value in 2008-2012, whether it is an absolute or a specific value. The setting of the target would combine grandfathering with other criteria including benchmarking whenever available. Credits for emissions reductions will be gained each year if the company has done better than its target. If the target has not been achieved, credits will have to be bought on the market. This credit-based reward system would avoid the problems associated with allowance allocation. Penalties for non-compliance would be established. Banking would be allowed and the six gases would be covered.

• *Norway* : Industry supports an emissions trading scheme covering as many sources as possible and practical and all six greenhouse gases, fully open to international trade. It is intended to have a law passed in Parliament around mid-2002. Participation until 2008, i.e. prior to Kyoto targets, would be on a voluntary basis. In return, companies that participate would not be subject to a CO_2 tax. This is the main reason why industry is fully supportive of the scheme. From 2008-12 onwards, participation is intended to become mandatory. To achieve a large coverage, the scheme would include large industrial sources and covers the wholesale (i.e.

wholesalers, importers) for fossil fuels for heating and transport fuels. This amounts to a coverage of approximately 80 % of all GHGs.

Source : Haites and Mullins (2001); Egenhofer (2002).

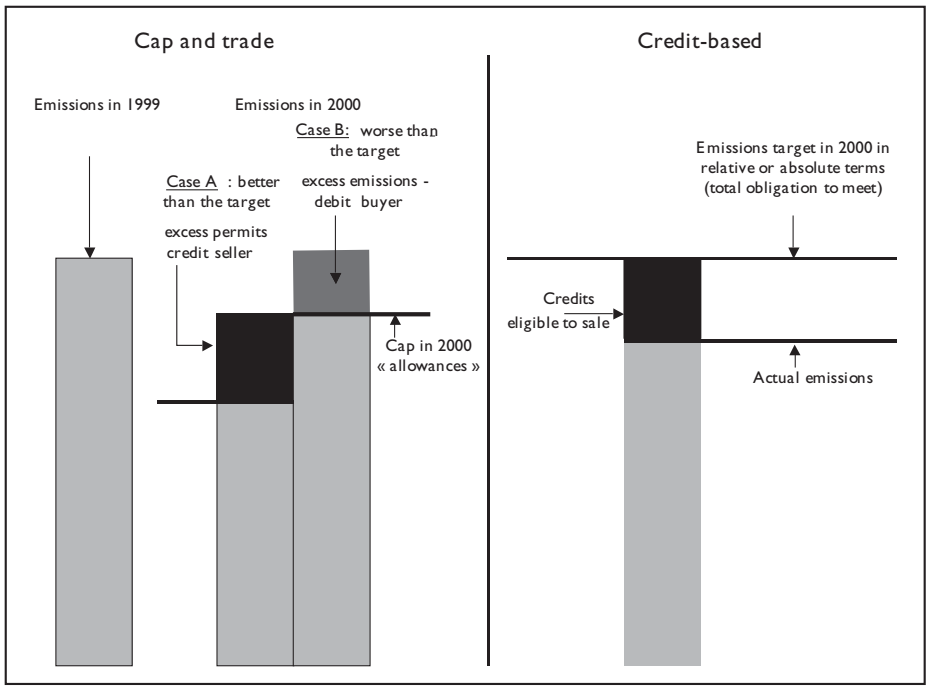
cap-and-trade model – has also the advantage of almost total certainty of the environmental outcome[24], because it sets an overall cap on pollutants.

It is interesting to note that industry in Europe on the whole has been by-and-large in favour of emissions trading in greenhouse gases or views it as a suitable alternative to either command-and-control measures of taxation[25]. Flexibility and the efficiency gains associated with tradable permits are seen as the instrument's best assets. For climate change, by now it can be said that emissions trading alongside with voluntary agreements have become the "instruments of choice" for industry. This position depends however on a number of assumptions including the allocation of "permits" for free or the use of relative targets (to avoid the cap). Both issues remain very controversial however and how they will be solved will remain critical to the success of tradable permits.

The standard model for tradable permit schemes is based on total allowances, i.e. a cap-and-trade schemes. These schemes typically cap company emissions by allocating allowances (“permits”) for pollutants. Companies must ensure that they stay below these caps. They have a choice of either reducing emissions by taking action or by buying additional permits depending on what is cheaper. Companies that reduce their emissions by more than the allocated cap can sell the surplus of permits to other companies, if the price is right or they may bank them for later use. The premise on which trading is based is that emitters incur different costs of reducing emissions. If emissions permits are tradable, low-abatement cost emitters can cut emissions below the cap and sell the difference to high-cost emitters, if the permit market makes this attractive. The alternative model are so-called resource (or credit-based) schemes. Under credit-based schemes, credits are created, i.e. “earned” when a source reduces emissions below the level required by existing, source-specific limits based on either regulation or an NEA. Important is that targets can be expressed in absolute or specific terms (i.e. as absolute caps or as energy efficiency targets).

