

# THE INFRASTRUCTURE FOR PERMITTING, INSPECTION AND ENFORCEMENT OF NITROGEN OXIDES AND CARBON DIOXIDE EMISSIONS TRADING IN THE NETHERLANDS

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## SUMMARY

Since the end of 1997, the government and the industry in the Netherlands have been engaged in the development of a nitrogen oxides emissions trading programme. The trading programme is to start by mid 2005. In a parallel European development a European Directive to enable and facilitate the trading in greenhouse gas emission allowances was enacted in October 2003. The carbon dioxide emissions trading started on 1 January 2005. The very ambitious timetable with respect to the implementation of the carbon dioxide emissions trading programme and the integration in the Netherlands with nitrogen oxides emissions trading proved a tremendous challenge for the policy development and the two ministries most closely involved. The complex legislation on carbon dioxide emissions trading was passed in Dutch Parliament in September 2004. The nitrogen oxides bill passed Lower House in December 2004, and is expected to be passed by the Senate during February 2005. The paper discusses in relevant detail the various aspects of the two emission trading programmes, what elements they have in common and where they differ, the legislative aspects and considerations of national and international law, the structure of monitoring, reporting, verification, inspection and enforcement, and finally the lessons learned during the process. It focuses specifically on the "implementation" elements of emissions trading.

## 1 OVERVIEW AND ANALYSIS: INTRODUCTION OF EMISSION TRADING IN THE NETHERLANDS

### 1.1 Introduction

Flexible approaches to achieve environmental targets have been a recurring topic in environmental policy discussions in the Netherlands since the early 1980's. Although these target-oriented approaches seemed attractive, most of these concepts, including emissions trad-

ing between different facilities, were at that time not regarded as desirable or applicable in the Netherlands' environmental and legislative setting. However, the idea of more flexible regulatory systems and cost effective solutions continued to attract attention throughout the late eighties and early nineties.

In the Netherlands, the interest in more flexible approaches came to the fore again in 1995 when various parties involved in national environmental policy

discussion became more and more aware of the major challenges presented by the sulphur dioxide and nitrogen oxides emission reduction targets in the first (1989) and the second (1994) National Environmental Policy Plan. Key players in the debate realised that achieving the government's targets for the 2000 and 2010 nitrogen oxides emission reductions from industrial installations had to be considered as overly ambitious. Moreover, industry began to openly question the long-term nitrogen oxides emission reduction targets while the regional authorities in charge of permitting of industrial installations also voiced their doubts. The start of emission trading programmes such as Acid Rain and Reclaim in the United States, and their early successes inspired supporters in the Netherlands to initiate discussions on the introduction of emission trading schemes. Various studies<sup>1</sup> were carried out to assess the applicability of emission trading in the Netherlands and to demonstrate the advantages of trading as a more cost effective approach in the abatement strategies of nitrogen oxides emissions in industry. Although these studies were most useful, it took another two years before opinions slowly began to shift towards emissions trading.

Parallel to the national discussion on nitrogen oxides emissions in the Netherlands a much larger, more political and global discussion on "policies and measures" to curb greenhouse gas emissions took place during the running up to the Kyoto conference. In this discussion the United States took the lead in opposing the various "command and control" options that were suggested and pressed for the alternative of worldwide trading of greenhouse gases. In 1999 the United Kingdom and Denmark made an early start with concrete experiments on carbon dioxide emissions trading in a national context. Recognising the danger of a proliferation of various, mutually incompatible systems of emissions trading within the European Union, the European Commission commenced at the end of 1999 with the development of a European scheme for emission allowance

trading. In a relatively short time and on the basis of very extensive work within DG Environment and a wide range of studies the European Commission published its legislative proposal<sup>2</sup> for a European scheme for trading in greenhouse gas emissions. In a remarkable short time political agreement between the Commission and the Member States was reached in the Council meeting of December 2002, and following agreement in July 2003 with the European Parliament the Directive 2003/87/EC<sup>3</sup> on the European Emissions Trading Scheme (EU-ETS) was enacted in October 2003.

