CLIMATE CHANGE POLICIES IN THE NETHERLANDS: ANALYSIS AND SELECTION

Merrilee Bonney

The Netherlands

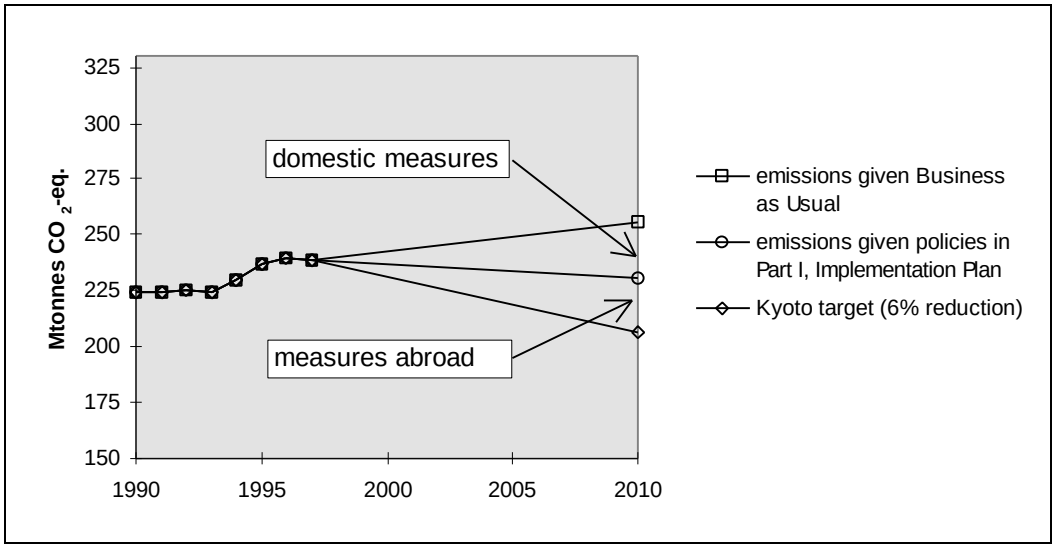
Abstract: *In the Netherlands best practices are assessed in terms of the complete set of climate change policy measures and instruments. In general, individual measures are selected on the basis of their cost-effectiveness. However, cost-effectiveness is never the sole criterion. Measures are also seen as part of a package which must spread the effort evenly across sectors and balance reductions between CO_2 and the other greenhouse gases. Policy instruments are based on the premise of self-regulation within frameworks, allowing target groups maximum flexibility to determine what actions they will take, and are custom tailored to the needs and possibilities of the various groups. Monitoring, evaluation and contingency planning make the effect of the package as a whole robust in the face of uncertainty about future developments.*

Introduction

Based on agreements reached in Kyoto and the European Union, the Netherlands intends to reduce emissions of greenhouse gases by 6% of their 1990 level in the period 2008-2012. This amounts to a reduction of about 50 million tonnes (CO_2-equivalents), or about 20% of what emissions would be in 2010 under a Business as Usual scenario. The Netherlands is striving to meet this commmitment cost-effectively by using the possibilities offered by the flexible mechanisms Joint Implementation, the Clean Development Mechanism and emissions trading, while at the same time making efforts to reduce emissions within its own borders. Part I of the Climate Policy Implementation Plan[1], issued in June of last year and approved by Parliament in November, outlines new measures that are being taken to reduce emissions in the Netherlands by 25 million tonnes of CO_2-equivalents in 2010. The remaining reductions needed to meet the 6% reduction target will be realized outside of the Netherlands. Policies dealing with the flexible mechanisms have been set out in Part II of the Implementation Plan, which was sent to Parliament in mid-March of this year.

[1] available in English at www.minvrom.nl

Figure 1: Emissions in 2010



The 50/50 split between emission reductions at home and abroad was motivated by a desire to maximize cost-effectiveness while at the same time maintaining the Netherlands' credibility in international fora and reaping the non-climate related benefits of measures taken at home. This paper will go into both the analysis that preceded the selection of measures in Part I of the plan, and the criteria that were used in putting together the package that was ultimately accepted.