If one looks at the current situation, different national initiatives combine the two different tradable permit models. For example, the UK emissions trading scheme (DEFRA 2001) combines cap-and-trade with a credit model. The reason is mainly that large parts of the UK industry had agreed a voluntary agreement, based on relative targets. These companies were reluctant in the follow to accept an absolute cap. Similarly, the initiative driven by Entreprises pour l'Environnement from the outset absolute with relative targets in a credit-based system (MIES 2000). The reason for the credit-based system was the public perception that a cap-and-trade scheme would constitute a "license to pollute".

Figure 5.1. PROPERTY RIGHTS AND TRADING POTENTIAL FOR CAP-AND-TRADE AND CREDIT-BASED EMISSIONS TRADING SCHEMES (EXAMPLE)



It is generally accepted that cap-and-trade programmes have the double advantage over credit trading schemes that they ensure environmental effectiveness and in most cases are less complicated, therefore bringing costs down. These were also the two main reasons why the U.S. Environmental Protection Agency (E.P.A.), which implemented most actual emissions trading schemes, has moved over time from credit trading to cap-and-trade schemes, which by now can be said to be the "traditional" approach. In Europe, however, major industries have negotiated agreements based on relative targets and therefore are reluctant to accept absolute caps. As a result, credit-based schemes might smoothen the transition to absolute caps and to a cap-and-trade system.

Credit trading with relative targets or any other rate-based policy bears the risk that the participating sector emits more than the assumed target due to unexpected output increases. Within the context of Kyoto Protocol where countries have to obey absolute emissions limits, government might want to avoid such risks. This real or perceived lack of environmental certainty is also the reason why non-governmental organisations object to relative targets. This is somewhat surprising. The uncertainty for emissions trading is the same as for voluntary agreements, if based on relative targets. If the public and governments have

accepted relative targets for voluntary agreements, then there is no reason why it should not be accepted for emissions trading.

Arguably credit-based schemes are more complex, i.e. they tend to have higher "transaction costs". This is at least what the empirical evidence suggests (cf. Stavins, 1995; Stavins, 2001). This is generally associated with the fact that the allocation of allowances in credit-based schemes is ex-post (i.e. after the company has proven having done better than its target). The most critical and politically sensitive issue in emissions trading is the allocation of "allowance" (in cap-and-trade) and "credit" (in baseline and credit), in fact the transfer of pro-

Table 5.1. MAIN FEATURES OF EUROPEAN EMISSIONS TRADING SCHEMES (ADOPTED, UNDER DISCUSSION)

	Allowance trading	Credit trading	Auctioning	Grand fathering
Danish power sector	3			3
UK emissions trading group	mixed			3
French EpE		3		3
Norway (under discussion)	3		3(partly)	3
Sweden (under discussion)	3		3	
BP target & trade	3			3
Shell STEPS	3			3
EU proposal	3	(3)	(left to member states)	

Source: Adapted from Egenhofer (2002).

perty rights from the government to the firm. While in allowances trading schemes, political controversy usually comes to a halt once the allowances are allocated and when the scheme starts, in credit schemes political controversy may continue, increasing the risk of governments changing the rules, as witnessed in the early US EPA schemes. Whether this will be an issue in the future remains to be seen. Increasing experience with baseline setting and certification in the context of NEAs or the context of the Kyoto might reduce risk of changing rules on allocation in credit schemes.

If we turn to the traditional (cap-and-trade) approach, the most controversial issue is the allocation of allowances, which is a prerequisite to trading. There are two main schemes for allocating permits: "grand fathering" and auctioning. Under a "grand fathering" scheme, each market participant receives permits based on its previous emissions. If an auctioning scheme is chosen, each market

participant has to buy permits. Either process inevitably involves a rationing of permits, since the number of available permits has to be decided. Grand fathering has the advantage of not entailing net costs for market participants, since permits are granted. By contrast, auctions imply an additional cost for market participants, due to the fact that they have to pay for permits.