Although most member states struggled during 2004 with varying success with the implementation and the precise interpretation of the definitions and articles of the EU-ETS directive, actual trading of carbon dioxide emissions within the framework of the directive has started on 1 January 2005. Perhaps not all elements of the directive, i.e. reporting, verification, inspection and enforcement, though most crucial for the success of the trading scheme, are yet fully resolved. In the Netherlands all systems and elements to enable full trading of carbon dioxide emissions are in operation and in June 2005 nitrogen oxides emissions trading is to start. This paper will outline the policy background of nitrogen oxides emissions trading and relate that to carbon dioxide emissions trading, discuss the similarities and differences of the two trading systems and outline the structure that has been set up for the implementation and actual start of emissions trading, i.e. the permitting, monitoring, verification, inspection and enforcement of emissions trading.

## 1.2 Background of the Dutch Nitrogen Oxides Emissions Trading Scheme

The Dutch nitrogen oxides emission reduction targets that form the heart and rationale for the trading programme are part of a broader set of targets to comply with the European Union directive on National Emission Ceilings, the so called

NEC Directive.<sup>4</sup> According to the directive the Netherlands are obliged to reduce overall nitrogen oxides emissions from 490 kilotons in 1995 to 260 kilotons in 2010. Negotiations with the major industry sectors involved resulted in a 2010 emission target for the industry of 55 kilotons relative to a 1995 baseline level of 120 kilotons. This target would be connected to the introduction of nitrogen oxides emissions trading in order to limit the total annual costs of industry. Various studies<sup>5</sup> had revealed that the costs of nitrogen oxides abatement could vary between installations from a low € 0.40 per kilo up to costs in the range of € 5 and even up to € 10 per kilo or more in some cases. By a system of emissions trading the costs per unit of nitrogen oxides total annual abatement costs for the industry could be reduced to a range of € 100 to € 200 million per year. The rationale for introducing nitrogen oxides emissions trading was therefore the consideration that with a system of trading the emission target of 55 kilotons could be realised in a cost-effective way.

## 2 INTEGRATION OF NITROGEN OXIDES AND CARBON DIOXIDE EMISSIONS TRADING

### 2.1 Design Elements of the Nitrogen Oxides Trading Scheme

The Dutch emissions trading programme differs markedly from other Cap & Trade programmes, such as the programmes in the United States (Acid Rain, Reclaim), and also the European trading programme on carbon dioxide emissions, as it is based on 'relative caps' directly related to the 'activity level' of the facility. In the case of regular combustion sources, which are responsible for about 85% of total nitrogen oxides emissions under the scheme, the allowed cap for an installation is based on a performance standard rate (PSR) defined as grams of nitrogen oxides per unit of energy (GJ) used in the facility. The PSR for 2010 is derived from converting the 2010 national emission target of 55 kilotons for the industry into a uniform per-

formance standard of nitrogen oxides emission per unit of fossil fuel used: the 55 kiloton target for the industry is divided by the total projected fossil fuel consumption by the facilities involved, resulting in a PSR of 40 grams nitrogen oxides per GJ in 2010. This should be compared with an 'average' emission performance of 95 g nitrogen oxides in 1995. It implies a reduction of more than 50%. At the start in 2005, the PSR has been set at 68 grams nitrogen oxides per GJ of energy, and every year this PSR will be tightened by 5 to 6 g/GJ to reach 40 g/GJ in 2010. The total emission allowed for a facility in a particular year will be calculated by multiplying the facility's total use of fossil energy input in that year by the PSR for that year. Specific process PSR's will be applied to industrial processes such as glass manufacturing, steel production, nitrogen acid production etc. which account in total for about 15% of industrial nitrogen oxides emissions.

The main rationale for the choice of performance standard rates (PSR) as a basis for emission allowances is that it provides individual companies with more flexibility to increase production in response to market opportunities, and is therefore more responsive to the needs of the industry. Moreover, a uniform PSR favours the more pro-active companies that have taken early action, and does not, as in most cap-and-trade systems, favour companies that have delayed their reductions measures. In this way the PSR encourages the industry to a more environmental responsive attitude and behaviour.