The Analysis: The Options Document

Preparations for the Implementation Plan began even before the Netherlands' share in the European Union's target was known. Given that elections were scheduled during the period when the plan had to be drafted, it was decided to split the process into a technical phase and a political one. Preparations were launched with the commissioning of a technical "Options Document"[2]. Prepared by the Netherlands Energy Research Foundation (ECN) and the National Instititute of Public Health and the Environment (RIVM), the Options Document bundled a wealth of technical information about 61 domestic emission reduction options from six fields: traffic measures, energy savings, renewable energy, power plants, non-CO_2 greenhouse gases and CO_2 storage in forests as well as underground. Each option was described following a set format that included emission reduction potential and costs, policy instruments for realizing the measure, how quickly reductions could be realized, societal support and sensitivity for future developments. The availability of a menu of options with complete, correct and transparent technical information made it possible to focus the debate during the political phase on the merits of the different measures, rather than waste time with confusion about the facts.

[2] ECN/RIVM, Options for Reduction of Greenhouse Gas Emissions, December 1998

Emission reduction potential

The emission reduction potential of the different options was calculated relative to emissions in 2010 given a Business as Usual scenario. This scenario was chosen because it provides a robust background against which to asses the effects of policy measures and instruments. The Business as Usual scenario assumed a healthy rate of economic growth, relatively high world oil prices, a high rate of technological development and penetration of new technologies, and the continuation of policies in place in the Netherlands before the Kyoto Protocol was signed. Those policies include an energy tax on small scale energy consumption, introduced in 1996 and raised every year since, long term negotiated agreements with branches of industry aimed at improving energy efficiency, energy efficiency standards for new buildings, subsidies for CO_2 reduction projects such as residual heat utilization and policies designed to increase the market share of renewables (with a goal of achieving a 10% market share by 2020).

Methods for calculating costs

Two methods were used for calculating the costs associated with the various emission reduction options, reflecting differences in the way that costs are perceived by different stakeholders.

The Financial Costs Method (also called the Final Users Approach) expresses costs as they are perceived by market parties such as businesses and households. Five sectors are distinguished: households, small businesses, agriculture, energy companies and industry. Costs calculated according to this method provide an indication of the extent to which financial factors might move market parties to take certain measures at their own initiative, or conversely, the extent to which policy instruments such as regulations or financial incentives might be needed in order to get the measures implemented. The Financial Costs Method works with the differing energy prices paid by final users of energy in the various sectors, including distribution margins, taxes and excise duties, and VAT where relevant, as shown in Table 1.

Table 1: Final users' energy prices

sector	electricity, *f*/kWh	natural gas, *f*/m^3
households	0.31	0.80
small businesses	0.23	0.60
agriculture	0.26	0.33
industry	0.13	0.23
national shadow price	0.09	0.22

1 euro = *f*2.20

Annual capital costs are calculated with the (estimated) interest rates that are paid on average by the different sectors of the economy (8% for households and agriculture, 15% for small businesses, energy companies and industry). Cost-effectiveness may be presented either including or excluding the effect of tax schemes and other government policies (tax credits, depreciation allowances, subsidies etc.) which affect capital outlays differently in different sectors.

The National Costs Method, on the other hand, presents the costs and benefits of options for the Netherlands taken as a whole. This method is used to provide a consistent basis for comparing the cost-effectiveness of measures regardless of who must ultimately take or pay

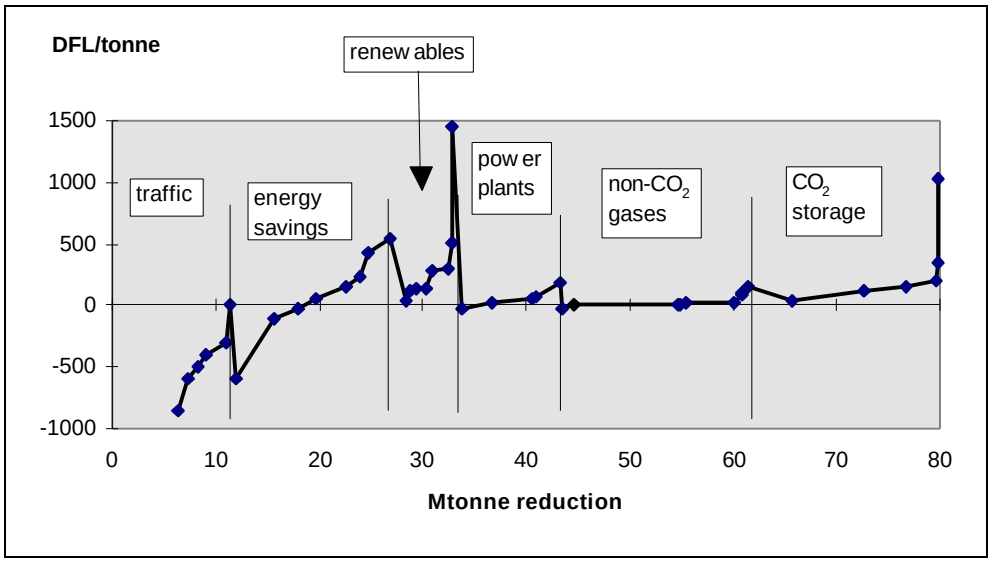
for them. What are costs for one sector are often benefits for another. While this information is certainly relevant for the sectors involved, the costs and benefits cancel each other out at the national level. In this method national shadow prices for energy are used. Finally, a social discount rate is used in calculating capital costs, based on the real interest rate. The Options Document assumed a social discount rate of 5%, in line with the real interest rate in the Business as Usual scenario.