Periodic auctioning has a number of technical advantages, such as equal access to and transparency in granting allowances. Auctioning would avoid a delicate negotiation of how many allowances are allocated to each firm, thereby avoiding difficult political negotiations. Auctioning would also benefit those that do not emit or emit very little or that have done best in the past, since early movers would have to buy fewer allowances. Thus, from an early action perspective, auctioning is advantageous. Auctioning would provide an advantage, for example, to basically carbon-free power generation from renewable or nuclear since they would have to buy only a few permits.

The industrial sector and the thermal power industry argue on the contrary that auctioning inevitably adds to costs (in absolute terms) of industry. Thus international competitiveness would suffer. Auctioning is seen as the equivalent of a tax, whose rate would be fixed by the market. Consequently, energy-intensive industries in particular oppose auctioning for the same reasons they oppose a tax. In the view of many industries, auctioning would annul the benefits of emissions trading and it is unlikely that energy-intensive industries will accept auctioning as the method of allocation. To make auctioning revenue-neutral, it was suggested to recycle revenues from the auctioning, thereby reaping the so-called double-dividend (cf. Carraro and Siniscalco, 1996). Revenue neutrality necessitates "earmarking" of government revenues, something that parliaments do not like since it reduces their scope for controlling the government. Therefore, in reality, recycling of revenues from auctions will be difficult to implement. It also increases government intervention and might reduce transparency, one of the cited advantages of auctioning.

In practice the debate remains largely academic. Since most of the trading population is likely or consist of big firms subject to international competition, the issue of allocation will be tilted towards avoiding extra costs. All major emissions trading schemes have finally come down in favour of some kind of grand fathering. Especially, since grand fathering can be organised in a way to avoid punishing early movers, for example by building into the allocation method a technical factor for climate-friendly technologies or combining output-related grand fathering with benchmarking. That way however, tradable permit schemes remain exposed to the "licence to pollute" claim.

In conclusion, although emissions trading has seen a dramatic rise in the EU recently, it remains unclear whether it will indeed become a suitable instrument for pollution control on a large scale, especially outside of climate change. Its efficiency gains and relative popularity with industry and other stakeholder

suggest it might. On the other hand, there is little knowledge about effects on redistribution. And as we have seen, it was exactly the fact that taxation, produced winners and losers that made taxation less popular than economic analysis had suggested.

And interesting question is to assess the potential effect of tradable permits on the design of policy mixes. Tradable permit schemes – in essence policies to restrict quantities – are incompatible with pricing policies (i.e. taxation) and regulation (which prescribe technology standards). If policy makers chose a tradable permit scheme, there is no room for additional measures for a particular pollutant. However this does not hold true for NEAs. Since tradable permit schemes are based on a target, there will always be political negotiation between governments and regulation authorities, similar to NEAs. We should not be surprised to find that the future instrument will be a combination of an NEA, which fixes the target and a tradable permit scheme, in order to reap additional efficiency gains.

6. CONCLUSIONS: TRENDS AND OPTIMAL POLICY MIXES

Within the EU and the OECD at large, we have witnessed a long-trend shift from command-and-control instruments towards economic instruments. While traditionally, regulation was the prime instrument, coupled by some environmental tax (notably fuel taxes) and charges (notably for waste and water), more environmental taxes and charges have been used, tradable permit schemes are becoming "acceptable" options, and voluntary agreements (VAs) are increasingly applied and becoming mature instruments. In addition, there is an growing move towards environmental tax reform (ETR) as countries change their tax base, reducing labour related taxes and increasing taxes and charges on environmental pollution, resources and services. This shift has been influenced by a diversity of motivations including economic (e.g. cost-effectiveness), financial (revenue-raising) socio-political (e.g. political acceptability), environmental (e.g. implementation & enforcement) or legal (e.g. competencies).

This shift of government policies is also reflected in a shift of position by the regulated firms. While firms' strategies under command-and-control regimes consisted of cost avoidance strategies, the shift towards economic instruments is mirrored by companies exploiting the environment in form of markets for new products or gain a competitive edge. Nowhere can this be better demonstrated as in climate change where companies such as BP and Shell have launched cap-and-trade emissions trading schemes. The rationale for this is partly to prepare the firms for an increasingly carbon-constrained world, i.e. first mover advantage in a broad sense.

The long-trend shift is advancing very unevenly among countries depending inter alia on the political conditions, the legal system, regulatory context, economic structure, cultural context, national preferences, the nature of the environmental problem, different environmental priorities. For example, while tradable permits have played a minor role in the EU, first taxation and then negotiated agreements have flourished. In the US, tradable permits were one of the instruments tested first and taxes and true voluntary agreements are less used.