### 2.2 The EU Carbon Dioxide Emission Trading System

EU-ETS Directive 2003/87/EC instructs Member States to implement legislation to introduce a European wide system of carbon dioxide emission allowance trading between industrial installations. The directive provides for an initial three-year period from 2005 to 2008 that will limit trading to carbon dioxide emissions from major stationary sources within the Community. This initial period will be followed by budg-

et periods of 5 years in which a further extension of emission trading to non-carbon dioxide greenhouse gas emissions might become possible as well as an expansion of trade with non-EU countries that have established national or regional schemes of greenhouse gas emission allowance trading. The EU-ETS directive aims to balance the benefits of a Community-wide cap-and-trade system with the principle of subsidiarity. Therefore the Member States will be the principal agents to implement the emission trading scheme on the basis of a set of guidelines and criteria laid down in the EU-ETS directive and its annexes. Especially important are the monitoring guidelines which were published in January 2004,<sup>6</sup> and the regulation on national registries, published in December 2004.<sup>7</sup>

The EU-ETS directive requires Member States to develop a national allocation plan and to indicate how it intends to allocate the allowances to the individual installations. The plan and the allocation must be based on objective and transparent criteria, including the criteria listed in Annex III of the directive. Nearly all member states have struggled with varying success with the principles and rules governing the allocation process, the criteria and providing the proper amount of allowances to the individual installations. Member States had to submit their national allocation plans before 31 March 2004 to enable the European Commission to approve the plans within a period of three months. Only few Member States were in the end successful in getting approval of the European Commission within those three months. Some were even as late as the end of December 2004 and for these Member States approval may take another few months. The allocation of allowances proved to be highly political. An issue that raised much debate was the total number of allowances that Member States proposed to allocate to their industry, and whether the allocation was acceptable pursuant to State Aid conditions. Other questions and issues were the cost-effectiveness of including small installations in the

trading programme, the correction afterwards if economic growth would be higher than anticipated, and the number of allowances for "new entrants." Another issue of major political importance involved the question whether the combustion installations of the chemical industry should be included or be left out of the emissions trading scheme. A good overview of the challenges and difficulties involved with the introduction of GHG emissions trading is provided in a recent article in *Environment*.<sup>8</sup> Undoubtedly in 2006 when the next round of national allocation plans that Member States will be submitted to the European Commissions all these issues will be revisited. It would be most useful if by that time, the Member States and the Commission have resolved some of the issues and developed an unambiguous defined set of rules on the basis of which the allocation can be carried out in a more coherent and uniform manner.

### 2.3 Allocation of Nitrogen Oxides Emission Allowances

Unlike the EU emission trading scheme (EU-ETS) the nitrogen oxides emission trading system does not require an initial allocation of emission rights to individual facilities. Allowances are automatically determined by the multiplication of the PSR for a particular year with the total fuel input or product output of the facility. Compliance check will take place after the annual budget period has ended by comparing the nitrogen oxides emitted by the facility with the emission that is allowed on the basis of the use of energy and the PSR for that year, after correction for allowances bought or sold during the year. In a similar way as in the EU-ETS companies will be given a four month period after the budget year to balance any difference between actual and allowed emission levels by buying and selling additional credits. This enables companies to accommodate for fluctuations in their production. The company that exceeds its own "automatic" allowance by buying too little or selling too many allowances will have to compensate

any shortage in the next year in addition to a penalty for not obeying the regulations governing the emission trading scheme.

#### 2.4 Similarities Between the Two Emission Trading Schemes

A major consideration to integrate nitrogen oxides and carbon dioxide emissions trading is the similarity of the two trading schemes on a number of elements. First of all, about 90% or more of all nitrogen oxides emissions and a similar high percentage of the carbon dioxide emissions are directly related to the use and combustion of fossil energy. In that respect the two types of emissions are directly linked to our ways of consumption and industrial production. Nitrogen oxides and carbon dioxide have also in common the very ambitious reduction targets that are necessary to achieve ultimately sustainable emission levels. By virtue of the NEC directive, nitrogen oxides emission reductions to be achieved by 2010 in most European countries range from 40 to 60%. The CAFE programme (Clean Air for Europe) aims at achieving Europe wide sustainable emission reductions by 2020, implying further emission reductions after 2010. Similarly, long-term sustainable emission levels for carbon dioxide require by 2050 reductions in Europe in the range from 50 to 70%. So, both carbon dioxide and nitrogen oxides have ambitious improvements in the emission "efficiency" in common with which the energy is "processed" in industrial production.

A second reason for integrating both emission trading schemes is based on the consideration that both systems have also a number of legislative concepts and requirements in common. This relates for instance to the way allowances are defined in law, the way allowances are acquired and transferred, the legal status of an allowance and the way the allowances can be used to comply with the legal requirements. Emissions trading means a departure from traditional type of environmental legislation in the sense that it is based on the principle that the private sector is "free"

to choose among themselves how to comply with the required emission reductions, provided that the emissions target is met. Emissions trading requires therefore a redefinition and rethinking of the means and the legal instruments by which the public domain is to be safeguarded and the private domain is to be organised in order to make emissions trading a success.

