

SF₆-policy development in the Netherlands

Ronald C.H. Flipphi,
The Netherlands Ministry of Housing, Spatial Planning and Environment, IPC 650
6, Oranjestraatsingel, P.O.-Box 30945, 2500 GX Den Haag, The Netherlands
Phone +31 70 339 4003, Fax +31 70 339 1313, Email ronald.flipphi@minvrom.nl

The Dutch challenge

The Netherlands at 16 million inhabitants has an economy of about 3% of the US. As all other EC member states, the Netherlands have ratified the Kyoto Protocol. This implies for the Netherlands an absolute 6% cut in total greenhouse gas emissions in 2008-2012 compared to 1990 for CO₂, CH₄ and N₂O and compared to 1995 for the fluorinated gases. Taking into account the expected growth in greenhouse gas emissions given business as usual the development should be curbed about 25% or 50 Mton CO₂ equivalent. This cut can be realised through emissions reduction from sources within the Netherlands or by using flexible instruments (CO₂-equivalent emission rights trading between countries, technical and/or financial assistance to reach lower emissions at specific sources and subsequent 'sharing' of the 'earned' reduction).

Assigning efforts

The Netherlands government has decided to realize no more than half of the efforts through flexible instruments, as it considers it necessary to show that developed countries are willing to change on behalf of a better environment. Also it was decided to realize two thirds of the efforts at home through CO₂ emissions reduction and one third through non-CO₂ greenhouse gases (ncgg's), although the latter have been calculated as considerably less costly. This was done considering the need for further emissions reduction beyond 2012. CO₂ makes out two thirds of the current emissions, so ncgg's offer limited possibilities for emissions reduction. On top of this, it is expected to be difficult to cut substantially on CO₂ emissions. It results from burning fossil fuels, which has been the engine of economic development since the start of the industrial revolution. Far reaching reduction of CO₂ emissions without shrivelling our economies will only be possible if we fundamentally change the way we make energy available. This transition of the energy economy is a painstaking process consuming many decades, that will only start when enough pressure is applied.

Policy triplets

Greenhouse gas policy in the Netherlands consists of three packages.

- The basic package, that would suffice to reach the 2008-2012 goal if the measures turn out to be fully effective and economic and technologic developments are as expected.
- The spare package, that contains additional measures to be implemented if the basic package falls short. Experiences in particular with energy saving show that policies systematically fall short. This would be a painful and costly error under the Kyoto Protocol.
- The instrumental renewal package, that will reduce reduction costs and reduce uncertainty about future emission levels. One element is stimulating research, technologic development and innovation. The second element is splitting up taking measures and paying for them, through national emission rights trading between businesses.

Table 1 : Netherlands nccg projects, targets, measures, instruments

source/application	greenhouse gas	reduction target (Mton CO ₂ eq)	measure	instrument
aluminium production	PFC	1,1	change to central worked prebaked feed	permit
HCFC production	HFC 23	3,0	auxillary afterburner installed	stricter emission limit in permit
traffic	N ₂ O	-	beneficiary side-effects of three-way catalytic converter	-
refrigeration	HFC	0,8	different leakage reducing measures, natural refrigerants	change decree?
foams/aerosols solvents	PFC, HFC F-gasses	0,35 -	apply alternatives replacing (H)CFC's by F-gases was minimal	agreement? -
fire fighting	F-gases	-	future reductions were anticipating by avoiding F-gases	-
semiconductors	SF ₆ , PFC	0,2-0,3	using up to date wafer machines, etc.	accepting WSC offer formally
switchgear	SF ₆	0,1	using up to date gas handling units, reuse (regenerated) gas, sealed-for-life gear, etc.	agreement
soundproof double glazing	SF ₆	0,1	using air, foils, two different gauges	use prohibition in decree
landfills	CH ₄	1,0	early gas collection	in contracts
oil and gas production	CH ₄	0,15	reuse gas, process optimization (gas drying, condensate treatment in off-shore	incorporate in standing agreement
agriculture	CH ₄ , N ₂ O	not quantified	beneficiary side-effects of manure and ammonia measures	-
small scale CHP	CH ₄	not quantified	low CH ₄ -slip engines	chance subsidy conditions
fertilizer production	N ₂ O	5,5	new cataliser	in permit or participation in emission rights trading system

