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Economic Commission for EuropeExecutive Body for the Convention on Long-range
Transboundary Air Pollution**Guidance document on economic instruments to reduce
emissions of regional air pollutants***Summary*

At its thirty-first session (Geneva, 11–13 December 2012), the Executive Body to the Convention on Long-range Transboundary Air Pollution adopted a guidance document on economic instruments to reduce emissions of regional air pollutants to the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), and decided that it would be the guidance document referred to in article 6, paragraph 1 (g), of the Protocol, as amended (ECE/EB.AIR/113/Add.1, decision 2012/9).

The present document contains the guidance document as adopted. It is designed to assist Parties in fulfilling their emission reduction commitments under the Gothenburg Protocol. The economic instruments of relevance here are market-based mechanisms that provide incentives to pollute less. As they are market-based, they offer the flexibility that will favour the most cost-effective and efficient pollution controls. Emphasis in this guidance is on the use of economic instruments for the control of regional air pollution from emissions of sulphur dioxide, nitrogen oxide, ammonia, volatile organic compounds and fine particles.

1. Economic instruments include a variety of policy tools, such as pollution charges and taxes or marketable permits. Provision of economic incentives to pollute less can, in principle, bring about the full internalization of the health and environmental costs of activities, leading to an optimal level of pollution control without the need for detailed specification of control measures. Emphasis in this guidance document is on the use of economic instruments for the control of regional air pollution from emissions of sulphur dioxide (SO₂), nitrogen oxide (NO_x), ammonia (NH₃), volatile organic compounds (VOCs) and fine particles, though the information presented has broader applicability for environmental improvement. A key feature of economic instruments is that, by giving polluters more flexibility in deciding how to respond to legislation than traditional command-and-control mechanisms, they can reduce the overall cost of pollution control policies, thus leading to the achievement of environmental goals in a cost-effective way. The instruments can provide a lasting incentive for behavioural change, as well as for the development of technological innovations and more cost-effective emission control measures. In many cases, economic instruments create revenues. In some cases these have been used to further other policy objectives (“double dividend”). In others, they have been earmarked for purposes closely related to the environmental objective: e.g., to compensate those that suffer damage from pollution; to subsidize emission control measures; or to compensate for a loss in competitiveness for the industry concerned. Some economic instruments are designed to serve purposes other than environmental ones, and some explicitly address a number of issues simultaneously. An effective and efficient system, however, may require a clear decision about its intention, as although incentive-based taxes will raise revenue, the two objectives (environmental improvement and revenue raising) are not fully compatible. Systems of economic instruments should be designed in different ways depending on whether their primary objective is to raise revenue or to promote environmental improvement.

2. To maximize the benefits of economic instruments it is important to consider carefully the conditions under which particular economic instruments are likely to perform well and to take account of the situations in which their use is less advisable, for instance, when an appropriate tax base cannot be found. Furthermore, every economic instrument can be designed and implemented in a variety of ways. Careful design and implementation may help to make them more effective and reduce the chances of undesirable side effects, for example, due to misdirected incentives. In many cases, this will mean that economic instruments are part of a policy mix in which direct regulation, voluntary approaches and exchange of information all play a role.

3. The experience gained in the use of economic instruments to reduce emissions of NO_x, sulphur, VOCs, NH₃ and particulate matter (PM) has been reviewed in a background document based on national expertise and scientific literature. Using this review and information from the 2010 questionnaire on strategies and policies in the framework of the Convention on Long-Range Transboundary Air Pollution, tables 1 to 3 below summarize the most important findings of relevance to Parties implementing the obligations of the Convention’s Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, or Gothenburg Protocol. The first of the three tables shows the main features and aspects of four categories of economic instruments that are likely to be the most relevant in the present context (tradable permits and quotas; emission and process taxes/charges; product charges and tax differentiation; and subsidies and fiscal facilities).¹ Their performance is assessed

¹ Deposit-refund systems are not included, as their applicability in the present context is extremely limited. Voluntary agreements, which are sometimes considered as economic instruments, are also omitted as they do not fall within the definition of economic instruments used here (i.e., they do not provide a financial incentive to reduce emissions).

against a number of criteria and some important issues in the design of the instruments are mentioned. Table 2 illustrates the applicability and actual application up to 2010 of the four instrument categories to various source categories (generally excluding reference to measures aimed principally at greenhouse gas controls) and table 3 presents a (non-exhaustive) list of provisions needed for the actual implementation of these economic instruments. Table 2 has been updated for 2010 based mainly on the Organization for Economic Cooperation and Development (OECD)/European Environment Agency (EEA) database on instruments used for environmental policy and natural resources management² (updated to 2010 for most countries) and the report *The Use of Economic Instruments in Nordic Environmental Policy 2006–2009*.³

4. Since the last update of this guidance document, a major difference is the implementation of the European Union (EU) greenhouse gas emission allowance trading scheme⁴ in 2005 and national emission trading schemes for carbon dioxide (CO₂) (e.g., in Denmark and Norway), and the co-benefits these reductions in greenhouse gas emissions will have in terms of reducing emissions of pollutants covered by the Convention. Trading schemes for other pollutants have also been introduced or considered (e.g., for NO_x in the Netherlands). Other major changes include the implementation of emission charges for NO_x and SO₂ in more countries, national carbon taxes and carbon-related incentive policies, the introduction of subsidies for renewable energy in many countries and the emergence of voluntary agreements between industry and Governments.