Another, more pragmatic consideration was that both systems would require similar provisions and facilities for the implementation and enforcement, i.e. monitoring, permitting, verification and inspection. The legislative framework that by now has been set up provides for one emission permit for nitrogen oxides and carbon dioxide. The monitoring protocol that is an integral part of the emissions permit must cover both emissions. The same applies for the procedures to acquire the permit and the approval of the monitoring protocol. Similarly, the operator is to prepare just one emission report and to have it verified and hand it in according to the same procedures. Furthermore, to facilitate the implementation and enforcement of both trading schemes one competent authority will be in charge and supervise the various legal requirements, the permitting, the inspection and the enforcement of the new legislative requirements. This new organisation, the Netherlands' Emission Authority (NEa), whose tasks and responsibilities will be outlined in the sections below, has been set up as an independent, autonomous governmental organisation with independent enforcement and sanctioning powers.

#### 2.5 Differences Between The Two Emission Trading Schemes

There are also clear differences between the two trading schemes. Basically these differences have their origin in the way emission allowances are being allocated or generated. The EU-ETS directive requires that Member States issue yearly the carbon dioxide allowances to the installations before the end of February of that year. The allowances once issued retain their "value" for compliance during the 3-

year or 5-year period they refer to. The carbon dioxide allowances are internationally transferable and individually traceable. Through the internationally standardised and secured logging system required by the European Union registry regulation a large number of safeguards have been build into the national registries developed and operated by the individual Member States.

In the nitrogen oxides trading system emission allowances are automatically generated by the use of energy or production, and this implies that allowances need not to be issued at the beginning of the year. Allowances are not internationally tradable or transferable, and can only be used by the installations participating in the national nitrogen oxides trading scheme. As a result there is no need to trace each allowance individually, but rather to ensure that at any time a transfer is taking place each number of allowances bought is "covered" or counterbalanced by an equal number of allowances sold. Furthermore, only transfers from one operator or installation to the other are legally recognised and allowable for compliance under the condition that the transfers in question have been properly registered and administered. A number of lessons learned from the development of the carbon dioxide registry will be taken on board for the development of the nitrogen oxides registry, though special rules and electronic modelling will need to be developed as the transfer of allowances in the nitrogen oxides trading scheme differ from those in the carbon dioxide trading scheme.

### **3 LEGISLATIVE STRUCTURE FOR NITROGEN OXIDES AND CARBON DIOXIDE EMISSIONS TRADING**

#### **3.1 Legislation**

In the Netherlands' legislative structure a new chapter 16 in the Environment Management Act (EMA)<sup>9</sup> is to provide for the framework of emissions trading of both nitrogen oxides and carbon dioxide. Actual implementation will take place by

means of a general decree<sup>10</sup> detailing the operations of the two trading schemes. A ministerial regulation<sup>11</sup> has been issued prescribing in detail the requirements on the monitoring and reporting of emissions. The decision to integrate carbon dioxide and nitrogen oxides emissions trading implied that all legal requirements and procedures had to be aligned. For some time this seemed a disadvantage as each time a close look had to be taken to all aspects of the two schemes in order to reveal a possible conflict in operation, procedure or definition. This had however the advantage that the design of the legislative framework for both schemes was thoroughly discussed between the legislative experts involved.

The combined nitrogen oxides and carbon dioxide permits will be granted only if the monitoring protocol that is part of the permit is shown to be in full accordance with the national monitoring regulation. The national monitoring regulation is the national implementation of the monitoring guidelines of the European Commission while for nitrogen oxides reference is made to the monitoring requirements of the Large Combustion Plant directive (2001/80/EC).<sup>12</sup> The operator is obliged to include in his monitoring protocol precise information on how, on the basis of the fuel consumption, emissions measurements and the use of raw materials, the annual carbon dioxide and nitrogen oxides load will be determined.

#### **3.2 Monitoring**

The monitoring protocol must contain detailed descriptions of how all the information concerning carbon dioxide and nitrogen oxides emissions that is relevant to nitrogen oxides and carbon dioxide emission allowance trading will be obtained, processed, recorded, internally validated and reported in an establishment. To make it as clear as possible to the operators and installations concerned how the requirements must be met, the monitoring regulation contains substantive and procedural requirements. On the basis of these requirements, the operator must achieve

the required accuracy in the monitoring of the carbon dioxide and nitrogen oxides emissions and the reporting on the emission data.