The Netherlands Reduction Programme for Non-CO₂ Greenhouse Gases

It was decided to develop nccg-policy for all significant sources under one special programme. This was done to ensure the necessary 8 Mton CO₂-equivalents emission reduction could be agreed upon, but also to improve the exchange of experiences and leaning between the fifteen projects. These projects range from SF₆ in sound reducing double glazing to methane from landfills, and from laughing gas from fertilizer production to HFC in metered dose inhalers (table 1 provides an overview). In addition a project was started to identify previously unknown sources, to exclude the possibility that significant sources would be missed out on.

Co-operative approach

For each nccg-source or application a working group was set up consisting of industry representatives, monitoring specialists and the national government. These groups had three tasks:

- Emission levels should be established and a monitoring protocol should be developed.
- Options for emissions reduction should be listed and their costs and conditions for their realisation should be identified.
- Put forward a proposal to reduce emissions, balancing the efforts for each source/application, and after approval by the minister, implementing the proposal.

The effects of this approach to policy making are:

- Information has been shared between industry, government and monitoring specialists,
- Presumptions were validated,
- Reduction measures have been developed, i.e. through a specific nccg-subsidy programme of M€3¼, that was, and still is, well used,
- A common framework has been developed, that assist policy to both be adequate to reach the Kyoto-target and have sufficient support throughout the different sectors of industry and other nccg-sources.

Key elements

Key elements of the common framework of the Netherlands Programme for nccg's are:

- Reaching the target is paramount,
- Fair distribution of efforts over the sectors,
- Maximized freedom to reach the sector targets,
- Avoid marked distortion,
- Allocate responsibilities clearly,
- Stimulate when necessary and effective,
- Ascertain a positive overall effect on greenhouse gas emissions (through calculation of TEWI), and other environmental issues (avoid passing the bucket).

Results of the Netherlands Programme for nccg's

On the basis of this framework, the Netherlands Programme for nccg's has proceeded to propose tailor made solutions for each of these sectors, developed in close corporation with these sectors. The Minister has accepted these solutions for all sectors early 2002. If all goes according to plan, the Netherlands will reduce nccg-emissions with at least 7 Mton CO₂-equivalents plus around 5½ Mtons (from fertilizers production) as a buffer.

General Dutch approach towards F-gases

The Netherlands have always emphasised the difference between ozone layer depletion (Montreal Protocol) and greenhouse effect (Kyoto Protocol). Ozone depleting substances (ODS) need to be phased out. Fluorinated greenhouse gases are stronger than the other three greenhouse gases. The basket of greenhouse gases needs to be reduced substantially, but there is no need to phase out any of them in specific. Climate change policy allows for choosing the most efficient measures.

Other European countries

The opinion of Austria, the Scandinavian countries and lately also Germany is quite different. These countries tend to preferring a phase out of the fluorinated greenhouse gases as they deem this a condition for the rapid development of feasible alternatives. Austria and Denmark have notified national legislation to this effect, although Austria has recently redrawn the bill under pressure of Industry. Germany has issued a discussion paper in which the need for SF₆-mixtures in the mid-voltage range is questioned. This is seriously contested by Industry.

European Climate Change Platform

The European Commission conveys the impression it agrees with these countries by proposing to integrate fluorinated greenhouse gas policy in the existing Regulation (EC) 2037 (2000) on ozone depleting substances. It also commissioned a consultancy to explore the possibilities of for specific applications of fluorinated greenhouse gases. The draft report recommends marketing and use restrictions for SF₆ in tyres, double glazing and racers as “potentially most adequate” and for magnesium production as “potentially suitable”. It recommends for production and use in switchgear to “not yet” consider these. It also recommends setting up monitoring of production and use of fluorinated greenhouse gases, which, for switchgear, is already being set up by CAPIEL/EURELECTRIC. For switchgear it was recommended to explore the possibilities of agreements between government and industries.