5. In addition to the issues presented in the tables, the following general considerations and recommendations should be taken into account:

(a) Economic instruments will have their optimal effect in cases where the market mechanism functions well. Therefore, it is necessary to check whether the actors who will be directly or indirectly affected by the instruments operate in (at least) reasonably competitive markets and have access to the information needed for their decision-making. It may be necessary to accompany (or precede) the introduction of an economic instrument with policies that improve the functioning of markets, their security and the availability of information on emission reduction options and environmental benefits;

(b) Although pollution taxes or tradable permits are often presented as alternatives to direct regulation, they will typically be embedded in a mix of instruments, in which standards, voluntary agreements and/or other instruments may also be involved. When developing an economic instrument it should be checked that the various instruments will be mutually reinforcing and not counteracting;

(c) Taxes and charges can have an incentive function and/or a revenue-raising function. The incentive function can be realized directly by making abatement efforts profitable or indirectly through reaction in the market (due to the cost increase being passed on to consumers);

(d) Preferably, economic instruments (especially taxes and charges), like other instruments, should be announced well in advance of their starting date and should involve consultations with stakeholders. This will enable producers and consumers to take account of the instrument in their investment decisions and to react optimally to the changed market

² www.oecd.org/env/policies/database.

³ H. Lindhjem et al., TemaNord report No. 2009:578 (Copenhagen, Nordic Council of Ministers, 2009). Available from <http://www.norden.org/en/publications/publikationer/2009-578>.

⁴ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

conditions, thus improving overall efficiency. However, for some product taxes, the announcement may also lead to stockpiling.

Table 1
Experiences, features, issues and considerations

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
Main features	Allow the reallocation of emission or production rights among firms (or their spatial or temporal reallocation by a single firm)	Polluter pays a fixed or variable tax (charge) per unit of emission or per unit of a polluting activity	Polluter pays a fixed or variable tax per unit of polluting product; tax on “cleaner” product may be reduced	Improve the competitiveness of products or processes that cause lower emissions than “standard” technology
Exemplary cases (see also table 2)	Emission trading programmes (United States of America); manure quotas (Netherlands)	NO _x charge (Sweden; Norway, Denmark); emission taxes in several Central and East European countries	VOC incentive tax (Switzerland); sulphur tax (some countries); tax reduction for “cleaner” fuels and cars (several countries)	Environmental funds (mainly in Central and Eastern Europe); accelerated depreciation schemes (several countries); price guarantees for renewable energy (Germany)
Applicability (see also table 2)	(Large) point sources (permits); polluting products (quotas)	(Large) point sources	“Intrinsically” polluting products	Low-emission technology (especially if performance exceeds standards)
Effectiveness	Allow flexibility while securing cap on total emissions	Can be very effective if rate is set at an appropriate level; precise effects of the tax may be difficult to estimate	Can be very effective if rate/difference compensates for higher cost of substitute	Can play an important role in creating a market for new technology; accelerated depreciation (and other corporate tax deductions) is only effective for profit-making firms
Efficiency	Potentially high, especially when abatement costs vary widely; accumulated capital savings in the United States estimated at > US\$ 10 billion	Potentially high, especially when abatement costs or costs of substitutes vary widely	Potentially high, especially when abatement costs or costs of substitutes vary widely	Eligible equipment may not be optimal in all cases; risk of subsidizing investments that would have been made anyway