The guiding principle of the monitoring regulation is that the determination of carbon dioxide emissions is systematically neither over nor under the actual values of the carbon dioxide emissions, and that the uncertainty with which the carbon dioxide emissions are monitored must be kept to a minimum. The minimum accuracy with which the activity data must be monitored is related to the annual carbon dioxide emission of the installation. Three classes have been distinguished, i.e. Class A of installations emitting not more than 50 Mtons of carbon dioxide, Class B emitting more than 50 but less than 500 Mtons, and Class C emitting more than 500 Mtons annually, whereby the highest accuracy level is attached to Class C, i.e. the installations with the highest annual emissions.

In order to assess the accuracy level (tier) with which at present and with existing equipment carbon dioxide emissions are being monitored in installations in the Netherlands and other Member States, the Ministry of Environment (VROM) instructed KEMA Netherlands to carry out an international study<sup>13</sup> on the practicability of the tier approach. With assistance of several national authorities across Europe some 20 installations cooperated in the project. The study revealed that many of the major sources for the installations do not obtain the required uncertainty in the individual activity data. However, when the major sources for an installation are combined to calculate the total carbon dioxide emission, the combined uncertainty in the activity data is considerably lower. The study shows that if the overall uncertainty in the total carbon dioxide emission is calculated, the results are generally within the 'typical uncertainties' as provided in the monitoring guidelines of the European Commission.

A similar requirement of accuracy levels has been attached to the monitoring of nitrogen oxides emissions. However, the monitoring of carbon dioxide involves other

procedures, methodologies and technologies than the monitoring of nitrogen oxides emissions. While there is a direct relationship between the carbon dioxide emissions of a fuel and its composition or conversion characteristics, and the annual carbon dioxide emission therefore can be calculated accurately on the basis of a calculation formula,, this is not the case for nitrogen oxides. To measure the nitrogen oxides emission it will always be necessary to measure the nitrogen oxides concentration in the flue gases of the combustion or process unit. In a similar way as for carbon dioxide, also for nitrogen oxides a cost-effective approach for the monitoring of the emissions has been selected whereby 4 categories of emissions sources are distinguished. Category I entails combustion plants > 100 MWth or other sources with combustion emissions or process units emitting more than 150 tons nitrogen oxides annually. Emission sources in this category have to be monitored continuously according to EN 14181. Emissions in Category II sources, i.e. combustion plants >50 MWth or process units emitting more than 75 tons nitrogen oxides annually shall be monitored through discontinuous measurements which have to be repeated once every six months. Sources in Category III and IV, each emitting in total not more than 4% of the total industrial nitrogen oxides emissions, must be measured every two or every four years. Similar to the KEMA study for carbon dioxide, various studies have been carried to assess the practicability of the accuracy levels for nitrogen oxides monitoring. These reports can be found on the website of the ministry of Environment. ([www.minvrom.nl/international/environment](http://www.minvrom.nl/international/environment)).

#### **4 IMPLEMENTING, INSPECTION AND ENFORCEMENT OF NITROGEN OXIDES AND CARBON DIOXIDE EMISSIONS TRADING**

- 4.1 NEa as the Competent Authority for nitrogen Oxides and Carbon Dioxide Emissions Trading Schemes

The Netherlands consider the permitting process, the inspection and enforcement as the most crucial elements of any emissions trading programme, and the ministry of Environment (VROM) has therefore invested heavily in setting up a proper structure and set of requirements to ensure the successful introduction and implementation of both trading schemes. The early development of nitrogen oxides emissions trading proved to be a major advantage. It meant that the importance of a proper structure of the monitoring, inspection and enforcement requirements was recognised early on, and also that these aspects required far more attention than in more traditional types of regulation. This was the main rationale for setting up the NEa as a new semi-autonomous governmental organisation that would be legally charged with the tasks and responsibilities of permitting, inspection and enforcement. The Environment Management Act empowers the NEa to act as the competent authority for both emission trading schemes and provides the Governing Board of the NEa with the clear instructions and the competence to sanction and penalise operators not abiding with the requirements of the law.