Finally, the Options Document made a distinction between the cost of a measure (defined as an action to be taken by a target group, leading to a reduction in emissions of greenhouse gases) and the cost of a policy instrument used by the government to induce the target group to take the measure. Some policy instruments, such as taxes and excise duties, change not only the costs of the measure in question, but also the costs to be borne by other target groups and the government. The extra burden due to possible raises in taxes were not included in the presentation of costs.

The Options Document provided a ranking of emission reduction options according to costeffectiveness based on both cost calculation methods. Cost-effectiveness calculated with the Financial Costs Method ranged from minus *f* 850 to plus *f* 1500 per tonne CO_2-equivalent. The lowest cost options were in the traffic sector and involved raises in excise duties, while placement of solar cells on buildings was the most costly, followed by afforestation projects. There were 19 million tonnes of reduction potential with negative costs, indicating that the value of the energy saved would actually outweigh the costs of taking the measures for the target goups involved.

Figure 2 shows the marginal costs in the six different emission reduction categories, calculated according to the Financial Costs Method.

Figure 2: Cost and potential of emission reduction options



The selection: Three packages of measures and instruments

The Implementation Plan had to satisfy a number of (seemingly conflicting) requirements. The Options Document made it clear that climate policy has a price tag. 'No regrets' measures have been nearly exhausted in the Netherlands. Nonetheless, meeting the Kyoto target must not cost society more than is absolutely necessary. At the same time, the costs of climate policy need to be spread fairly over all groups within society. Furthermore, the desire to keep costs down may not be allowed to result in quick fixes which might delay or jeopardize structural changes over the longer term. Finally, the Implementation Plan had to provide a degree of certainty and robustness never before required of Dutch climate policies. After ratification of the Protocol, the Kyoto target will become the first emission target ever to be internationally binding. These considerations led to adoption of three 'packages' of measures and instruments.

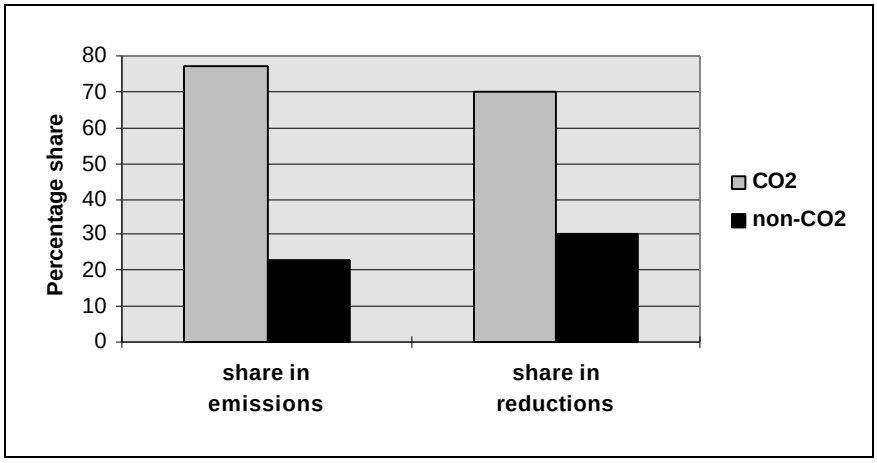
The basic package: criteria for selecting measures

The basic package contains measures costing less than *f* 150 per tonne avoided CO_2-equivalent, which can be taken now, which offer a reasonable degree of certainty, and which together should be good for a reduction of 25 million tonnes in 2010. Cost-effectiveness was the primary criterion driving the choice of measures to be included in the basic package. It was, however, never the sole argument for selecting or rejecting measures or instruments. Target group support is one of the determinants of a measure's chance of success. In putting together the policy package a balanced distribution in the impacts of measures across target groups was sought. It is good for the support base when all target groups contribute to the total national effort. Examples of cost-effective measures that were not chosen because they could not count on public support include lowering the speed limit on national highways and prolonging the operating life of the Netherlands' one remaining nuclear power plant.