Outcomes of the Netherlands policy project on SF₆ in switchgear

SF₆ in switchgear is one of fifteen projects of the Netherlands Programme for the reduction of non-CO₂ greenhouse gases. Given the gradual rise in the banked quantity of SF₆ and the historic development rate of emissions reducing measures, industry agreed that it should be able to maintain emissions on 1995 levels when relevant external conditions would remain within the expected range. Recently, the only producer in the Netherlands, VATECH, formerly Elin Holec, concentrated its production of high voltage (>36kV) switchgear in the UK. The industry in the Netherlands now only consists of the users (several major industrial plants, electricity generation, distribution, power system infrastructure administrators), a mid-range voltage switchgear producer Eaton Holec, and KEMA high voltage laboratories. A monitoring protocol consistent with the Common Reporting Format has been agreed by all parties. Voluntary agreements are currently negotiated.

Switchgear users

For the users of switchgear the content of the agreement will probably consist of a relative or conditional emission ceiling supplemented with responsible care provisions. These provisions are necessary as the agreement should be acceptable as the Netherlands implementation of the forthcoming EU legislation. It should also have effective, proportional and deterring sanctions. In particular for the administrator its statutory task to secure the electricity supply is an absolute condition for all measures to be taken. The liberalisation of the electricity production and distribution forces to realize buffer capacity in the grid. This prohibits tailor making the grid and the generation locations to the spatial distribution of electricity consumption. The possibilities for the users to reduce SF₆-emissions include:

- Installing mid-range switchgear without SF₆.
- Installing sealed-for-life mid-range voltage gear, and returning these to the producers at the end-of-life.
- As the Netherlands is strongly urbanized the possibilities to use voluminous air-insulated switchgear are limited. A German life-cycle analysis has shown that larger air-insulated switchgear at a greater distance from the user has an adverse effect on overall greenhouse gas emissions.
- Using up-to-date gas handling units during maintenance of high voltage switchgear.
- Running diagnostics without opening high voltage switchgear, and reducing the maintenance frequency.
- Using only maintenance personnel trained to minimize leakage.
- Improving end of life recovery and recycling.
- Closing down a particular installation that has a relatively high leakage rate.

High voltage laboratories

For KEMA it would be virtually impossible to operate within an ambitious emission ceiling. The number, kind and quality of the switchgear that is tested in their facilities differs strongly from year to year. As they operate in global competition the voluntary agreement will probably focus on meticulous good housekeeping.

Think globally, act locally

As shown in this paper the Netherlands tries to develop a balanced policy for nccg's in close co-operation with industry. With its active approach the Netherlands policy strives for the use of switchgear that reduces overall greenhouse gas emissions. This will include SF₆-insulated switchgear for the foreseeable future. The conduct of other countries is also important for the future acceptance of SF₆. The following actions and measures could help to further reduce SF₆ emissions.

- Avoiding unnecessary transport of SF₆.
- Promoting recycling and reusing SF₆ on site.
- Promoting the use of appropriate handling equipment.
- Promote setting up SF₆ handling and storage ventures.

References

- ABB c.s., Life Cycle Assessment, Electricity Supply using Sulphur-Hexafluoride Technology, 1999

- J.W. Wouda, SF₆ management and handling by switchgear manufacturers and users: an overview of the situation in the European Union, paper presented at the EPA Conference SF₆ and the environment, Emission reduction strategies. San Diego, 2-3 November 2000
- Julia Williams-Jacobse, Reaching reduction targets through co-operation: the Dutch reduction programme non-CO₂ greenhouse gases (ROB), in: Van Ham, Baede, Guigerit and Williams-Jacobse (eds), non-CO₂ greenhouse gases, Millpress, Rotterdam, 2002