At the same time as we have seen a shift towards incentive-based instruments, we witness increasingly a shift towards combining instruments. More and more environmental policy integrates instruments into a portfolio of instruments that when combined offer a more optimal instrument package and result. The traditional discussion of "which instrument is best" is moving increasingly towards one of "which package of instruments is best".

The main reason for this shift is that new environmental legislation has to build on existing realities – the country's regulatory history, existing instruments and commitments, the economic structure, political views and inter-relation with instruments and policies in other Member States. For example, introducing cap-and-trade emissions trading schemes in the "real world" has to accommodate existing instruments such as VAs. Integration of instruments into a portfolio or mix has the further advantage of being able to capture the different advantages of the various instruments. Hence, policy mixes are designed to "optimise" the incentives to mitigate pollution.

This shift has been accelerated especially in climate change. Specifically for climate change, a driver for integration at the micro-level are the newly emerging climate policies, e.g. within the framework of the Kyoto Protocol. The Kyoto Protocol establishes three genuine market-based instruments for international action (so-called Kyoto mechanisms[26]) but leaves contracting parties free to apply whatever instrument suits best for domestic abatement. As a consequence, governments have started to think about combining the Kyoto mechanisms with domestic policy approaches such as NEAs, taxation, domestic emissions trading or regulation. The variety of policy instruments applied among the different EU Member States is formidable. Germany for example relies on a mixture of a voluntary approach in the form of a recognised unilateral commitment by industry and taxation and regulation for the remainder of the economy. The Netherlands initially preferred NEAs, mainly rate-based coupled with the use of the Kyoto Protocol's project mechanisms. The UK from the outset attempts to combine emissions trading, both allowance and baseline and credit trading (based on absolute as well as relative targets), taxation and negotiated agreements. All these approaches have in common that they present an attempt to combine instruments, in fact develop the "optimal" policy mix.

As this policy mix becomes more pronounced, the intensity of balancing different – often conflicting – objectives increases, and the task of selecting an "optimal instrument mix", which are compatible, and efficient, while not being wasteful (i.e. high administrative or transaction costs) or including "unnecessary" instruments, becomes more important. Under a command-and-control approach the main factor that mattered was environmental effectiveness, coming down to select the appropriate technology or emission standards. Economic instruments all raise issues of effectiveness, efficiency and equity. Effectiveness concerns, i.e. the level of pollution control are mainly aired regarding negotiated agreements and indeed the objective of early agreements was questionable. But this issue has been partly addressed in the meantime. The efficiency question naturally is at the heart of the debate of economic instruments.

There is a well-developed body of literature and much political debate about equity, i.e. the effects of income on households when it comes to taxation. There is relatively little analysis and even less discussion on equity and tradable permits, although we expect that this will dominate the debate as tradable permit schemes get implemented.

While there are broad trends, the practice across the Member States continues to be very varied and reflecting each countries' particular situation and history. While some applications in some countries are not transferable to others, given that their effectiveness is linked to institutional, legal, cultural and economic context, there is a wealth of experience across the EU of interest of practical value to other Member States. Indeed, we are already seeing a continued practice of comparison and benchmarking of practice and effects across Europe, which is leading to some "soft harmonisation" in some areas complementing the "strict harmonisation" or EU regulations. Continued efforts are being made to enable voluntary agreements to be comparable and compatible across Member States, Member States are learning from practice with ETR and adopting the appropriate lessons, and examples of practice are used to fuel national debates each time a new instruments or package of instruments is being considered domestically.

At the current times, the climate change commitment and the work on the various related instruments is the focus of policy instrument development – both at the domestic level and EU level. This has become a new impetus for environmental tax reform, the application of VAs, linkage of taxes to VAs and tradable permits with the ultimate aim of developing an optimal policy mix.

NOTES

THE CASE FOR PLURALISM : DIFFERENT NATIONAL APPROACHES TO ENVIRONMENTAL POLICY IN EUROPE

[1] BAT as applied to the EU IPPC (Integrated Pollution and Prevention Control) Directive, BAT is used as best-available techniques, which includes best-available technology.

[2] For the sake of simplicity we are using the term economic instrument for this list. Some of these instruments are no « true » economic instruments such as voluntary agreements.

[3] These are not formally « Agreements » as such, as the European Commission does not have the remit to be a formal partner in « Agreements ». To be precise, these are Commission « recognised » industry « Self-commitments ».