The basic package builds further on the foundations laid down in the past, stepping up both energy conservation and renewables policies to go beyond 'no regrets' measures in these fields. While the emphasis in CO_2 policy remains on energy conservation and renewable energy, the Netherlands will also be tackling emissions from coal-fired power plants. The government hopes that plant owners will voluntarily reduce these emissions so that beginning in 2008 their CO_2 emissions per kiloWatthour are no higher on average than they would be if natural gas were used in the plants. It is up to the owners of the plants to determine how they will achieve this. In return, the government is prepared to convert the current tax on fuel inputs for electricity production into a tax on the electricity generated. This could save power plants as much as *f* 300 million per year and improve their ability to compete in a liberalized energy market in Europe.

The basic package also gives the non-CO_2 greenhouse gases a more important role, accounting for about 30% of the expected reduction in emissions in 2010. The 70/30 split between CO_2 reductions and reductions of other greenhouse gases closely follows the current split in emissions. It reflects attempts to find an appropriate balance between (somewhat costlier) measures that contribute to deflecting the trend of growing CO_2 emissions and measures that reduce large amounts of non-CO_2 emissions relatively inexpensively.

Figure 3: CO_2 share in emissions and reductions in 2010



Another factor in the selection of options to be included in the basic package was the extent to which measures can be operationalized by means of policy instruments. This is a major determinant of a measure's reliability. Priority was given to measures with a relatively reliable reduction effect in order to minimize the risk of not meeting international obligations under the Climate Treaty.

The basic measures will cost between *f* 1.0 and *f* 1.5 billion annually in 2010 (depending on the approach used for calculating costs). More than half of the financial costs for final users of energy are attributable to the use of renewable energy sources. The distribution of the effort across sectors is shown in Table 2.

Table 2: Distribution of emissions and reductions across sectors in 2010

sector	emissions, Business as Usual in Mtonnes CO_2-eq. and %		reductions due to new policies in Mtonnes CO_2-eq. and %	
industry (incl. refineries)	89	33%	10.0	11.2%
energy companies	61	24%	8.0	13.1%
agriculture	28	11%	2.0	7.0%
traffic	40	15%	3.0	7.4%
households	23	9%	2.3	10.0%
trade, services, government	12	5%	1.0	8.3%
other	6	3%	--	--

The basic package: Development of policy instruments

The principle of 'self-regulation within frameworks' has long provided the point of departure in developing the policy instruments with which to induce target groups to take measures in the Netherlands. Emission reductions are brought about mainly by negotiated agreements with target groups, reflecting the 'consultation and consensus' culture prevalent in the country. Negotiated agreements are facilitated by market-oriented instruments such as taxes and fiscal incentives and supported by regulations pursuant to the Environmental Management Act. This line was also followed in developing policy instruments with which to implement the basic package. The instruments of climate policy vary by target group. They are custom tailored to meet the needs and optimize the possibilities of the target groups to which they are directed.

Without custom tailoring they would not be specific enough and would therefore be ineffective. The result is that there are currently more than 25 different climate change policy instruments in existence. Appendix 1 provides an overview of the relationship between the policy measures contained in the basic package and the primary and secondary policy instruments with which they are being realized.

A recurring theme in Dutch CO_2 policies, which also arose during the debate on the Implementation Plan, pertains to the energy-intensive industries which operate in international markets. Although these industries are in general already very energy efficient, they often have relatively cost-effective emission reduction possibilities. However, their ability to recoup costs in product prices is limited. It is a constant challenge finding ways to induce them to become even more efficient without exposing them to the economic risk that would be inherent in unilateral imposition of policies. This is, for example, the reason why the Netherlands' energy tax focuses on small scale energy consumption with degressive rates up to volume ceilings (of 10 million kWh electricity and 1 million m^3 natural gas per year), above which there is no tax. Industrial energy conservation is being realized in the context of various agreements that have been negotiated with industrial sectors. Companies using more than 0.5 PJ of energy per year signed the Benchmarking Covenant in 1999, committing themselves to becoming the most energy efficient in their sectors in the world by 2012. Companies not participating in the Benchmarking Covenant are expected to take all energy conservation measures with an internal rate of return of at least 15% (equivalent to a payback period of 5 years). This expectation forms the point of departure for negotiated agreements with companies not participating in the Benchmarking Covenant and for energy requirements in environmental permits.