#### 4.2 Nitrogen Oxides Emissions Trading In Relation To The Requirements Of The EU IPPC Directive

The Integrated Pollution Prevention and Control (IPPC) directive requires that each plant/installation has a permit and operates under conditions in accordance with the principles and requirements of the directive. The permit must contain emission limit values that are based on an assessment by the Competent Authority of the emission values achievable through the application of Best Available Techniques (BAT) in the installation considered. There is a conflict of "management" between the IPPC permitting structure and an emissions trading structure whereby the operator decides for himself what is the most cost-

effective action to take in his particular situation. This conflict of management approaches has been well recognised, and the nitrogen oxides emissions trading has been designed such that in its present form it does not conflict with the IPPC approach. It means that for now the enforcement of BAT will also be maintained when the system of nitrogen oxides emissions trading comes into force.

It is however the clear intention of the Netherlands to press for changes to the IPPC directive in order to incorporate and integrate emissions trading of nitrogen oxides and other substances fully in a future revised IPPC. In 2002 the Netherlands initiated the ENAP project aimed at a European dialogue to explore new approaches for regulating industrial installations. Within this project four workshops were organised, the first of which explored the possibilities and constraints of nitrogen oxides and SO<sub>2</sub> emissions trading within present EU legislation. The proceedings of this workshop together with the proceedings of the other three workshops and the concluding high-level conference on the ENAP project can be found on the website of the Netherlands Ministry of Environment ([www.minvrom.nl/international/environment/enap](http://www.minvrom.nl/international/environment/enap)). The aim is that a revised IPPC would resolve the present situation of two conflicting principles of environmental management, i.e. emission trading on the one hand and the concept of enforcing reductions and BAT through emissions limit values in the permit on the other.

#### 4.3 Responsibilities in the Emissions Trading Environment

In the Netherlands' situation a clear distinction has been made between the precise responsibilities of the two authorities in relation to nitrogen oxides, i.e. a regional authority which is competent to issue the IPPC permit, and an emission authority (NEa) at a national level which is the competent body to provide the emission permit for carbon dioxide and for nitrogen oxides in a structure of emissions trading. The IPPC authority is responsible for

maintaining the emission limit values as contained in the permit or prescribed by the national legislation implementing the LCP directive or other EU legislation relevant for nitrogen oxides. The NEa is responsible for the proper structure and procedures of the monitoring and reporting of the annual nitrogen oxide missions. Especially with regard to the continuous monitoring of the larger installations specific arrangements have been made between both authorities to ensure that the monitoring equipment and procedures in each particular situation are in line with other monitoring aspects of the IPPC permit, and to ensure that the monitoring equipment is regularly inspected and visited by one of the competent authorities. Both authorities have made specific arrangements to cooperate and to fully inform each other on the permitting, inspection and enforcement actions with regard to nitrogen oxides emissions. These arrangements must ensure that operators won't be confronted with two authorities dealing with the same issue and taking opposite positions in a particular situation.

#### 4.4 The Validation Of Monitoring Protocols

As early as 2002 a total of ten operators started experimenting with drafting monitoring protocols for their installation. The first results showed a wide variety in the structure, monitoring procedures and details, and other elements to such an extent that it was hardly possible to compare the scope and content of one protocol with that of the other. In order to safeguard a level playing field between the installations involved, a well defined set of uniform requirements on the structure of the monitoring protocols, the monitoring rules and conditions, the data processing, quality assurance, internal control systems and reporting requirements was therefore necessary. Early in 2003 this assessment based on the aforementioned experiments was conveyed also to the team of consultants that advised the European Commission on the guidelines for the monitoring and reporting of greenhouse gas emissions

pursuant to the EU-ETS directive. Moreover, a next set of experiments by operators learned that a rigorous, systematic approach was needed with regard to the validation of these protocols. It became also clear that a most stringent and clear cut division of responsibilities between the competent authority, the operator and the verifier was needed in order to safeguard the interests involved and to distinguish the responsibilities of the public domain from those of the private sector in order to ensure a proper functioning of the emissions trading schemes. As a result of these experiments a project was started to develop a validation protocol with a clear set of criteria and procedures to enable the validation of the monitoring protocols of some 250 installations in a uniform and unbiased manner. After testing and experimenting with the various elements of the validation protocol, the final version of the validation protocol has clearly demonstrated its usefulness in October last year when in the very short time of altogether 8 weeks some 250 monitoring protocols were validated by the NEa. As the validation of the monitoring protocols is the most critical and time consuming element of the permitting procedure, this validation protocol and the strict procedures allowing a very efficient permitting process, proved a most valuable tool. Technical assistance was provided by four consultancy firms who independently evaluated and processed these 250 protocols and provided the NEa with their advice whether to approve the protocol, to request the operator for additional information or to return the draft protocol to the operator for not meeting the minimum standards.