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
Monitoring and enforcement effort involved; administrative costs	Dependent on procedures and conditions; may be relatively high due to trade approval procedures	Dependent on number of sources affected and on measuring method; administrative costs in the case of the Swedish NO _x charge estimated at 0.7% of revenues	Relatively low, in particular if existing administrative infrastructure can be used and if number of producers/importers is limited; administrative costs in the case of the Swedish sulphur tax estimated at 0.1% of revenues	Dependent on scope and details of the subsidy scheme
Distributional aspects and economic impact	Dependent on assignment of permits/quotas (e.g., “grandfathering” or auctioning); if markets are imperfect, dominant firms may increase their market power	Dependent on market situation, tax/charge rate, costs of emission reduction and allocation of revenues; impact can be minimized by recycling revenues back to tax/charge payers	Dependent on market situation, tax/charge rate, cost of substitutes and revenue destination; distributional impact may be regressive (having most impact on those with low incomes) if basic goods (e.g., energy) are taxed and if income tax is simultaneously reduced	May come into conflict with the “polluter pays principle”; may lead to “windfall profits” if subsidized investment would have been made anyway
International trade aspects	No discrimination against foreign-owned firms	“Border tax adjustments” can be applied, but should be compatible with World Trade Organization (WTO) and, where applicable, EU rules	Tax/charge can be levied on imported goods and refunded for exported goods (but no customs duties allowed in intra-EU trade); discrimination against foreign producers should be avoided	Compatibility with WTO and, where applicable, EU rules should be checked in advance; appearance of favouring domestic producers should be avoided
Possible side effects	Risk of “hot spots” if location of emission matters; auctioned permits raise revenue for public spending	Taxes will generate revenue	Taxes will generate revenue	Subsidy may act as a catalyst in negotiations between environmental authorities and firms
Important issues in instrument design	Criteria for trade approval should be transparent and not too restrictive, so as to avoid limited participation in the market; fiscal treatment of permits and quotas (as assets) should be clear	Tax should be accompanied by a reliable emission reporting system	Scheme should provide for exemption/refund if product is used in ways that do not cause emissions	Budgetary impact should be carefully assessed, especially if scheme is “open-ended”

Table 2

Applicability and application by main source category

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges^a</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
NO _x : (large) point sources	✓✓ Emissions trading: CA, US, GB, NL, CH ^b “Internal bubbles”: DK, NL	✓✓ Incentive charge on emissions: SE, NO Financing charges/taxes on emissions: BG, CA, ^b CZ, DK, EE, ES, ^b FR, HR, HU, IT, LV, LT, ME, PL, RO, RS, RU, SK		Emission related: CZ, NL ^c Energy related: AT, CA, DK, DE, LT, NL, NO, PL, SE, GB Industry related: CA, CY, FR, DE, GR, NL, PL, PT
NO _x , SO ₂ , PM and VOCs: mobile sources, including shipping	✓ Only used on the urban scale: Krakow (PL), Singapore	✓✓ Environmentally motivated road pricing: AT, BE, CZ, DE, NL, PL NO _x tax on large mobile sources: NO Congestion charging: GB, SE Fee differentiation for shipping according to NO _x emissions: SE	✓✓ Lower taxes on “cleaner” vehicles and/or fuels: AL, AT, BA, BE, BG, CA, HR, CY, CZ, DK, FI, FR, DE, GR, HU, IS, IE, IT, LV, LI, LT, LU, NL, NO, PL, PT, RO, RU, SK, SI, ES, SE, CH, TR, UA, GB, US Charges for use of studded tyres: NO	Investments: CA, CY, HU, IT, LT, NO, PL Car-scraping schemes: CA, CY, IE, IT, NL, NO, FR, GR, PT, RO, SE, GB, US Funding schemes and reductions in road tolls for trucks with PM filters: CH, DE, DK, NL, PT, US
SO ₂ : large point sources	✓✓ Emissions trading: PL, ^d US, GB, CH ^b “Internal bubbles”: NL, GB	✓✓ Financing charges/taxes on emissions: BG, CZ, DK, EE, ES, ^b FR, HR, HU, IT, LV, LT, ME, PL, RO, RS, SE, SK	✓✓ Taxation of fuels differentiated according to sulphur content: BE, BG, DE, DK, FI, FR, LI, LU, NO, PT, SE, CH, GB, TR	Energy related: AT, CA, DK, DE, LT, NL, NO, PL, SE, GB Industry related: CA, ^b CY, FR, DE, GR, NL, PL, PT
SO ₂ , PM: small point sources		✓✓ Taxes on emissions: CZ	✓✓ Tax credits/refunds on high performance appliances for small scale wood combustion to reduce PM emission: FR, NO	

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges^a</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
VOCs: large point sources	✓✓ Emissions trading: CA, US	✓✓ Incentive charge on emissions: CH Financing charges/taxes on emissions: CZ, EE, FR, LI, LV, PL Financing charge on processes: PL	✓✓ VAT reduction for low-solvent paint: CZ, SK Tax on solvents (as from 2000): CH	Energy related: AT, CA, DK, DE, LT, NL, NO, PL, SE, GB Industry related: CA, CY, FR, DE, GR, NL, PL, PT
VOCs: small point sources and products		✓✓ Taxes on emissions: CZ	✓✓ VAT reduction for low-solvent paint: CZ, SK Tax on solvents (as from 2000): CH	
NH ₃ : large point sources		✓✓ Financing charges/taxes: BG, CZ, EE, PL, LT		Industry related: CA, CY, FR, DE, GR, NL, PL, PT
NH ₃ : agriculture	✓✓ Emissions trading (“offsets”): NL ^b	✓ Emissions charge: SK Charge on surplus manure: BE, NL	✓ Charge/tax on nitrogen fertilizer: AT, ^c DK, FI, ^c NO, SE, US ^b	✓✓ Subsidies/tax breaks for NH ₃ control, including organic farming: CZ, DE, IT, NL, NO, SI, GB