[4] For a broad discussion on experience with VAs, see EEA (1997), OECD (1999), ten Brink et al (2002) and the 1996 Communication (COM(96)561 final of 27.11.1996). Furthermore, for the EU political context it is worth looking at the 6th EAP (COM(2001)31final of 24.1.2001) and White Paper on European Governance (COM(2001)428 final of 25.7.2001).

[5] These are with the European, Japanese and Korean automotive associations: ACEA, JAMA and KAMA.

[6] There are few comprehensive assessments of the transaction costs, partly as there is a lack of clarity on what should be contained under this title, and partly as time spent by authorities on VAs is often not linked and costs apportioned to VAs. See ten Brink ed, 2002 for useful classifications and cost examples.

[7] The Dutch Energy Efficiency Benchmarking Covenant has individual firm agreements (as its predecessor the Long Term Agreements) whereby Dutch plants benchmark with the average energy efficiency of the best region in the world or with the best 10 % of plants world-wide to determine individual targets.

[8] The existence of VAs can in some cases allow a broader instrument package to be passed than would be the case without VAs, helping implement important strategies (e.g. the UK climate change strategy).

[9] For existing good practice guides see the European Commission guidelines (CEC, 1996), NGO guidelines (Green Alliance, 2001a and 2001b), the Dutch Guidelines on Covenants and the European Climate Change Programme (ECCP) multi-stakeholder sub-working group on voluntary agreements guiding principles for climate change VAs (http://www.europa.eu.int/comm/environment/climat/eccp_longreport_0106.pdf).

[10] The term « tax » is generally used where the revenues accrue to the national (or regional) exchequers, and the term « charge » is used where the revenues go to pay for some service or are recycled for a particular use. In the latter case, the revenues are said to be « earmarked » or « hypothecated ».

[11] For further detail see ECOTEC (2001), EEA (2000), OECD (1997 and 2001) and the OECD and European Commission Databases on environmental taxes and charges: www.oecd.org/env/policies/taxes/index.htm and www.europa.eu.int/comm/environment/enveco/env_database/database.htm

[12] Some of these are not « pure CO_2 taxes » whereby there a tax is related to CO_2 content equally across fuels. There are also a wide range of full or partial exemptions from the tax so a significant proportion of CO_2 emissions are untaxed.

[13] This scale of revenues is significantly lower that would have been the case had there not been extensive use of exemptions – the OECD database shows that there are around 1000 exemptions to the 235 environmental taxes – see OECD 2001. While many of these were justified and justifiable on competitiveness grounds, a number of exemptions that are still in existence today cannot truly be argued to be important safeguards of competitiveness for truly sensitive industries.

[14] It is usually the case that taxes and charges are implemented at a low rate, with the intention of increasing the rate over time. In some cases the levels do not rise significantly after imposition.

[15] See ECOTEC (2001) and OECD reports for assessments on the effect and effectiveness of taxes and charges.

[16] Also called « hypothecation ».

[17] The reform in 1993 primarily concerned households, the reform in 1995 concerned industries and the latest reform in 1998 concerned both households and industries (Krog, 1999).

[18] The reduction of 0.2 per cent is based on total tax revenue of around 339 billion Euros in 1995.

[19] The French generalised pollution tax was created in 1999 grouping 17 environmental taxes on waste, water and air pollution together. The ETR was regarded as « unconstitutional » in 2001. Future developments are unclear.

[20] Builds on other studies, seehttp://europa.eu.int/comm/environment/enveco/taxation/environmental_taxes.htm

[21] Though with « gateway restrictions » limiting the extent of access to ET.

[22] As part of the *ex-ante* assessment

[23] There are certainly cases where earmarking is not appropriate given the scale of the revenues and the need for flexibility in fiscal choices.

[24] Two qualifications need to be made, however. Effectiveness is not necessarily ensured in case of rate-based credit schemes (see below) and in cases where compliance is either not ensured or non-compliance does not lead to mitigation effects in the follow. That is typically the case where non-compliance leads to financial penalties lower than the actual permit carbon price, and therefore polluters can buy themselves out of mitigation actions.

[25] There are some important exceptions, however in Europe. They include parts of German industry and the chemical and other energy-intensive industries.

[26] The Kyoto mechanisms are International Emissions Trading (IET) and the so-called project mechanism, Joint Implementation (JI) and the Clean Development Mechanism (CDM).

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