#### 4.5 Verification of Emission Reports

As the introduction of emissions trading implies the entry of environment emissions into the financial domain, new safeguards must be developed to ensure that emissions are properly monitored and verified. All participants in the trading scheme must therefore adhere in the same way to the uniformly defined rules of the "game". After some early discussion in

2002 KPMG Sustainability was commissioned to draft a verification protocol outlining the various elements that needed to be covered in a verification process. Article 14 of the EU-ETS directive requires Member States to ensure that emission reports are verified in accordance with Annex V of the directive before being handed in to the competent authority. KPMG based their draft verification protocol on the various elements contained in Annex V. This draft verification protocol was then forwarded to the International Emissions Trading Association (IETA). By October 2004 IETA together with the Certification Committee of the European Co-operation for Accreditation (EA) had developed a draft guidance note on the basis of which national accreditation bodies can start the process of accreditation of national verifiers. This guidance note contains the various verification requirements and specific process and competence aspects needed for carrying out the verification in accordance with the EU-ETS directive.

In the Netherlands, some 25 operators participated from May to August 2004 in a large-scale demonstration project to test all main elements of the two emission trading systems. One of the elements in the test concerned the verification of emission reports. One outcome and major lesson from this verification testing exercise was that without proper preparatory actions the verification of the emission reports in February-March 2006 may prove to be very difficult. Most monitoring protocols, even after having been validated, still contain elements that are too vague or too open formulated to enable a proper verification by the verifier. Before the actual verification of the emission reports starts early next year, most operators in the Netherlands will be advised to take more time and seek the advice of the verifier in order to implement and adjust the various elements of monitoring protocols and to bring operational procedures in line with the requirements of the permit and the monitoring protocol. One of the recommendations of the demonstration test was that all operators should be invited and stimulated to have their monitoring

systems and reporting procedures verified as early as mid 2005 through a systematic and thorough pre-verification exercise. The aim of this pre-verification is to reveal which elements, aspects or procedures of the emission monitoring in the installation need further improvement in order to enable in February or March 2006 a smooth verification process of the emission report in line with the requirements of the EU-ETS directive.

#### 4.6 Inspection and Enforcement

The aim of verification is to guarantee that the emissions reported by the operator are a true representation of the monitoring as required by the permit. As such the verification must ensure the general truthfulness of the emissions reported by private sector. The verifier will start his verification process on condition that the emissions as reported by the company are a correct representation of the emissions as monitored according to the monitoring requirements. Inspection by the competent authority however is based on a different assumption. The inspector will look specifically for elements of non-compliance. So the verifier and the inspector have a different "basic" attitude vis-à-vis the reported emissions. The inspection and enforcement actions by the NEa as competent authority must respond to the public and demonstrate that also in a system of emissions trading the public interests of the environment are well protected through the proper functioning of the control mechanisms. The NEa is obliged to ensure that the emissions reported from the private sector are in full accordance with the permit requirements and the monitoring protocols as approved. Moreover, the NEa will see to it that the system achieves the environmental targets set. In order to ensure that the inspection and enforcement actions by the NEa are credible in the eyes of the industry and the public, the NEa has developed an inspection and enforcement strategy as an integral part and tail end of its whole implementation, permitting, inspection and enforcement structure. As part of that strat-

egy it is the intention of the NEa to make inspection and enforcement visits to all installations in a period of three years.

## 5 LESSONS LEARNED: CONCLUSIONS

For the last four or five years emission trading has been a major topic in environmental policy discussions in Europe. Most of these discussions were and are directly related to emissions trading within the context of climate change and the Kyoto protocol. Much less interest went out to the advantages of emissions trading as an instrument for achieving cost-effective reductions of other emissions, such as nitrogen oxides. Even now, in January 2005, the concept of emissions trading is still not accepted everywhere in Europe as a next phase in environmental policy development.

This should not have been a surprise. In order to function properly, emissions trading requires a well-defined legislative context. And as legislation itself is one of the most important cultural aspects of a modern society, strongly tied to the norms and values held by its people, the success or failure of emission trading very much depends on the full acceptance by society that future ambitious emissions reductions require also a cost-effective approach of reducing emission such as offered by emissions trading. It calls for a more proactive attitude of the industry towards regulation and towards reducing its own environmental burden. It requires also the recognition that a command and control type of regulation does not always serve the objectives effectively.