The reserve package: Contingency planning

The reserve package contains measures which will be made ready for implementation during the coming years but not necessarily introduced. It serves as a kind of safety net under the basic package in case it fails to produce the desired results. The contingency measures in the reserve package (extra energy tax and excise raises beyond those already planned, CO_2 storage underground and N_2O reductions in the chemicals industry) will be prepared now in such a way that they are ready and waiting 'on the shelf'. If it becomes necessary to actually implement them, they can reduce emissions quite rapidly. The plan provides for a system for monitoring emissions and policies and for review and evaluation in 2002 and 2005. Go/no-go decisions about introducing reserve measures can be taken at those times. 2002 was chosen since it marks the end of the current government's term in office, while 2005 is named in the Kyoto Protocol as the year in which parties must be able to show demonstrable progress towards meeting their targets.

The innovation package: Looking ahead

Both the basic and reserve packages are directed at meeting the Kyoto target. Their emphasis is therefore on measures which can reduce emissions within a time frame of about ten years. Over the longer term more far-reaching reductions will have to be realized. A third package, the innovation package, therefore focuses on the steps to be taken now to prepare technologies and policy instruments for the longer-term future.

CO_2 storage underground is a new element in Dutch climate policy that plays a role in all three packages. The government has expressed willingness to consider contributing financially to the development and demonstration of CO_2 storage in the context of private initiatives to construct a CO_2 buffer for fertilizing crops in greenhouses during the summer. Experience acquired during this project can be used in preparing underground CO_2 storage at industrial sites as a measure to be held in reserve. CO_2 storage can also play a role in the development of climate neutral energy carriers as part of the innovation package. Climate neutral energy carriers are ones which emit little or no CO_2 during their entire life cycle. Examples include electricity based on wind or sun, liquid fuels derived from biomass that is produced in a sustainable way, and energy produced from fossil fuels which have been decarbonized, for instance through CO_2 capture and storage underground. The technology track of the innovation package is aimed at developing and applying new, climate neutral gaseous and liquid fuels.

The innovation package also contains activities directed towards developing new climate change policy instruments. As noted above, there are currently more than 25 custom tailored instruments being deployed. A consequence of this situation is that the government has to operate a great many dials and knobs in order to limit the risk of emission reductions not being realized. This maze of instruments could become impenetrable for both the government and the target groups as policies are stepped up following the first commitment period of the Kyoto Protocol. A system of tradeable emission permits under an emission ceiling (cap and trade) could offer advantages in such a situation. The instrumental track of the innovation package is aimed at working out the particulars of such a system.

Monitoring and reporting

Both policy progress and actual emissions will be monitored during the approach to 2008-2012 in order to assess whether policies are being implemented according to plan and whether it is necessary to activate reserve measures. The quality and reliability of emission data are being enhanced by means of a program of standards for monitoring emissions and reductions of greenhouse gases. It will include methods to be used for determining emissions, standards for minimum accuracy and completeness, verification, formats to be followed, units to be used, level of detail and reporting frequency.

Conclusions

In the Dutch situation best practices are those policies and measures which, taken together, are cost-effective, spread the effort in a balanced way across target groups, encourage structural changes which reduce CO_2, include monitoring, evaluation and contingency planning and allow target groups flexibility in what actions they take while assuring that results are achieved.

Appendix 1: Overview of climate change policy measures and instruments in the basic package in t

measures	Primary policy instruments	secon
promotion of more fuel efficient cars	EU agreement with auto manufacturers; CO_2 differentiation in Dutch new car tax	labelling
promotion of other transport modes	tax measures	road pricing
promotion of fuel efficient driving behavior	enforcement existing speed limits; tax breaks for in-car instruments sich as econometers	education; in
energy savings in industry and greenhouse horticulture	negotiated agreements industry: international benchmark for companies with energy use >0.5 PJ per year; all measures with payback period of 5 years or less for others greenhouses: 65% improvement in energy efficiency 1980-2010	tax credits; e environmenta CO_2 buffer in
energy savings in existing housing	Energy Performance Advice	Energy Prem inspections o standards fro consumption
energy savings in existing non-residential buildings	Energy Performance Advice	tax credits; p inspections o 2004; tax on
promotion of energy efficient appliances	Energy Premium	energy labelli consumption
5% renewables by 2010	exemption from tax on small scale energy consumption	tax refunds t lower govern with target g
measures at coal-fired plants	negotiated agreement coupled with tax reform	standards for
CO_2 sequestration in forests	trade in CO_2 certificates	tax incentive
N_2O from car catalysts	EU regulations	
process adjustment aluminum plants	environmental covenant	environmenta
afterburner HCFC plant	environmental permit	
reduction of HFC's/PFC's used as alternatives for halons and (H)CFC's	environmental covenants	regulations, s