Abbreviations: Names of countries are abbreviated using two-letter International Organization for Standardization (ISO) codes as follows: AL = Albania; AT = Austria; BE = Belgium; BA = Bosnia and Herzegovina; BG = Bulgaria; CA = Canada; CH = Switzerland; HR = Croatia; CY = Cyprus; CZ = Czech Republic; DK = Denmark; EE = Estonia; ES = Spain; FI = Finland; FR = France; DE = Germany; GB = United Kingdom; GR = Greece; HU = Hungary; IS = Iceland; IR = Ireland; IT = Italy; LI = Liechtenstein; LT = Lithuania; LU = Luxembourg; LV = Latvia; MA = Malta; ME = Montenegro; MK = Macedonia; NL = Netherlands; NO = Norway; PL = Poland; PT = Portugal; RO = Romania; RU = Russian Federation; RS = Serbia; SK = Slovakia; SE = Sweden; SI = Slovenia; TR = Turkey; UA = Ukraine; US = United States.

Notes: The number of ticks reflects the relative suitability of the instrument/source category combination: ✓ indicates general suitability; ✓✓ indicates the highest level of suitability.

^a Excluding non-compliance fees.

^b Subnational level.

^c Abolished.

^d Subnational experiments.

Table 3

Implementation provisions

This table presents a concise (non-exhaustive) checklist of the main actions, tasks and responsibilities likely to be involved in the application of the four types of economic instruments. Successful application of the instrument depends on the clear assignment of responsibilities for the implementation of each of these items.

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
Preparation	<ul style="list-style-type: none"> • Assessment of relevant factors and institutional settings (including division of responsibilities among different levels of Government) • Determination of appropriate instrument mix • Initial proposal for introduction of the economic instrument • Feasibility study and impact assessment (economic, environmental, administrative) • Revised proposal • Consultations with all parties involved (clarification of objectives, explanation of instrument chosen, overview of consequences, listing of comments, wishes and objections) • Final proposal and political decision procedure • Time schedule and preliminary/transitional provisions 			
Legislation	<ul style="list-style-type: none"> • Definition of tradable items • Eligible actors • Conditions and criteria • Relationship with existing regulations • Administrative procedure for trades • Sanctions 	<ul style="list-style-type: none"> • Taxable/chargeable events/products • Taxable/chargeable actors • Tax/charge rates, exemptions and refund criteria • Declaration/assessment procedure • Appeal procedure • Sanctions 	<ul style="list-style-type: none"> • Eligible investments/products • Eligible actors • Conditions and criteria • Amount/rate • Application procedure • Appeal procedure • Sanctions 	
Information provision	<ul style="list-style-type: none"> • Information campaign at the introduction of the instrument (both general and targeted) • Continuous availability of information and assistance for affected/eligible actors 			

	<i>Tradable permits and quotas</i>	<i>Emission and process taxes/charges</i>	<i>Product taxes and tax differentiation</i>	<i>Subsidies and fiscal inducements</i>
Execution, monitoring and enforcement	<ul style="list-style-type: none"> • Assignment of permits/quotas (auctions; redistribution of permits that have been removed; renewal of temporary permits/quotas) • Monitoring trade • Possible government interventions in the permit/quota market • Compliance checks • Judicial action 	<ul style="list-style-type: none"> • Monitoring of emissions (or sample checks) • Checking declarations • Imposing tax/charge assessments • Tax/charge collection and redistribution • Judicial action 	<ul style="list-style-type: none"> • Monitoring of sales volume of product (or sample checks) • Checking declarations • Imposing tax/charge assessments • Tax/charge collection and redistribution • Judicial action 	<ul style="list-style-type: none"> • Checking applications • Checking compliance with criteria • Issuing decision on application • Payment • Fraud investigation • Judicial action
Evaluation	<ul style="list-style-type: none"> • Establishing a time schedule and criteria for evaluation (before introduction) • Determining procedures for data collection and exchange (before introduction) • Laying down the initial situation and envisaged development/objectives (before introduction) • Confronting observed results with objectives • Analysing causes of deviation from objectives • Identifying implementation problems, administrative costs and unwanted side effects • Proposals for adjustments of the instrument, or for other measures to achieve the objectives in order to avoid problems, costs or unwanted effects. 			