Traditional regulatory instruments have in that respect their own "anomalities". Although by now the idea of carbon dioxide emissions trading has become widely accepted in Europe, the interest in Europe for the trading of other emissions, such as for sulphur dioxide and nitrogen oxides, is still very low. The example of the Netherlands shows that the development of nitrogen oxides emission trading has been a major effort in thinking and constructive

debate between the various sectors of society. It has taken several years of intense discussions among all parties involved before the various aspects of this nitrogen oxides emissions trading programme were sufficiently explored and the results could be agreed upon. The input from industry, and especially from some very dedicated people who were prepared to devote much of their time and energy in the development of nitrogen oxides emissions trading, has been instrumental to the successful development and launching of the trading scheme.

One of the lessons learned is that new complex regulatory solutions require the talent, energy and cooperation of many dedicated people from industry and government. Moreover, it may be that the economic aspects of emission trading are self-explanatory, the development of an emissions trading programme is a most difficult undertaking. Solving the practical problems, such as the monitoring requirements and the legal constraints are time-consuming and difficult. In fact "emissions trading" is a completely new field of environmental instrumentation, covering new grounds and new procedures. It involves a rethinking and redefining of the role of the government as the legislator and the arbiter of the "common goods." This has been a real challenge all along during carbon dioxide emissions trading. If one looks back over the full period from 1997 till now one conclusion must be that conceptually and from an economic point of view emissions trading is a most interesting environmental instrument, most useful and effective for achieving ambitious long term reduction targets for substances such as carbon dioxide and nitrogen oxides. However, another conclusion must be that taking the concept of emissions trading into practice is most challenging but also very difficult.

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<sup>2</sup> COM (581) 2001 Proposal for a directive of the European Parliament and the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ EU C75)

<sup>3</sup> Directive 2003/87/EC of the European Parliament and 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 (OJ EU L275)

<sup>4</sup> Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants, (OJ EU L 309/22)

<sup>5</sup> Potential for reduction of NO<sub>x</sub> emissions at the industry, refineries and the Power Industry, and the Costs involved, by Stork Comprimo Protech, 26 October 1998. (available in Dutch only). Sensitivity analysis of the cost of NO<sub>x</sub> reductions in the Industry, Refineries and the Power Industry, also by Stork Comprimo Protech, 28 May 1999. (available in Dutch only).

<sup>6</sup> Commission Decision of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ EU L 59)

<sup>7</sup> Commission regulation (EC) No 2216/2004 of 21 December 2004 for a standardised and secured system of registries pursuant to Directive 2003/87/EC

of the European Parliament and of the Council and Decision No 280/2004/EC of the European Parliament and of the Council (OJ EU L 381)

<sup>8</sup> Greenhouse Gas Trading in Europe: "The New Grand Policy Experiment", by Joseph A. Kruger and William A. Phizer, published October 2004, Environment, Volume 46, Number 8.

<sup>9</sup> Amendment of the Environmental Management Act and other Acts in connection with the implementation of Directive no. 2003/87/EC of the European Parliament and of the Council of the European Union of 13 October 2003 establishing a scheme for greenhouse gas emission allowances trading within the Community and amending Council Directive 96/61/EC (OJ L 275) and the establishment of an emission authority (EC Directive on Greenhouse Gas Emission Allowance Trading Implementation Act.

<sup>10</sup> Decree containing provisions with regard to the implementation of implementation of Directive no. 2003/87/EC of the European Parliament and of the Council of the European Union of 13 October 2003 establishing a scheme for greenhouse gas emission allowances trading within the Community and amending Council Directive 96/61/EC (OJ L 275) ( Decree on Emission Allowance Trading).

<sup>11</sup> Regulation containing provisions with regard to the determination and recording of greenhouse gas emissions for the purpose of the the implementation of Directive no. 2003/87/EC of the European Parliament and of the Council of the European Union of 13 October 2003 establishing a scheme for greenhouse gas emission allowances trading within the Community and amending Council Directive 96/61/EC (OJ L 275) and the implementation of the Commission Decision of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ EU L 59)

<sup>12</sup> Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants(OJ EU L 386)

<sup>13</sup> Assessment of the accuracy and quality in monitoring for CO<sub>2</sub> emissions trade at different sectors across Europe "Testing the tier approach in practice", KEMA Netherlands, February 2005.